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*Reading for Understanding:
Towards an R&D Program
in Reading Comprehension*

*RAND Reading Study Group
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PREFACE

In the fall 1999, the Department of Education's Office of Educational Research and Improvement (OERI) asked RAND to examine ways in which OERI might improve the quality and relevance of the education research funded by the agency. As part of this work, RAND convened two study groups in the areas of reading and mathematics education to develop long-term programs of research in the two respective fields. This report is the initial draft of the RAND Reading Study Group (RRSG), which sets forth a framework for a program of research in reading comprehension. We hope it will be the starting point for a major discussion among researchers, practitioners, and policy makers of needed R&D related to reading comprehension.

This report is the product of initial deliberations of the RRSG – 14 experts representing a range of disciplinary and methodological perspectives on the field of reading. The positions of the study group report must be tested in discussion, debate, and ultimately in research and practice. The report, as amended by the comments from the field and further deliberations of the study group is intended to be used by OERI staff in developing solicitations for a major program of research, in reading.

To promote the building of active research and practice communities, the study group reports will be distributed widely. This draft report will be made available on a public website (www.rand.org/multi/achievementforall) along with external reviews from eight experts in reading research and practice. The website will allow visitors to comment directly on the report and to participate in discussions around key issues in the reading field. In addition, the report will be presented and discussed at all appropriate professional meetings. The RRSG will use the input collected to create a revised version of this report in late-summer 2001. We anticipate that the report will be a "living document" that is regularly revised over the course of the program.

The RAND project will produce a comparable report in the area of mathematics education research, prepared by a RAND Mathematics Study Group. In addition, RAND will prepare a report documenting lessons learned in using study groups to develop programs of research and outlining the supports needed to successfully continue these programs and develop new programs of research.

Funding for this research was provided under a contract with OERI and was carried out under the auspices of RAND Education and the Science and Technology Policy Institute (S&TPI), a federally funded research and development center sponsored by the National Science

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INTRODUCTION

2 This draft report from the Rand Reading Study Group (RRSG)¹ formulates an initial
3 proposal concerning the research issues that the community of reading researchers most
4 urgently needs to address over the next 10-15 years. We encourage readers of this draft version
5 to respond with feedback about our summary of the issues, the coherence of our model of
6 reading comprehension, and our sketch of the research enterprise. Ultimately, this document may
7 become the basis for more formal agenda setting. At this point it is an invitation to join a
8 conversation about an area of great practical importance: reading development and reading
9 instruction.

10 The proposed research agenda builds upon a number of recent efforts to summarize the
11 knowledge base in the field of reading. These efforts include the National Research Council
12 report on Preventing Reading Difficulties in Young Children, the Report of the National Reading
13 Panel, and the recently published edition of the Handbook of Reading Research. Given the
14 availability of these and other older sources,² the RRSG did not see the need to replicate recent
15 efforts to synthesize the knowledge base concerning initial reading and its implications for
16 instruction and assessment of the general population. Thus we argue that the primary challenge
17 of improving reading performance in the early grades is now to incorporate research based
18 knowledge systematically into teacher preparation and practice. We still have much to learn,
19 however, about how children become good comprehenders, how to design and deliver
20 instruction, and how to prevent comprehension failure.³

¹Members of the Rand Reading Study Group are Donna Alvermann, Janice Dole, Jack Fletcher, Georgia Earnest Garcia, Irene Gaskins, Art Graesser, John Guthrie, Michael Kamil, William Nagy, Annemarie Sullivan Palincsar, Catherine Snow, Dorothy Strickland, Frank Vellutino and Joanna Williams.

²Given the availability of these three recent research syntheses, and many additional review papers and volumes (e.g., the first two volumes of the Handbook of Reading Research), this report does not provide individual citations for claims made. We append a bibliography of integrative sources on which we have relied. Since this was an attempt to generate consensus about a research program, we do not make claims based on single studies.

³The fabled Illinois Center for the Study of Reading, of course, focused its research efforts during many years on the task of understanding comprehension, and much of our current knowledge base is due to those efforts. However, the CSR concentrated its attention on cognitive processes, represented in our model under the dimension of 'components.' Our goal is to broaden the research agenda by incorporating additional dimensions, and to emphasize relevance to teacher preparation and instruction.

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21 The RRSB is composed of 14 experts representing a range of disciplinary and
22 methodological perspectives on the field of reading. This group met twice for a total of 7 days,
23 with writing and discussion between the meetings, to establish a convergent perspective on what
24 is known about reading, what are the most urgent tasks in developing an integrated research
25 base, and what needs to be done to improve reading outcomes. The RRSB decided early in its
26 deliberations to concentrate on the issue of promoting skilful reading, with a focus on the
27 development of comprehension and the capacity to acquire knowledge through reading. This is a
28 field in the accumulated knowledge base is limited to particular areas and to particular
29 populations of students. We need to develop a more coherent model of reading comprehension
30 by determining where the most urgent gaps in our knowledge are, by developing networks of
31 communication among researchers currently working in several different research traditions, and
32 by working with teachers and teacher educators to translate research into practice.

33 What is the core problem within the field of research on skilful reading? At one level, the
34 core problem is the construction of a unifying theory of reading comprehension that
35 acknowledges its complexity and is informed by the multiple perspectives (including educational,
36 cognitive, linguistic, sociolinguistic, discourse analytic, and cultural) that have been brought to
37 bear in the design and conduct of literacy research. Considerable research has been directed at
38 issues of reading comprehension, but these research efforts have been neither systematic nor
39 interrelated. At another level, the core problem presents itself in a practical form when a 6th grade
40 teacher turns to research with the question ‘What should I do with my students who don’t
41 understand their history texts or can’t learn from reading science texts?’ Teachers with such
42 questions encounter only a partial knowledge base. That knowledge base typically does not
43 sufficiently acknowledge the exigencies of the classroom, does not attend simultaneously to the
44 demands of reading to learn during content area instruction while still learning to read, and may
45 not be relevant to the reading profiles of many students in a diverse class. Given the enormous
46 educational importance of promoting reading comprehension and learning among elementary and
47 secondary students, we need to organize what we know about these topics, define what we need
48 to know, and pursue the research that will be most important for improving teacher preparation,
49 classroom instruction, and student achievement.

50 The purpose of the RRSB, then, is to summarize the state of research and research-
51 based practice in the field of reading comprehension, in order to generate a well-motivated
52 agenda for future research that will inform practice in this area. This specific document is a first
53 attempt at describing such a research agenda, formulated so as to elicit commentary from the
54 broadest possible constituency of reading researchers. Because the RRSB did not undertake the
55 kind of extensive, expensive, exhaustive review that informed both Preventing Reading

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56 Difficulties in Young Children and the Report of the National Reading Panel, relying instead on
57 consensus and on the distributed knowledge base of its members, this document should be seen
58 as a stimulus to discussion rather than a summative statement.

59 1.1 Issues Motivating this Report

60 The proposed research agenda is motivated by a number of overarching issues of
61 concern to the research and practice communities.

62 1.1.1 The demand for literacy skills is high and increasing. The U.S. economy demands
63 a universally higher level of literacy achievement than at any prior point in history, and it is
64 reasonable to believe that literacy demands will increase in the future. A society with few blue-
65 collar but many service-related and information-based jobs increasingly is demanding high school
66 graduation as a minimum credential for employment. Moreover, advanced vocational or
67 academic training is a requirement now for a wide variety of positions, which previously might
68 have gone to high school dropouts. Thus, ensuring advanced literacy achievement for all
69 students is no longer a luxury but an economic necessity. Utilizing computers and gaining access
70 to the internet make high demands on literacy skills, and in some cases demands for novel
71 literacy skills that we do not yet understand how to teach or analyze.

72 1.1.2 The level of reading skills is remaining stagnant. Reading scores of high school
73 students, as reported by the National Assessment of Educational Progress, have not improved
74 over the last thirty years. While math scores have improved, reading remains stubbornly flat. In
75 fact, grade 12 students recently decreased significantly in reading achievement. With few
76 exceptions, indicators of achievement in States and Districts have shown no growth or slow
77 growth across the grades, in the past ten years.

78 Furthermore, in international comparisons of performance on reading assessments, U.S.
79 11th graders perform very close to the bottom, behind students from The Philippines, Indonesia,
80 Brazil, and other third world nations. This poor performance contrasts with rankings in grade 4,
81 when U.S. students perform close to the top in international comparisons. These findings confirm
82 the impressions of teachers that many students who read well enough in the primary grades
83 confront difficulties with reading thereafter.⁴

84 1.1.3 Reading comprehension instruction is often minimal or ineffective. Teachers often
85 assume that students will learn to comprehend merely by reading. Although some will, many

⁴ The fall in rankings from 4th to 11th grade may reflect the greater inclusiveness of U.S. secondary education. However, the current insistence on 'educating all students' implies that we cannot hide behind selection bias as an excuse for low performance of high school students.

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86 others will not. Teaching comprehension to children is challenging because reading is complex.
87 Students who are good comprehenders use strategies in reading to learn new concepts, get
88 deeply involved, critically evaluate what they read, and apply their new knowledge to solve
89 practical as well as intellectual problems. But many students fail at doing these things.
90 Furthermore, reading and enjoying high quality literature are valuable for learning, but students
91 must be cognitively engaged in what they read if comprehension is to be fostered. One problem
92 is that materials in the classroom are often too difficult or uninteresting for many students to read.
93 Moreover, comprehension instruction tends to be emphasized less in subject matter classrooms
94 where teachers are focused on content. Sometimes children miss early opportunities to learn
95 because comprehension instruction is delayed until the later elementary grades, even though it
96 should be taught starting from kindergarten. Sometimes reading comprehension instruction is
97 provided by one teacher, but in subsequent years teachers do not build on the foundation
98 established by a teacher in an earlier grade.

99 Reading instruction is seldom effectively integrated with content area instruction.
100 Children need to read well if they are to learn what is expected of them in school beyond grade
101 three. Teaching in the content areas relies on texts as a major source of instructional content.
102 These texts are not designed to support comprehension instruction, but may be too dense or
103 difficult for students to understand or learn from without some comprehension support. Content
104 area teachers presuppose adequate literacy skills among their students, and are typically not
105 themselves well prepared to teach students with below average literacy skills, despite Sterl
106 Artley's injunction 'every teacher a teacher of reading'. At the same time, there are specific
107 reading comprehension tasks that must be mastered in the context of specific subject matters.
108 Learning discipline-specific vocabulary words, text structures, methods, and perspectives
109 involves acquiring both content and reading skills, simultaneously. The relatively poor
110 performance of U.S. middle school and secondary school students in international math and
111 science comparisons likely reflects in part their poor performance as readers.

112 The achievement gap between minority and mainstream children persists. Attention to
113 reading comprehension is crucial in a society determined to minimize achievement gaps between
114 mainstream children and those from ethnic and racial minority groups, between urban and
115 suburban, as well as between middle and working class children. National Assessment of
116 Educational Progress scores, for example, show that 17-year-old African-American students
117 score at the level of 13-year-old European-American students—a gap that has decreased only
118 minimally in the last 20 years. This large and persistent gap in reading achievement in the later
119 elementary and secondary grades relates to differences in achievement in other content areas,
120 and to differences in high school dropout and college entrance rates.

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121 The explanations for these differences vary. Some of the gap can be explained by
122 cultural and social issues, reflected in the increasing difficulty of making school-based literacy
123 relevant to learners from some groups. Minority children, even middle class members of ethnic
124 minority groups, are likely to have less access to excellent instruction than do white children. In
125 responding to the 2000 NAEP results, Secretary Riley said 'We know today that disadvantaged
126 students are not well served by a watered-down curriculum and low expectations,' yet such is
127 often all that is available to them.

128 Second language speakers have particular challenges as the reading tasks they face in
129 English push them beyond the simple texts of the 2nd and 3rd grade level. Texts encountered in
130 later grades often incorporate sophisticated vocabulary, linguistic structures, and discourse
131 structures second language speakers do not know. Furthermore, the greater amount of cognitive
132 effort required when reading in a second language may discourage second language learners
133 from engaging in the reading practice they need to become more proficient.

134 1.1.4 High stakes tests are impacting reading comprehension instruction in unknown
135 ways. The standards-based movement in education is an effort to improve schooling for all
136 children by establishing clear achievement standards. Children are tested to provide information
137 to parents, teachers, and schools about degree of compliance with the standards. Increasingly,
138 failure to meet the standards is being associated with child-specific sanctions, such as retention
139 in grade or withholding high school diplomas. The achievement tests to which these high stakes
140 are attached often reflect reading comprehension ability, even when the specific goal of the test is
141 to assess knowledge in the content areas. There is very little data on the impact of high stakes
142 tests on student achievement overall, though some data suggest an increase in dropout rates,
143 and it is clear that much instructional time is devoted to test preparation. In particular we need to
144 know how poorer comprehenders are selectively affected either by the tests themselves or by the
145 various consequences associated with them.

146 1.1.5 The preparation of teachers does not adequately address children's needs for
147 reading comprehension instruction. We know that child outcomes relate to the quality of the
148 instruction received, which in turn reflects teacher preparation and ongoing teacher professional
149 development. Yet teacher preparation and professional development programs are inadequate in
150 the crucial domain of reading comprehension, in part because the solid, systematic research
151 base that should undergird teacher preparation does not exist.

152 1.1.6 Making good on the federal investment in education requires more knowledge
153 about reading comprehension. The recent implementation of the Reading Excellence Act (REA)
154 has as a major goal the introduction of instructional practices that have a basis in research.

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155 Efforts funded through REA are currently focused on beginning reading instruction. However, the
156 successful development of beginning reading skills does not ensure that the child will
157 automatically become a skilled reader. The fourth grade slump in reading achievement is a well-
158 documented phenomenon. Explicit instruction in reading comprehension is essential for many
159 children in ensuring the transition from beginning to skilful reading. Presently the research base
160 necessary to inform teachers and schools about best practices for teaching reading in the
161 postprimary grades is not adequately developed. The enormous investment (\$260 million) in
162 REA will be lost without development of our knowledge base concerning reading comprehension.

163 **1.2 What We Know**

164 While these various overarching issues may make the task of developing a research
165 agenda that would contribute to the improvement of practice seem formidable, we are
166 encouraged by the recognition that there is a good deal we already know in addressing the
167 practical challenges of improving reading comprehension outcomes.

168 First, we know some of the prerequisites to successful reading comprehension. We
169 know, for example, that reading comprehension capacity builds on successful initial reading
170 instruction, and that children who can read words accurately and rapidly have a good foundation
171 for progressing well in comprehension. We know that children with good oral language skills
172 (large oral vocabularies, good listening comprehension) and with well-developed stores of world
173 knowledge are likely to become good comprehenders. We know that social interaction in homes
174 and classrooms as well as the larger sociocultural context influence motivation and participation
175 in literate communities and help construct students' identities as readers, thus influencing their
176 access to text. We know that children who have had rich exposure to literacy experiences are
177 more likely to succeed. We know about several instructional practices that are related to good
178 reading outcomes, although such knowledge is much more extensive for initial than for later
179 reading. Finally, we know that instruction based on an appropriate and well-articulated alignment
180 between curriculum and assessment can improve performance in reading as well as other areas.

181 We also know several approaches to education and to reading instruction that do not
182 work. We know, for example, that many approaches to compensatory education for socially,
183 economically, and educationally disadvantaged groups do not promote success in reading
184 comprehension. We know as well that identification of children as learning disabled, without
185 specific instructional treatments tailored to their individual needs, fails to generate reading
186 comprehension gains. We know that current approaches to teaching second language learners,
187 whether in ESL, bilingual, or all-English settings, often do not address the particular challenges of
188 reading comprehension. We know that the enormous complexities of teaching and the brevity of

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189 teacher education programs have the unfortunate consequence that the vast majority of novice
190 teachers are ill prepared to engage in practice that reflects the existing knowledge base about
191 reading. We know this situation is particularly critical for special education, ESL, and bilingual
192 teachers who, while requiring an even deeper understanding of reading, language, curricula and
193 instructional practices than the mainstream teacher, in fact have even fewer opportunities in their
194 preparation programs to acquire this expertise. We know that professional development in the
195 domain of early reading instruction is improving, increasingly incorporating information from
196 research about the characteristics of good instruction, but that such is not the case for reading
197 comprehension instruction in the later elementary grades. We know that a frequent consequence
198 of failure on high-stakes assessment, namely retention in grade, does not improve long term
199 reading achievement without specialized instruction. Finally, while we have a fairly long list of
200 instructional strategies that have been shown to be effective in targeted interventions or
201 experimental settings, we need to know how to implement these teaching approaches on a large-
202 scale basis, into a coherent reading program that spans the elementary, middle and high school
203 grades.

204 1.3 Defining Reading Comprehension

205 The larger agenda that concerns the Rand Reading Study Group is the promotion of
206 skilful⁵ reading. We see achieving reading proficiency as a long-term developmental process;
207 skilful reading has different characteristics at different points along its developmental trajectory.
208 The endpoint, adult skilful reading, encompasses the capacity to read, with ease and interest, a
209 wide variety of different kinds of materials for varying purposes, and to read with comprehension
210 even when the material is neither easy nor intrinsically interesting. Adult skilful reading involves
211 reading for purposes of pleasure, learning, and analysis, and represents a prerequisite to many
212 forms of employment, to informed participation in the democratic process, and to gaining access
213 to cultural capital.

214 Our focus in this document is on one aspect of skilful reading, reading comprehension as
215 it is traditionally conceived of within educational settings. Teachers think of reading
216 comprehension as what students are taught to do in reading instruction during the early school
217 years, and the capacities they are expected to display throughout the middle and high school
218 years. Reading comprehension is usually a primary focus of instruction in the postprimary

⁵ We adopt the spelling 'skilful' not just because it is the default in the Microsoft Word spellchecker, but also to distance ourselves intentionally from the concept that competent reading is a cluster of individual skills that can be learned and practiced independently of each other.

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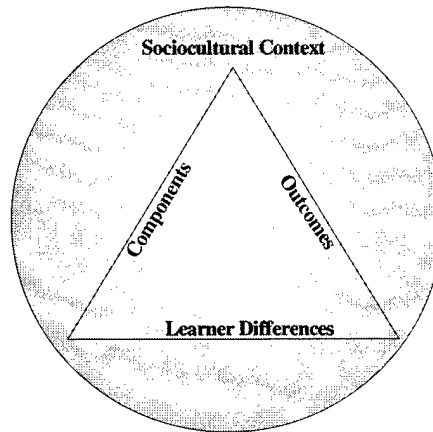
219 grades, after word recognition skills have been largely mastered, though comprehension of text
220 should also be an integral part of reading instruction with beginning readers as well.

221 Our first task in formulating this research agenda was to define what we meant by
222 reading comprehension. A useful definition would generate a map of what we know and what we
223 need to know about the process and development of skilled reading comprehension.

224 We define reading comprehension as the process of constructing meaning through interaction
225 and involvement with written language. The reading comprehension process includes three
226 dimensions: the cognitive components involved, the outcomes, and reader differences. These
227 three dimensions define a phenomenon that occurs within a larger sociocultural context (see
228 Figure 1), which shapes and is shaped by the reader, and which comes into contact with each of
229 the dimensions, influencing knowledge, processing, purposes, outcomes, and the nature of
230 reader differences. The sociocultural context affects students' acquisition of the reading
231 components, their demonstration of outcomes, and often is a source of individual and group
232 reading differences. It mediates students' experiences, just as students' experiences influence
233 the context.

234 Readers comprehend texts by extracting and creating meaning. Successful
235 comprehension entails a variety of prerequisite skills, abilities and knowledge. A reader must be
236 motivated and engaged with the text and must have a purpose or a goal for reading. Readers
237 use a variety of cognitive and metacognitive strategies to draw on their knowledge to arrive at a
238 meaning. Among the kinds of knowledge a reader uses are world knowledge, linguistic
239 knowledge, discourse knowledge, and vocabulary. In addition, readers have to process many
240 non-print sources of information (pictures, tables, charts, etc.) to comprehend the text fully.
241 Fluency is also an important element in comprehending text. That is, in order to orchestrate the
242 components of comprehension, a reader should be able to do oral reading with reasonable
243 speed, accuracy, and expression.

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Figure 1. Dimensions of Reading Comprehension

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Note: The three dimensions of reading comprehension form the sides of a triangle, to indicate perspectives which all must be considered in the analysis of reading comprehension. The triangle is displayed within a circle representing the sociocultural context within which any act of reading must be interpreted.

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The end of comprehension can be the acquisition of knowledge or the confirmation of knowledge. Comprehension can also lead to applications, as in following directions. Or comprehension can lead to involvement in the meaning of the text, as when a reader gets lost in a story.

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While we can describe an archetypal process of comprehension, we must also describe the sources of variation that are reflected in individual acts of comprehension. All readers have different knowledge and strategies for interacting with text. Consequently, comprehension is different between and among readers as a function of those differences. These differences account for the variations in comprehension between readers and for differences in the same readers at different times for different tasks. Some of these differences depend on the tasks, developmental stages, social, cultural and language backgrounds of the readers. The socio-cultural context in which reading occurs imposes values and restrictions on meaning for what is read, why it is read and how it is to be interpreted.

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264 1.4 Components

265 Reading comprehension is, in part, comprised of a set of cognitive components and
266 processes. These can be conceived of as the various things that have to happen, in some
267 combination, when an act of comprehension while reading occurs. These components interact in
268 combination during comprehension activities. Virtually every component we discuss has a
269 processing aspect (i.e., cognitive operations and procedures) and a content aspect (i.e., language
270 codes, knowledge structures). We started by sifting through the research literatures to select the
271 components that met the following criteria:

- 272 • There is good evidence they are essential for reading comprehension
- 273 • They are distinguishable from one another
- 274 • They are relevant to many different reading tasks
- 275 • They function both individually and in various combinations for successful
276 comprehension.

277 Nine components fulfilled these criteria. These represent, in our view, components that
278 get called upon when reading in order to generate comprehension of the text. For each of these,
279 we evaluated the research base with two questions in mind: a) is there sufficient knowledge
280 about the component itself and about its relation to reading comprehension? b) is the available
281 knowledge being utilized in practice (instruction, design and selection of materials, and teacher
282 preparation)? Using this information, we established for each of the nine components a sense of
283 the need for further research of either of two types: research to expand our knowledge base
284 about the component itself, and research to develop, implement, and evaluate instructional
285 applications grounded in the knowledge base. We discuss each of the nine components in turn,
286 including examples of questions that might form part of the research agenda associated with
287 each.⁶

288 1.4.1 Vocabulary. We use the term vocabulary here to refer specifically to knowledge of
289 word meanings. (Development of sight word vocabulary, as aspect of word recognition, is dealt
290 with in this report only insofar as it impacts comprehension via fluency.) The large body of
291 research on vocabulary has consistently shown the importance of vocabulary knowledge for

⁶ The questions presented in this portion of the document are meant to be examples of how questions could be focused on each of the components. They all represent questions we consider important, but they have not been prioritized. We discuss in a final section of this document our process for assigning priorities to various topics. Assigning priorities to specific questions should, we argue, await feedback from the field.

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292 comprehension. This relationship is remarkably robust across ages and populations. Recent
293 analyses of vocabulary instruction show that explicit vocabulary instruction produces gains in
294 comprehension. Despite these findings, current practice de-emphasizes vocabulary instruction,
295 in part because traditional, definition-based approaches to vocabulary instruction are not very
296 effective, either for increasing vocabulary or for improving reading comprehension.

297 Questions:

- 298 • What vocabulary should be taught? How much vocabulary should be taught? How
299 should teaching methods be adapted for different categories of vocabulary words?
- 300 • What is the optimal combination of focus on individual words and word-learning
301 strategies?
- 302 • What knowledge, skills, or abilities are needed to benefit from vocabulary instruction
303 (e. g. dictionary skills, metalinguistic abilities, language proficiency level)?
- 304 • What are effective methods for increasing the reading vocabulary of learners of
305 English as a second language?

306 1.4.2 World knowledge. World knowledge comes from experience and from texts
307 previously read. A large amount of research has demonstrated the importance of world
308 knowledge for reading comprehension. We know that most children from middle-class families
309 enter school with more world knowledge about school-related topics than do most children from
310 poor families. We also know that children from working class and/or ethnic minority families often
311 enter school with specific knowledge related to their own cultural and community backgrounds
312 which teachers may not make relevant to the texts being read. When the knowledge that readers
313 bring to the reading of a text is untapped, comprehension is imperiled.

314 Questions:

- 315 • How do readers coordinate world knowledge with texts and generate relevant
316 inferences?
- 317 • How does lack of appropriate world knowledge influence reading comprehension?
- 318 • What are the conditions under which world knowledge interferes with or facilitates
319 reading comprehension?
- 320 • What factors help or hinder students in making connections between text and their
321 knowledge of the world?

322 1.4.3 Motivation. The expert reader is motivated. Motivation is defined here as
323 encompassing intrinsic motivation, extrinsic motivation, self-efficacy, social goals, and experience

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324 reading. Reading motivation is highly correlated with reading proficiency, and research
325 addressing the directionality of these relationships is strongly needed.

326 Because reading is an effortful activity that involves choice (“Am I going to read or do
327 something else?”), motivation is fundamentally important to reading comprehension. Motivational
328 processes such as intrinsic motivation and self-efficacy are needed to energize and direct the
329 cognitive strategies central to reading comprehension. Recent research suggests that
330 elementary school aged children with stronger reading motivation spend substantially more time
331 reading than do students with lower motivation. Children who read more frequently demonstrate
332 better reading comprehension. Unfortunately, although most children initially are positively
333 motivated toward reading, many lose their motivation as they go through school. Instructional
334 programs that maintain and enhance motivation, thus, are needed.

335 Reading motivation is multifaceted; that is, motivation consists of a number of aspects.
336 First, children with a strong sense of competence or efficacy are likely to engage and achieve.
337 Second, research suggests that when children are intrinsically motivated to read, value reading
338 highly, and are oriented toward the goal of mastery goal orientations, they are more likely to
339 engage and achieve in reading. Third, extrinsic motivation such as recognition and competition
340 are associated with reading achievement and amount of reading. Motivation often is considered
341 a characteristic of the individual. However, instructional practices and other classroom context
342 factors strongly influence children’s motivation. There are needs for instruction supportive of
343 reading motivation as well as assessments that measure aspects of students’ motivation and self-
344 efficacy in reading.

345 Questions:

- 346 • How can reading motivation and self-efficacy in reading be conceptualized in terms of
347 existing motivation theories, and new, theoretically grounded descriptions of
348 motivation for different populations of readers, texts, contexts and ages?
- 349 • How does reading motivation relate to reading comprehension, both directly, and as it
350 may be mediated through behaviors such as amount of reading, and use of cognitive
351 reading strategies?
- 352 • What are the characteristics of texts and textbooks, such as personal or cultural
353 relevance, structure of text, and vividness of details that make them interesting?
- 354 • How is reading motivation influenced by context variables such as task success,
355 “hands-on” activities, (e.g., science observation, historical enactment), autonomy
356 support, personal or cultural relevance, and teacher/peer characteristics?

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357 1.4.4 Purposes and goals. Students who are expert readers are purposeful. They have
358 specific goals for reading such as gaining knowledge, enjoying literature, locating specific
359 information, and learning from text in order to solve problems. Students with clear goals are better
360 comprehenders than students with vague goals. Goals may also be motivational and social. For
361 example, students with the motivational goal of mastery use better reading strategies than
362 students with the performance goal of gaining recognition as a good reader.

363 Questions:

- 364 • How do students' purposes for reading about a topic relate to their knowledge level,
365 their interest, and their competence in using other reading strategies?
- 366 • What are the purposes for reading that increase reading comprehension most
367 strongly for specific populations of readers?
- 368 • What are the purposes for reading that increase reading comprehension most
369 strongly for various types of readers?

370 1.4.5 Cognitive/metacognitive strategies. Strategies are processes and procedures that
371 readers use in comprehending text. Some of these strategies reflect conscious awareness
372 whereas others are acquired without conscious effort or become automatic with practice. A
373 strategy is regarded as metacognitive if its use is triggered by the reader's assessment of his or
374 own cognitive state, for example, the reader slows down when reading text on an unfamiliar topic
375 or rereads a sentence that contradicts previously held beliefs. Cognitive and metacognitive
376 strategies have been extensively investigated in the fields of cognitive psychology, cognitive
377 science, and education during the last four decades, so there is an abundance of mature theories
378 that are grounded in empirical research. Some individual strategies have proven to be effective
379 in laboratory, group, and classroom environments (such as comprehension monitoring, question
380 generation, the construction of explanations, and the construction of story structures). Some
381 strategies have been frequently investigated in the laboratory, but rarely in the classroom (such
382 as building coherent mental models of what the text is about, generating particular classes of
383 inferences, and integrating the current text with other texts). There is little knowledge available
384 about the prerequisites to effective strategy instruction.

385

386 Questions:

- 387 • Under what conditions can students learn comprehension strategies most effectively?
- 388 • To what extent are the strategies effective at different ages and levels of ability?

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- 389 • To what extent is the effectiveness of these strategies dependent on domain
390 knowledge?
- 391 • At what age and under what conditions can bilingual students acquire and use cross-
392 linguistic knowledge and strategies to improve their reading comprehension?

393 1.4.6 Linguistic knowledge. Linguistic knowledge encompasses oral language
394 capacities, both production and comprehension, and the capacity to reflect on one's knowledge of
395 language. Successful reading depends on extensive knowledge at all linguistic levels –
396 phonology, morphology, and syntax, as well as higher-level discourse structures.

397 Children's oral language knowledge has been shown to contribute to their reading
398 comprehension in a variety of ways. For example, children's listening comprehension becomes
399 more highly correlated with reading comprehension as children grow older. Measures of
400 syntactic knowledge also predict both language and reading comprehension, as do measures of
401 morphological knowledge.

402 Children's awareness of language units and structures also contributes to reading
403 comprehension. The role of phonemic awareness in early reading has been well documented.
404 However, there is growing evidence that after second grade other types of metalinguistic
405 awareness, in particular syntactic awareness, make a greater contribution the comprehension.

406 Written language has a number of linguistic features, which may not be familiar to many
407 students. One is more complex syntax. The vocabulary of written language also has a more
408 complex morphology than oral language – it is richer in prefixed, suffixed, and compound words.
409 The different genres and types of text encountered in later grades make specific linguistic
410 demands on the reader.

411 Although the relationship between linguistic knowledge and reading comprehension is
412 well documented, there are a number of research questions, which still need to be addressed,
413 such as the following:

414 Questions:

- 415 • Syntactic knowledge is presumably both a contributor to, and consequence of,
416 growth in literacy. What is the nature of the relationship between syntactic
417 knowledge and growth in literacy, and how can it inform our understanding of reading
418 comprehension?
- 419 • What type of metalinguistic knowledge and abilities contribute to reading
420 comprehension?

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- 421 • What linguistic features differentiate electronic text, hypertext, and multimedia from
422 conventional texts?

423 1.4.7 Discourse knowledge. Expert comprehenders use discourse knowledge to
424 connect text elements in a coherent fashion and to relate the content to the messages of the
425 author. Discourse knowledge includes the structure of different text genres (e.g., narrative,
426 expository, persuasion), the distinction between given (old) and new information in the discourse
427 context, the points (main messages) that the author intends to convey, the topic structure, the
428 pragmatic goals/plans of the communicative exchange, and the function of speech acts (e.g.,
429 assertion, question, directive, evaluation). Discourse knowledge builds on linguistic knowledge
430 but is distinct from it. A moderate amount of research has been conducted in the fields of
431 discourse processing and education, but more basic research is needed. Children's
432 understanding of narrative text has been extensively investigated, whereas the comparative lack
433 of studies of expository text and the prevalence of expository tests in the later school years give
434 this topic considerable urgency for all ages and dimensions of reader differences. There is a
435 complex interaction between world knowledge and discourse knowledge that needs further
436 exploration.

437 Questions:

- 438 • How is discourse knowledge of print acquired?
- 439 • How do readers understand the structure of expository texts with different structures
440 (e.g., problem-solution, claim plus evidence, cause-effect)?
- 441 • How do readers understand the pragmatic function of sentences and utterances
442 conveyed in the text?

443 1.4.8 Fluency. Fluency is defined as effortless reading with ease and expression.
444 Fluency includes accuracy and automaticity of word identification, ease in decoding, and
445 expressiveness in reading connected text. It presumes accurate word identification and decoding
446 ability. We have extensive knowledge of these latter two components, including basic research on
447 the relation of fluency to comprehension and findings concerning classroom practices to promote
448 fluency. There is ample evidence that the most effective instructional method for all types of
449 children integrates explicit instruction about the alphabetic principle with attention to
450 comprehension. These programs, however, have often not adequately addressed the fluency
451 component of skilful reading. Without adequate fluency even readers who have good word
452 identification and decoding abilities cannot comprehend text easily.

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453 Reading theory suggests that fluent reading consumes few cognitive resources, releasing
454 attentional and other capacities for use in comprehension. More research on the relationship of
455 fluency to vocabulary and comprehension is needed. We know that practice enhances fluency.
456 Two instructional methods are effective: (1) repeated reading, in which a single text is re-read
457 several times; and (2) guided oral reading with feedback. Both methods lead to improvement in
458 word knowledge, reading speed, oral accuracy, and, to a lesser extent, comprehension. Both
459 good and poor readers benefit, but not all practice is effective.

460 Questions:

- 461 • What are the characteristics of effective interventions to improve fluency for poor
462 comprehenders, including the amount of reading or re-reading that is involved and
463 the nature of the feedback?
- 464 • How is the relationship among practice, fluency, and reading comprehension affected
465 by the type of text read?
- 466 • What is the relationship between fluency and comprehension for readers of English
467 as a second language?

468 1.4.9 Integrating nonprint information with text. Reading comprehension often requires
469 the integration of print and non-print information, such as graphs or pictures. In electronic text,
470 there are often multimedia components (e.g. sound or video information) that need to be
471 integrated with text for efficient reading comprehension. Use of electronic text is widespread and
472 rapidly becoming a commonplace in schools and classrooms. However, there is very little
473 knowledge about the processes involved in multimedia integration. Because the amount of
474 multimedia information is increasing so rapidly, there is an urgency to determining the ways in
475 which this information can be processed effectively. Instructional research has a lower priority
476 until more basic knowledge is accumulated.

477 Questions

- 478 • What skills or abilities are necessary to integrate multimedia information and
479 conventional text?
- 480 • What is the overlap between the skills and abilities necessary to comprehend
481 conventional text and the skills and abilities needed to comprehend and integrate
482 multimedia information?
- 483 • Under what conditions does multimedia information enhance or interfere with
484 comprehension of conventional print?

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485 1.4.10 Summary. We have presented here nine components that we argue define the
486 cognitive representations and processes involved in reading comprehension. Since individual or
487 group differences on any of these components would be hypothesized to relate to differences in
488 reading outcomes, understanding these components and their interrelationships better is an
489 important target of research. Nonetheless, we do not propose that this list of components by
490 itself defines reading comprehension, nor that research on them would constitute a complete
491 agenda for understanding comprehension.

492 **1.5 Outcomes**

493 The second dimension that defines reading comprehension is the potential outcomes of
494 the act of comprehension. The categories of outcomes we propose encompass many that are
495 richly represented in the models of reading comprehension that motivate current instructional and
496 assessment practices, whereas others are rarely included in assessment and only inconsistently
497 in instruction.

498 We have defined three major classes of outcomes, with examples under each of
499 specific operations that readers might engage in. The relevance of these specific tasks to an
500 assessment agenda is discussed later in this document.

501 1.5.1 Knowledge. Successfully comprehending a text involves understanding the
502 content of what is read, integrating new with already stored information, and critically evaluating
503 the information presented. In the process of comprehending, new specific pieces of knowledge
504 are acquired and linked to previously acquired knowledge. Understanding involves drawing
505 appropriate inferences as well as interpreting the information that is explicitly conveyed. Good
506 comprehenders evaluate what they learn while reading, and develop new knowledge structures
507 as a consequence of reading. People often think of this as getting the point while also reading
508 between the lines. Specific operations that reflect gaining knowledge include:

- 509 • Getting the gist
- 510 • Recalling what was read
- 511 • Gaining content knowledge
- 512 • Drawing appropriate inferences
- 513 • Learning new vocabulary items
- 514 • Evaluating the relation of new to previous knowledge
- 515 • Changing beliefs based on new knowledge

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516 1.5.2 Application. Content becomes useful when it can be applied to practical problems
517 and tasks, such as programming a VCR or baking a soufflé, or to intellectual tasks such as
518 figuring out a writer’s political stance or analyzing an argument. Good comprehenders apply what
519 they have understood from reading both in day to day functioning and in learning about new
520 topics. An aspect of using knowledge effectively is judging its importance and relevance to one's
521 tasks. Specific operations include:

- 522 • Using newly acquired knowledge in further comprehension
- 523 • Performing a task
- 524 • Solving a problem
- 525 • Building connections
- 526 • Evaluating utility of knowledge

527 1.5.3 Engagement. Good comprehension is characterized by deep concentration and
528 becoming absorbed in reading. In other words, good comprehenders are often involved with the
529 ideas, the emotional experiences, and the style of text. They read purposefully, for both affective
530 and intellectual goals. They have confidence in their ability to understand what they read. They
531 also evaluate the quality of the texts they read and determine the relevance of those texts to their
532 own lives. Operations that reflect engagement include:

- 533 • Reacting aesthetically
- 534 • Monitoring topic interest
- 535 • Showing motivation and efficacy
- 536 • Evaluating critically

537 **1.6 Reader Differences**

538 While the two dimensions of components and outcomes might be sufficient to define
539 reading comprehension from the perspective of a single reader, they clearly fall short in defining
540 reading comprehension as a field of study. A third dimension is needed to represent the sources
541 of variation in the way reading comprehension occurs. Indeed, we think of reading
542 comprehension as a triangle with each edge representing one of the dimensions, and each
543 defining a set of factors that should be incorporated into any research agenda.

544 Thus, we incorporate into our definition of reading comprehension as a field of study the
545 dimension of reader differences, i.e., sources of variation in the functioning of the various
546 processes in service of the various outcomes. We include reader difference in our definition in

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547 part because some of these sources of difference (e.g., the developmental differences associated
548 with age and instructional history, or the intra-individual differences associated with text and task)
549 alter the ways in which the components work in comprehension, and affect reading outcomes.
550 Reader differences are an important source of variance in outcomes that can help us understand
551 what factors influence comprehension.

552 We include others, such as cultural, language, and social differences, both because they
553 address the overarching issues which motivate this agenda and because discovering such
554 differences might well cast light on our basic understanding of reading comprehension. Most
555 important, we include the dimension of differences to emphasize the dynamic nature of reading
556 comprehension, its susceptibility to influence from a wide array of intra- and inter-individual as
557 well as group factors. We discuss reader differences starting with the individual and moving out
558 to the sociological. As we did for the components, we provide sample questions that might be
559 formulated about each of the sources of difference.

560 1.6.1 Intra-individual differences. By intra-individual differences, we mean differences in
561 the reading performance of a single reader that emerge as a function of interest, situation,
562 motivation, or other factors. Every student has a particular profile of reading competencies and
563 interests. For example, some students read stories frequently and are expert in story
564 comprehension, whereas they rarely read electronic text. In contrast, other students may be
565 competent on computer and Internet reading, whereas they are not proficient in interpreting
566 written stories. These intra-individual differences are not well represented in current measures of
567 reading comprehension and are seldom used productively in instruction.

568 Questions:

- 569 • What are the patterns of intra-individual differences in competence that appear
570 among students at different ages?
- 571 • How can teachers take advantage of special student reading expertise and
572 motivation to increase the effectiveness of classroom instruction?
- 573 • How would we design assessments that better reflect students' reading
574 competencies, by identifying the extent and patterns of intra-individual differences?

575 1.6.2 Inter-individual differences. Individual children and adults vary in their reading
576 comprehension abilities. Some of this variability, no doubt, reflects the assessment procedures
577 used to measure reading comprehension. In addition, though, learner characteristics may
578 partially account for these differences. Thus, differential development of a variety of capacities
579 prerequisite to reading comprehension, such as nonlinguistic abilities and processes (e.g.

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580 attention, visualization, inferencing, reasoning), can generate varying outcomes. Similarly,
581 differences in the nine components of reading comprehension identified above may lead to
582 patterns of relative strengths and weaknesses that are directly related to variations in reading
583 comprehension abilities. The degree to which these components develop in an individual child or
584 adult may well account, in part, for individual differences in the development of reading
585 comprehension abilities. Thus, it would seem that such variables may be usefully targeted in
586 research evaluating inter-individual differences in reading comprehension.

587 Questions:

- 588 • What is the evidence that specific components such as those exemplified above
589 account for inter-individual differences in reading comprehension?
- 590 • Are specific skills, abilities, and knowledge such as those exemplified above
591 differentially weighted as determinants of inter-individual differences in reading
592 comprehension?
- 593 • Are there developmental differences in the contribution made by reading-related
594 skills, abilities and knowledge in accounting for inter-individual differences in reading
595 comprehension?
- 596 • To what extent do affective and motivational variables mediate the contribution made
597 by nonaffective/nonmotivational variables in accounting for inter-individual differences
598 in reading comprehension?

599 1.6.3 Social class differences. Social class refers to the status individuals are accorded
600 in a society. This status is a function of race, gender, ethnicity, language, and economic
601 conditions. Research has demonstrated consistent effects of social class on reading
602 achievement. For example, low SES schools generally produce lower reading achievement than
603 high SES schools. Similar findings exist for many of the other components of social class. What
604 is needed is a more complete exploration of the full range of socioeconomic effects and their
605 relationships to reading comprehension.

606 Questions:

- 607 • How do the various social class characteristics of readers affect their reading
608 comprehension?
- 609 • Are there specific comprehension processes that vary with readers' social class
610 characteristics?

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- 611 • How do social class characteristics of readers interact with other individual
612 differences?

613 1.6.4 Cultural differences. All cultures, as historically evolved beliefs, values, and ways
614 of organizing the tasks of life, teach people about what is worth working for, how to succeed, and
615 who will fall short. Cultures offer a wealth of positions that readers can inhabit. Each position
616 requires certain things. For example, to inhabit the position of “good reader,” one must possess
617 certain abilities that are verifiable and recognizable to others who occupy that same position. But
618 how children end up inhabiting some positions and not others in their classroom environments is
619 more a matter of being put into those positions because of differential instruction, teacher
620 attitudes, and expectations than of being incidentally placed into them. Researchers working
621 within a sociocultural framework recognize the possibility that youth who are routinely described
622 as resistant readers may actually be readers who use alternative literacy practices, such as
623 transcribing hip-hop performances or composing love letters, to express themselves and to make
624 meaning of texts that are essential to their very survival. A productive research focus would
625 highlight situational contexts promoting success at various sorts of literacy tasks.

626 Questions:

- 627 • In what way do readers' cultural expectations influence their comprehension
628 processes?
- 629 • How do different sociocultural groups differ in their definitions of successful reading
630 comprehension, and in the tasks they would value as operationalizing successful
631 reading comprehension?
- 632 • What are the effects of cultural differences on reading comprehension?

633 1.6.5 Language differences. Readers differ in how they use language to communicate,
634 in the forms of language that they speak, and in the number of languages that they know.
635 Differences in communication practices and in language or language variety spoken have major
636 implications for children's reading comprehension development, especially when teachers do not
637 acknowledge or understand the different ways in which children communicate and the various
638 languages that they know. A child's capacity to use a first language as a resource in learning oral
639 and literate English may well depend on aspects of instruction and interaction with teachers.
640 Monolingual readers also differ in their oral language development, knowledge of linguistic
641 structures, exposure to rhetorical forms, and vocabulary development. These aspects of their
642 language development influence their ability to comprehend increasing levels of text difficulty.

643 Questions:

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- 644 • How do differences in oral language proficiency (vocabulary, syntax, knowledge of
645 rhetorical structures) affect the reading comprehension of children at different ages?
- 646 • What is the role of English oral language proficiency versus first language literacy in
647 reading comprehension for second language/bilingual students?
- 648 • How does language variation affect students' reading comprehension?

649 1.6.6 Developmental differences. The general goal of developmental research is to
650 investigate particular psychological constructs (e.g., reading comprehension) in terms of its basic
651 components, the age of first appearance of each component, the course of development toward
652 automaticity of each component, the integration of components with each other, the degree of
653 independence among the components, and the change of conditions with age that enable the
654 components to function together. Although developmental differences are related to child age,
655 they are also crucially influenced by amount and quality of instruction. There are a number of
656 classic questions to be addressed in developmental research on reading.

657 Questions:

- 658 • When does each reading comprehension component first appear chronologically?
- 659 • As age increases, does a given component become automated, thus permitting other
660 components to appear?
- 661 • When (and how) does each component become integrated with other components?
- 662 • To what extent are changes across time in the major construct (or its components)
663 qualitative or quantitative?

664 1.6.7 Summary. Figure 1 summarizes the model of reading comprehension we believe
665 helps organize the issues and the agenda for future research. Comprehension is viewed as
666 having several components that together produce beneficial outcomes, with sources of reader
667 differences that are partly explained by sociocultural context. This model suggests that research
668 on comprehension specify the component processes being called upon, the comprehension
669 outcomes being elicited, and how the various sources of reader differences are being accounted
670 for.

671 Obviously, no single research undertaking considers all nine components, all three
672 outcomes, and all six sources of difference simultaneously. Nonetheless keeping the full
673 complexity of this model of reading comprehension in mind could help researchers locate their
674 own research focus on the larger landscape defining the phenomenon. Recognition by individual
675 researchers of the potential working of all the various components, the variety of outcomes, and

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676 the full array of sources of difference among readers could improve the systematicity of reading
677 comprehension research by providing a basis for understanding the relations among targeted
678 research efforts.

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2.0 THE RESEARCH AGENDA: IMPLICATIONS OF THIS MODEL OF READING COMPREHENSION

In this section of our report, we formulate the most important issues to be addressed within the field of reading comprehension, based on the model of reading comprehension presented above. The summary of our state of knowledge about each of the dimensions in the model, presented above, included questions about those specific topics, which of course should find their place in a larger research agenda. In addition, though, many questions about the important topics of assessment, instruction, sources of poor reading comprehension, teacher preparation, and institutional structures and policies cut across the three dimensions in our model of reading comprehension. Thus, we turn in this section to a presentation of the questions the RRSg considered most important under each of those topic headings. Example questions are suggested for each issue. A much longer list of questions related to these issues generated by the RRSg is included in the appendix.

In the final section of the document, we discuss strategies in setting priorities. Under this topic, we include prerequisites to establishing a research program that would carry out the agenda, issues of infrastructure and methods, as well as the thinking behind our own identification and classification of priorities.

2.1 Assessment

One could point to a plethora of studies and policy discussions about comprehension assessment over the last 10 years. These have addressed topics such as the use of performance assessments, portfolios, and other assessment formats (multiple choice, essays, fill-in-the-blank questions). Unfortunately, the research community has not provided educators with assessment procedures that can optimally inform practitioners or policy makers. Furthermore, their own research activities would benefit from a more comprehensive and more theoretically grounded assessment system.

As noted above, our identification of the three broad categories of the outcomes of reading comprehension leads to a new way of thinking about the nature of comprehension assessment. Currently, comprehension assessments are heavily focused on only a few tasks: reading for immediate recall, reading for gist, and reading to infer or disambiguate word meaning. Assessment procedures to evaluate learners' capacities to modify old or build new knowledge structures, to use information acquired while reading in the interest of problem solving, to evaluate texts on particular criteria, or to become absorbed in reading and develop affective or

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33 aesthetic responses to text have occasionally been developed in the pursuit of particular research
34 programs, but have not influenced standard assessment practices. We know that assessments,
35 in particular high stakes assessments, influence instruction. Thus the absence of these tasks in
36 widely used reading assessments diminishes emphasis on them in instructional practices as well.

37 We argue that a system of reading assessment should reflect the full array of important
38 reading comprehension consequences, and that a research program to establish expectable
39 levels of performance for children of different ages/grades on this full array of outcomes is
40 necessary. Such a program is prerequisite to developing criteria for performance at different
41 age/grade levels, and to pursuing questions about reader differences associated with instructional
42 histories, social class, language, and/or culture in reading comprehension outcomes.

43 While the reading comprehension outcomes defined above constitute the basis for
44 designing a comprehension assessment that would reflect success, our model suggests that
45 assessments designed to reflect the components of reading comprehension are also necessary.
46 For instance, when the outcomes-assessment identifies children who are performing below par,
47 component-oriented process assessments could be helpful in indicating why their reading
48 comprehension is poor. Furthermore, component-oriented assessments are crucial in dissecting
49 the impact of particular instructional or intervention practices.

50 In short, a comprehensive assessment program reflecting the tripartite model of reading
51 comprehension presented here would have to satisfy many requirements that have not been
52 addressed by any assessment instruments, while also satisfying the normal psychometric criteria.
53 We present a complete list of requirements for such a system in Appendix A. Central
54 requirements included in that list are the capacity to identify poor comprehenders, to identify
55 sources of poor comprehension and subgroups of poor comprehenders, sensitivity to
56 development and to instruction, and utility for instructional decision-making.

57 A sample of issues that would certainly arise in the process of developing a
58 comprehensive assessment system for reading comprehension would include:

- 59 • The impact of various response formats on performance
- 60 • Variation in performance across text types
- 61 • The impact of nonprint information
- 62 • The impact of various sorts of formats and accommodations on the test performance
63 of learners of English as a second language
- 64 • Variation in performance across a variety of discourse types and genres, including
65 hypertext

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- 66 • The impact on performance of specifying different purposes for reading
- 67 • The capacity to differentiate domain-specific and reading-general components
- 68 • The need to reflect performance on literacy tasks typical of electronic reading, such
- 69 as retrieval

70 The capacity to explore some of the components that go outside the traditional rubric of
71 comprehension, such as scanning, intertextuality, domain specific strategies, consulting
72 illustrations, and so on.

73 **2.2 The Development of Automated Reading Assessment Systems.**

74 We see the development of an assessment system for reading comprehension as having
75 a very high priority. We recognize that developing a comprehensive assessment system is a
76 long-term project. A crucial piece of such a system is criteria for judging performance across the
77 developmental span. Nonetheless, a substantial start could be made in the short run, either by
78 targeting assessment of outcomes and components as a major task of the research agenda, or
79 by encouraging the development of prototype assessments for outcomes and components within
80 other research efforts (such as research focused on instructional efficacy). Such an effort would
81 be central to pursuing larger research agendas, e.g., longitudinal work to create a picture of the
82 development of reading comprehension, a large-scale effort to determine how American children
83 are functioning as readers, or a systematic pursuit of differences in reading comprehension
84 performance related to culture, social class, language status.

85 The approach to assessment proposed here differs from current approaches to reading
86 assessment in that it is based on an appropriately rich and elaborated theory of reading
87 comprehension. Assessment procedures generated by this approach are thus also more likely to
88 be influenced by theoretically grounded reading research. It also places high value on the utility
89 of assessment for instruction. Given the high time demands that comprehensive assessment
90 systems can place on students, developing assessments that are embedded in and supportive of
91 instruction would allow the accumulation of better knowledge about student achievement in the
92 context of improved instruction.

93 **2.3 Instruction**

94 The definition of reading comprehension presented here generates a very long list of
95 potential research questions, examples of which we have presented above. It acknowledges only
96 glancingly, though, the topic of instruction. Of course, many of the components identified are
97 developed through instruction, but direct links to questions about how to teach reading
98 comprehension, what materials to use in teaching it, what specific skills or strategies to teach,

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99 and what teachers need to know in order to teach it well are not typically linked to specific
100 component processes, outcomes, or learner characteristics. In addition, the type of instruction
101 needed to promote the reading comprehension of students from diverse cultural and linguistic
102 backgrounds needs to be specifically addressed. Thus, here we add another layer to the
103 research agenda, questions about instruction broadly conceived.

104 There is an important distinction to be made between curriculum and instructional
105 practice. Curriculum addresses the question, 'What is worth knowing?' What topics should be
106 addressed in comprehension instruction? The model proposed here, for example, might suggest
107 a curriculum focused, in part, on vocabulary, world knowledge, linguistic and discourse
108 knowledge, or an emphasis on different outcomes of reading such as reading for the gist or to
109 gain content knowledge. But there are many other comprehension curricula currently in
110 practitioners' hands, including the old basal reading programs that focus on discrete skills, the
111 strategies found in the report of the National Reading Panel, or curricula related to various
112 systems of benchmarks and standards for reading.

113 Instructional practices, on the other hand, refer to what teachers say and do to teach
114 these topics. For example, a teacher may wish to teach vocabulary as part of her comprehension
115 curriculum. The curriculum is vocabulary and the instructional practice is *what the teacher says*
116 *and does* to teach vocabulary. In addition, a teacher may wish to teach fluency by modeling with
117 a picture book how good readers read with expression. The curriculum is fluency and the
118 instructional practice is the teacher reading a picture book aloud in an expressive manner.

119 **2.4 Comprehension Instruction**

120 There is a body of knowledge about instructional practice that promotes reading
121 comprehension and student engagement. For example, research shows that instruction in
122 summarizing text, explaining text, and asking questions increases students' comprehension of
123 text. Researchers have also developed specific instructional programs that have been shown to
124 be effective in promoting reading comprehension. However, there are many activities and
125 practices currently being used that have not been empirically substantiated.

126 Two critical questions arise: Which curriculum best promotes comprehension? What
127 instructional practices (what teachers say and do, not what activities are used) promote
128 comprehension? Both questions need research..

129 In this section and those that follow, we first identify overarching questions that have high
130 priority. Underneath each of these, we list examples of more specific research questions.

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131 Overarching Question: What does good comprehension instruction look like at different
132 ages and reading levels in terms of activities and practices?

- 133 • What is the effect of mandated frameworks on effective reading comprehension
134 instruction?
- 135 • What are the effects of different types of materials and formats on comprehension
136 instruction?
- 137 • What are the elements of vocabulary instruction that make a difference in students'
138 comprehension?
- 139 • What is the effect of writing on reading comprehension?

140 2.5 Content Area Instruction

141 The amount and difficulty of expository or nonfiction text that students are expected to
142 read and comprehend increases dramatically at the end of the primary grades. Reading
143 assignments are given in social studies, science, and mathematics texts, often with the
144 expectation that students will know how to comprehend the dense text of content-area materials
145 without specific instruction in how to do so. Not all students who successfully read narrative text
146 cope successfully with this transition. However, we know that such students can be helped by
147 teacher explanations and modeling about how to think their way through content-area texts.

148 Overarching Question: How can students' comprehension of content-area materials be
149 improved at elementary, middle, and high-school levels, and how does good comprehension
150 instruction at these levels differ for the various content-area domains?

- 151 • What does comprehension instruction look like when students are taught to use the
152 text in domain-specific ways (e.g. to use science texts to support scientific inquiry, or
153 to take a historiographer's approach to historical materials)?
- 154 • What features of classroom instruction, including writing, peer discussion, multimedia
155 and interest-based text, make content area reading and materials more relevant to
156 students?

157 2.6 Instructional Responses to Diversity

158 Many of the curriculum questions previously raised also may be applicable to the reading
159 comprehension instruction of students from diverse linguistic and cultural backgrounds. However,
160 there also are specific instructional questions that need to be addressed. The reading
161 performance data for students from diverse linguistic and cultural backgrounds illustrate the need
162 to focus on these students' reading comprehension. Our assessment of activities, materials, and

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163 instructional practices for these students needs to be based on what we know about cultural and
164 linguistic diversity and the students' current and previous educational experiences.

165 Overarching Question: What specific instructional activities, materials, and practices are
166 related to effective comprehension and engagement of students from various cultural and
167 linguistic backgrounds?

- 168 • How can school-initiated experiences, related to the enhancement of students' world
169 knowledge, lead to improvements in reading comprehension?
- 170 • What is the effect of using students' cultural, home and community knowledge on
171 their reading comprehension?
- 172 • What type of comprehension instruction is needed in the first and second language
173 for bilingual students?
- 174 • What instructional activities and practices promote comprehension for speakers of
175 nonstandard dialects?
- 176 • How can changes in curriculum and practice address gaps in reading comprehension
177 among diverse groups?

178 2.7 Sources of Poor Reading Comprehension

179 With adequate instruction, most children will experience success and problems with
180 reading comprehension will be prevented. However, given the evidence for intra- individual and
181 inter-individual variation in learner characteristics and the broad range of environments in which
182 children develop, it is not surprising that some children do not acquire adequate reading
183 comprehension skills. These characteristics can include learner characteristics, text
184 characteristics, social variables, and instructional variables. It is important to recognize that the
185 sources of poor reading comprehension cut across ethnic, sociocultural, and organizational levels
186 of analysis. Regardless of the source, it is important to conduct research with children and adults
187 who experience difficulty with reading comprehension in order to identify the barriers to skilled
188 reading and to begin to develop remedial interventions that improve reading comprehension.
189 Some of the important research questions in these areas are exemplified below:

190 2.7.1 Learner Characteristics. How do learner characteristics impact students' level of
191 reading comprehension?

- 192 • oral language characteristics (e.g., phonology, morphology, syntax, vocabulary)

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- 193 • awareness of language structures (syntactic awareness, pragmatic awareness,
194 concept of word as a unit of form, sensitivity to word meanings, awareness of
195 discourse patterns)
- 196 • nonlinguistic abilities and processes (e.g., attention, visualization, inferencing,
197 reasoning)
- 198 • affective and motivational factors
- 199 • social, cultural, and home background

200 What types of compensatory strategies do poor comprehenders use that impact reading
201 comprehension positively or negatively?

202 2.7.2 Social, Interpersonal, and Interactional Variables. What is the effect of the social
203 climate and patterns of interaction in and out of classrooms on the reading comprehension of
204 struggling readers? (How does the social organization of the classroom, e.g., group size and
205 established interaction patterns, influence struggling readers' willingness to engage in learning
206 from subject matter texts?)

207 2.7.3 Instructional Variables. What are the school level variables, policies and
208 instructional practices and programs (regular, compensatory, and supplementary) that have an
209 impact on the reading of poor comprehenders?

210 What are the effects of classification practices and special educational programming on
211 the development of functional literacy and reading comprehension skills?

212 Are the instructional practices that appear to be effective for native English speakers also
213 effective for children from more diverse linguistic and cultural backgrounds?

214 To what extent are teachers able to individualize instruction effectively to meet the needs
215 of individual students, especially poor comprehenders?

216 2.7.4 Text Characteristics. How is the reading comprehension ability of poor
217 comprehenders affected by the nature of the texts they are asked to read? In particular, what are
218 the effects of genre, including electronic/hypertext/multimedia, diversity of texts, difficulty levels,
219 predictability, decodability, and vocabulary?

220 How is the reading comprehension ability of students affected by the nature of the texts
221 they listen to? In particular, what are the effects of genre, difficulty level, vocabulary diversity,
222 and discourse structure?

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223 2.8 Teacher Education, Professional Growth, and Institutional Structures and Policies

224 Teachers who have more professional education (preservice and inservice) are more
225 likely to use teaching practices that are associated with higher reading achievement. Teachers
226 need a strong understanding of theory and research about reading comprehension on which to
227 base instructional decisions, and they need familiarity with ways to embed reading
228 comprehension instruction into a broad array of activities. They need to know how to select
229 specific instructional practices in a fashion that is sensitive to student needs and appropriate to
230 the affordances of the materials available.

231 Effecting change in instruction also presupposes knowing a good deal about the
232 organization of schools, about educational policy, and about the impact of assessment on
233 curriculum and instruction. We need more understanding of the links between teacher education
234 and practice, and how the links might lead to greater student comprehension in reading. More
235 specifically, the following questions need to be addressed:

236 Overarching Question: What are effective ways of bringing about changes in policy and
237 educational practice to promote improved comprehension?

- 238 • What should be the content of preservice instruction for teaching reading
239 comprehension?
- 240 • What are the effects of different types of practical experiences on preservice
241 teachers' comprehension instruction?
- 242 • How do standards for teaching, performance assessments, and incentives affect
243 teacher practice and lead to improved student comprehension?
- 244 • What are the school level variables, policies, and instructional programs (regular,
245 compensatory, and supplementary) that have an impact on students' reading
246 comprehension?
- 247 • What types of professional development for in-service teachers lead to improved
248 reading comprehension instruction?

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3.0 STRATEGIES FOR DEVELOPING A RESEARCH PROGRAM ON READING COMPREHENSION

This report was designed explicitly to serve as a foundation for conversation and consultation with the field of reading researchers, in order to generate a broad base of input to any OERI funded research effort. It is clearly premature to specify a list of research questions or to rank order research topics based on the thinking in this document. Nonetheless, the RRSRG recommends that some large-scale, basic descriptive research efforts be considered. For example, it would be helpful in undertaking future, more targeted research, to have descriptive information concerning what teachers' knowledge base related to comprehension really is. Related to this topic is the equally important question what gets taught in preservice programs about reading comprehension. We have some information from the NAEP about how students of different ages and social groups perform on certain tasks, but expanding the variety of tasks assessed would be of value. Similarly, NAEP provides some basic descriptive information about instructional conditions, but the richness of that database could be vastly expanded, to provide better information concerning what kinds of policies and programs focused on reading comprehension are currently in place in U.S. schools. It is worth thinking about how NCES might help provide some of this basic descriptive information.

We recognize as well that defining issues of intellectual challenge and practical importance is only one task in trying to formulate a research program. In this section of the report, then, we consider some additional prerequisites, issues of infrastructure and methodology that have to be addressed, further considerations on the basis for priority setting, and the next steps that need to be undertaken.

3.1 Prerequisites to Establishing a Research Program

OERI's goal is to present a research program that instantiates high quality and displays high utility. If OERI is to meet this goal, it must first (together with other representatives of the education research community) address widespread doubts concerning the quality and relevance of educational research, and address specific complaints concerning the credibility of OERI's research initiation and management efforts.

Of course, educational research is not all bad, nor is medical research, with which it is often perniciously compared, all good. In any case, given its limited funding, OERI has little influence over the vast majority of educational research. The task for OERI is to select and support very high quality efforts within educational research, and to demonstrate not just the

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33 intellectual credibility but also the practical utility of that research. We suggest that at least three
34 steps be taken, in the field of reading research, to promote that effort:

35 3.1.1 Developing a community of researchers. Research relevant to reading
36 comprehension has been carried out within a variety of disciplines (linguistics, sociolinguistics,
37 discourse processing, anthropology, psychology, cognitive science) and by individuals working in
38 quite distinct fields. Furthermore, the field of reading itself is sociologically somewhat complex,
39 as emblemized by the existence of different organizations of reading researchers (International
40 Reading Association, National Reading Conference, Society for the Scientific Study of Reading)
41 with only partially overlapping membership, and of strong constituencies of reading researchers
42 within other organizations (American Educational Research Association, Society for Text and
43 Discourse). Making progress in reading comprehension research will require creating links
44 across the now distinct subfields and subgroups. We suggest below that a revised proposal
45 review procedure can contribute substantially to the task of forming a community of reading
46 researchers linked by their common intellectual focus.

47 3.1.2 Developing a community of researchers and practitioners. The challenge of
48 reading comprehension is intrinsically a practical challenge, and reflective practitioners represent
49 a source of knowledge that is insufficiently represented in the journals or the research proposals.
50 If work on reading comprehension is to have an impact on practice within our lifetimes, then the
51 concerns of practitioners need to be incorporated from the beginning, and the work must be seen
52 as operating in Pasteur's quadrant⁷ rather than being exported to schools after the papers are
53 published. Mechanisms for incorporating practitioner expertise into the research process need to
54 be developed and nurtured.

55 3.1.3 Mechanisms for developing the infrastructure needed to select and manage the
56 research. We discuss specifics of the infrastructure OERI will need in the next section. However,
57 procedures for getting from here to there also need to be in place. This includes decisions about
58 how requests for proposals will be researched and written, about who will serve on review panels,
59 about how the accumulation of research findings will be monitored to serve as input to later
60 requests for proposals, and so on.

⁷ Pasteur's quadrant refers to the quadrant of research defined by simultaneous contribution to basic and applied problems. Pasteur's contributions to the understanding of infection and contamination constituted theoretical breakthroughs even as they also formed a basis for fighting disease and promoting public health.

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61 3.2 The OERI Infrastructure

62 To ensure that the OERI initiative in reading comprehension research is successful,
63 several infrastructure issues must be addressed. Concerns about the quality of the research
64 funded by OERI, its review procedures, and the oversight of projects in the field are widespread.
65 The RRSB notes that OERI has aggressively attempted to address these issues in recent years.
66 There has been a clear effort to prioritize the research agenda despite the fact that the budget
67 specifically devoted to research and independent of funding for Centers and the regional labs is
68 relatively small, particularly compared to other federal research entities. The effort to extend
69 these resources by collaborations with other federal research entities through, for example, the
70 Interagency Education Research Initiative (IERI) and the Bilingual Research initiative have
71 enhanced the OERI research mission and reflect judicious use of resources by all the agencies
72 involved in these efforts. Review procedures are being addressed by OERI, but a major
73 organizational issue is that OERI personnel are expected to handle many non-research tasks.
74 This makes the oversight of research and the management of review difficult to handle, since any
75 individual often has multiple responsibilities within OERI.

76 In order for this initiative to be successful, the RRSB recommends that steps be taken to
77 insulate the research functions of OERI from the broader dissemination and management issues
78 that OERI and the Department of Education are required to address. A position should be
79 established for someone who would direct this initiative and related reading research projects
80 within OERI. The person in this position should be expected to interact and collaborate with
81 individuals in other federal research entities involved with reading research. The person should
82 interact with the field, assist in the development of proposals, and help synthesize the knowledge
83 base that will emanate from this and other federally sponsored reading research initiatives. This
84 person should not be responsible for review. The recommendations for peer review developed by
85 the OERI Advisory Board should be fully implemented, particularly those related to peer review
86 and research management. As part of this implementation, OERI should draft criteria for
87 evaluating research proposals and develop procedures for training reviewers and evaluating the
88 quality of reviews. A standing review panel with staggered, longer-term appointments should be
89 established that includes expertise reflective of the diversity of research projects and
90 methodologies that this initiative is likely to attract. Creating this committee will help establish
91 continuity in review as well as possibly providing an advisory component to the OERI reading
92 research program. This approach to review will provide considerable feedback to investigators in
93 the field, thus contributing to enhanced research expertise. By virtue of the diversity of expertise
94 on the panel, collaborations among researchers with different perspectives will be encouraged
95 that will lead to the integration of knowledge across sub disciplines essential to the advancement

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96 of knowledge about reading and instruction. No reviewer should be appointed to this panel
97 without training and a trial period on the committee. Individuals with limited independent research
98 experience should not be placed on the committee, and procedures for terminating a reviewers
99 who fail to discharge their responsibilities should be established.

100 Prior to the solicitation of research proposals, it is crucial that the research mission of
101 OERI be affirmed. This implies that research programs at OERI be given high priority, and
102 insulated from organizational or logistical interference. Furthermore, OERI will need to
103 emphasize the importance within its overall research mission of this specific initiative to develop a
104 research base of scientific knowledge about reading comprehension.

105 Once a reading comprehension agenda is established, research should be solicited in a
106 variety of formats, guided by the nature of the problems under investigation. Solicitations should
107 reflect a long-term plan with short-term and long-term goals. There should be continuity in the
108 crafting of these solicitations, reflecting for example feedback on the success of earlier
109 solicitations, and accumulation of knowledge about the research agenda established. The
110 solicitations should reflect an attempt to coordinate with the efforts of other agencies and
111 initiatives, with a focus on a component of the overall research agenda that is specific to OERI
112 and with which OERI is specifically identified. Although field-initiated research should continue to
113 receive support, it is critical that the OERI take the lead in facilitating high quality reading
114 comprehension research through carefully crafted initiatives that reflect the priorities identified in
115 this report and the emerging body of knowledge about reading comprehension that will emerge
116 from this initiative. Different types of grants should be supported, including grants that support
117 multiple connected projects around coherent central themes with collaborations across
118 investigators that are of sufficient scale to address the complex issues involved in research on
119 reading comprehension. To develop a cadre of investigators capable of high quality research, the
120 RRSO specifically recommends that research training fellowships and developmental grant
121 programs for young investigator be created.

122 **3.3 Methods Appropriate to the Task: Research Methodologies**

123 The RRSO considered at length the issue of methodologies necessary to address the
124 research questions identified by the committee. There was consensus among the committee that
125 a range of methodologies was not only necessary, but was essential to ensuring rigorous
126 evaluation of the various research questions. A particular research study may involve a
127 combination of different types of approaches and different types of data requiring the need to
128 adhere to multiple evidentiary standards. In the interest of rigor, it is imperative that the
129 methodology selected to address a research question be driven by the question itself and not by

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130 arbitrary judgments that some methods are stronger than others. For that matter, it is also not
131 possible to make clear-cut divisions across types of methodologies, for a number of reasons:

- 132 • classes of methodologies overlap to a large extent
- 133 • there is no intrinsic ranking of values associated with any particular methodology
- 134 • high levels of rigor can be defined for any form of disciplined inquiry, whether
135 classified as qualitative or quantitative.
- 136 • methodologies can only be assessed with reference to the research questions they
137 are being used to answer

138 Among quantitatively oriented studies, true experiments, of course, represent an ideal
139 methodology for assessing impact of instruction or intervention. True experiments are sometimes
140 not feasible, though, since their successful implementation requires a set of conditions that
141 cannot always be met in educational settings. In these cases, well-controlled quasi-experiments
142 provide a standard of evidence that, while not as high, is acceptable.

143 Quantitative studies, including program evaluations, are typically enriched by the
144 inclusion of methods that simultaneously provide descriptive and correlational data on, for
145 example, the interaction of learner characteristics and response to intervention. Similarly, some
146 methodologies that are qualitative and observational may have strong quantitative components,
147 such as the observation and coding of classroom teaching behaviors in a time-by-activity
148 framework essential to evaluating the effects of instructional strategies on student achievement.
149 Some questions call for ethnographic methods, e.g., how the introduction of a new intervention
150 addressing reading comprehension into a school is responded to by teachers and principal.
151 Qualitative methods are often the most appropriate ones when the goal is discovery. For
152 example, in depth qualitative studies on bilingual students' use of metacognitive and cognitive
153 strategies while reading in two languages have generated information on their reading that would
154 have been difficult to obtain otherwise. Qualitative methods are also highly desirable when in-
155 depth information is needed about important components of an intervention's functioning. Such
156 information may illuminate, for example, whether the intervention is likely to be undermined or
157 supported within a school. In addition, qualitative methods are useful in providing a cultural
158 perspective on why certain groups respond the way they do to instruction, or in describing how
159 teachers' practices differentially affect students' reading engagement and performance.

160 Thus, scientifically rigorous research studies use methods appropriate to the research
161 questions of interest. In many instances, multiple methodologies are used that blend descriptive,
162 correlational, and experimental methods in the more quantitative area with a range of qualitative

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163 methods essential to addressing the questions of interest. It is also possible that the appropriate
164 methodology of interest will be predominantly one or another type, though there is substantial
165 variability in the characteristics of a single methodology that defy simple lumping of methods into
166 categories.

167 Science is essentially evidence-based. When multiple types of evidence can be cited in
168 support of a particular conclusion, there is greater capacity for building consensus, ensuring the
169 translation of research to practice, and supporting the sustainability of research-based practices.

170 3.3.1 Summary. It is to be hoped that one aspect of this research agenda will be to
171 increase the receptivity of educational thinking to the value of rigorous research, and to stimulate
172 active discussion of research methods and their appropriate application. A program of research,
173 especially one structured across several years, is ideally characterized by procedures to guide
174 selection of questions through a process of setting research priorities, as well as to ensure
175 replication of findings, deepening of understandings, charting of progress, and assessment of the
176 degree of convergence across studies and research methods. The research program proposed
177 here on reading comprehension should be a model for the effective choice and use of appropriate
178 and diverse methods.

179 **3.4 Procedures for Establishing Research Priorities**

180 The RRSB did not attempt, within the constraints of its limited time, to take on the
181 challenge of establishing a prioritized list of research undertakings. Rather, we considered our
182 role one of defining a general area of research, and sketching within that area some of the
183 parameters that might help determine a specified research agenda in the future. It is clear,
184 furthermore, that the specifics of that agenda should be informed by comments and reactions
185 from a group much larger and more broadly representative than the one that drafted this report.

186 Members of the RRSB all formulated their own lists of pressing problems and urgent
187 research questions. Those problems and questions became one basis for our discussions. An
188 additional basis was the emergent model of reading comprehension sketched here, and an
189 inventory reflecting:

190 What basic research knowledge was available about each of the various components,
191 outcomes, and sources of learner differences identified as defining reading comprehension, and
192 how much if any of that research knowledge was being put to use in influencing practice?

193 Our deliberations were greatly informed by a grid (Figure 2), alternately represented as a cube
194 (Figure 3), that located various topics in a space defined by a) the richness of the research base,
195 b) the extent to which current practice is reflective and informed, and c) how much is known about

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196 relevant practice. Those figures were a useful heuristic in identifying the implications of the
197 location of any particular topic. For example, a topic such as the relevance of discourse
198 knowledge to comprehension, which is informed by a rich knowledge base but minimally
199 incorporated into practice, is ripe for "implementation research" designed to develop an
200 understanding of how the research knowledge might be incorporated into curriculum, into teacher
201 development, or in another way introduced into the classroom. Another topic (e.g., role of
202 vocabulary) might have a rich basis of knowledge from research and a relatively rich basis of
203 knowledge concerning procedures for implementation, but still relatively little implementation in
204 the average classroom; such a topic might be identified as appropriate for quasi-experimental or
205 experimental evaluation of instructional interventions in classroom or whole-school settings. Yet
206 another topic important to reading comprehension but which has been only minimally researched
207 (e.g., integration of nonprint and print media in comprehension) might be simultaneously tackled
208 with basic experimental research and with exploratory methods applied in classrooms. In other
209 words, when the knowledge base is impoverished and the potential for relevance to practice very
210 high, the research priorities should be focused on simultaneously expanding the knowledge base
211 while exploring practice options.

212 The grid and cube were used repeatedly by the RRSB as a heuristic in trying to decide
213 how to characterize various specific research topics. The priorities ultimately determined
214 reflected decisions about the various dimensions identified, as applied to topics and to questions.
215 The research topics (status of the components, outcomes, and learner differences) were judged
216 on the following criteria:

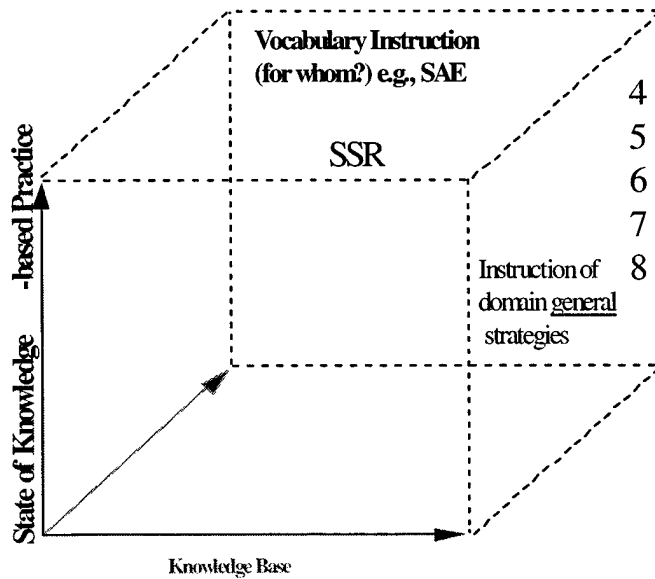
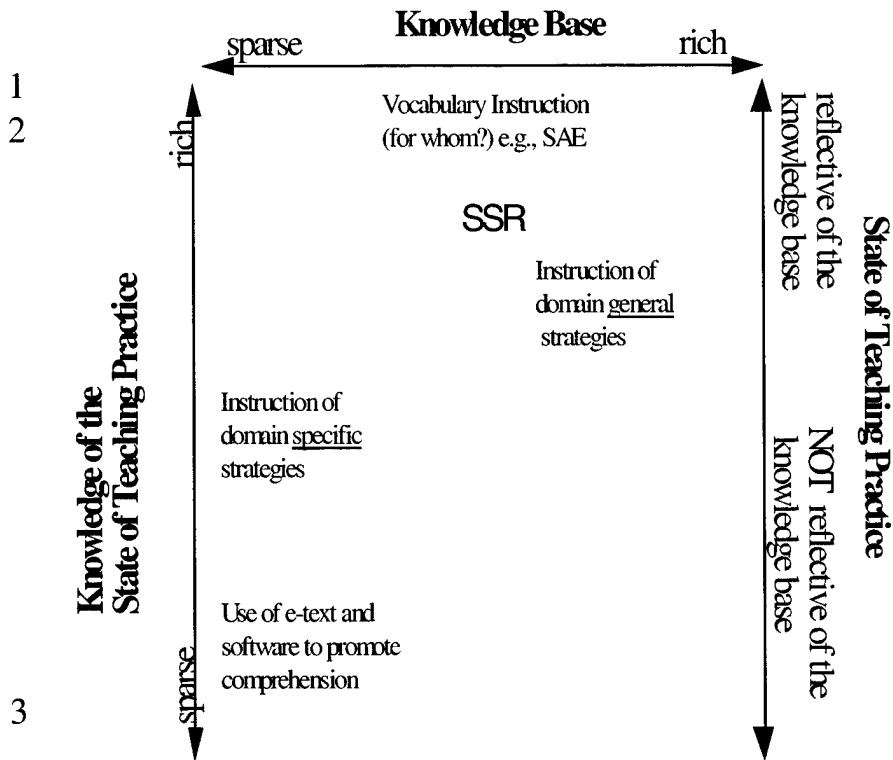
- 217 • The richness of the knowledge base in its current state
- 218 • The importance of expanding the knowledge base
- 219 • The importance of exploring instructional applications.

220 The research questions presented in the second half of this document, on the other hand,
221 were judged based on:

- 222 • The richness of the knowledge base
- 223 • The extent to which relevant applications were already deployed

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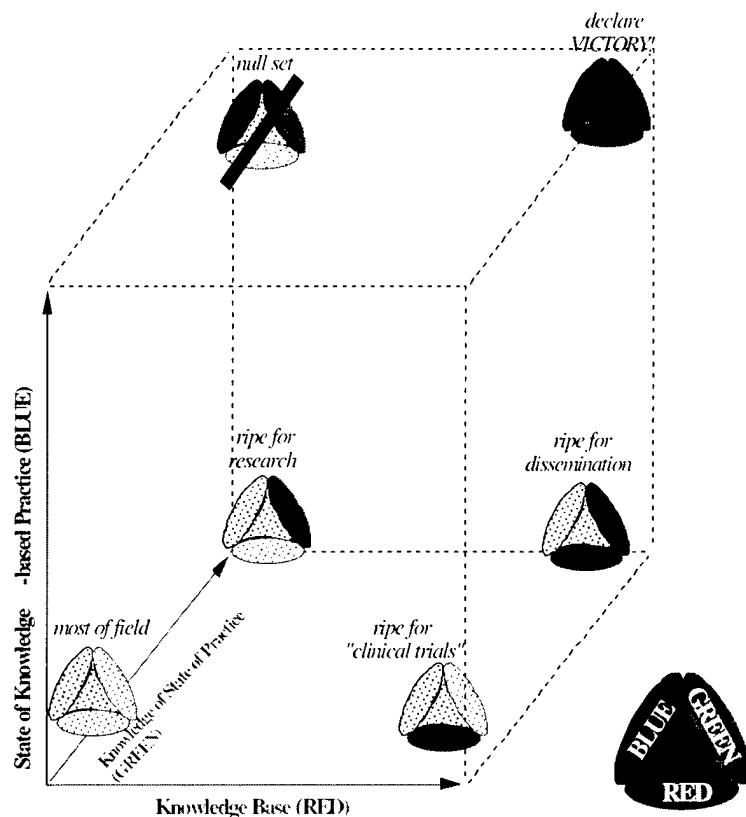


- Use of e-text and software to promote comprehension
- Knowledge of State of Practice
- Instruction of domain specific strategies

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Figure 2. Knowledge Base/Teaching Practice Grid

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Figure 3. Knowledge Base/Teaching Practice Cube

229

These judgments are reflected in the descriptions provided of the dimensions of our reading comprehension model, and in our specification of research questions.

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Obviously any proposed research program represents a compromise between focus and breadth. We have chosen for breadth, relying that reactions from our colleagues will form a crucial resource when it comes to making decisions about how to focus more narrowly on research priorities. But it may be helpful to readers to note a number of points that arose in our deliberations as we tried to establish priorities:

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236 3.4.1 Tension between a focus on 'postprimary' and inclusion of a wider age range. We
237 discussed at some length the value of focusing our questions more specifically on a particular
238 age range, e.g., grades three through five or six, on the grounds that this is where practitioners
239 are most concerned with effective reading comprehension instruction. We chose not to limit the
240 age range of interest for a number of reasons. First, we did not wish to suggest that reading
241 comprehension should be ignored in reading instruction in the primary grades; many
242 accomplishments of kindergarten, grade one, and grade two readers are directly relevant to
243 current and future comprehension success. Second, we recognize the practical challenges
244 facing the content area teacher in middle and secondary school classes, and the degree to which
245 those challenges are intricately related to reading comprehension. Third, our conceptualization of
246 reading comprehension is inherently developmental, encompassing precursors that develop in
247 the preschool and primary school years as well as outcomes displayed in secondary school. This
248 conception precludes restriction of the age range of interest.

249 3.4.2 Tension between priorities derived from our analysis of research and practice, and
250 priorities determined by other factors. We recognize that there are competing priorities within any
251 research program. For example, there are priorities derived from political realities, associated
252 with the availability of fiscal and human resources, limited by the practicalities of certain kinds of
253 research undertakings, and related to the likelihood that results would actually be used to change
254 practice. The group that produced this report limited itself to thinking about what we need to
255 know. Obviously, a research agenda specified by OERI will need to incorporate the impact of
256 other factors in selecting research targets as well.

257 3.4.4 Research projects versus a portfolio of research efforts. While research priorities
258 tend to be attached to questions or problems, planning a research effort requires thinking about a
259 packet of activities that fit together and address practical as well as intellectual issues. Thus, we
260 suggest that the research planning effort consider a strategy for soliciting short term and longer
261 term projects simultaneously. Shorter-term projects could generate useful outcomes relatively
262 quickly, e.g., evaluating well-founded instructional interventions. Longer-term undertakings would
263 be designed to underpin future improvements in practice through an expansion of our basic
264 understanding of reading comprehension, e.g. planning a multi-site, large-scale longitudinal study
265 of reading comprehension.

266 3.4.5 Tension between preplanned and emergent research priorities. The RRSB
267 achieved a remarkable degree of consensus on the formulation of issues in reading
268 comprehension. It did not conclude, though, that this document should be an unfiltered basis for
269 soliciting research proposals, in part because we agreed on the need to let the quality of research
270 proposed partly determine the research priorities. Bad research on an extremely important topic

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271 is not likely to advance the field as much as excellent research on a slightly less pressing topic.
272 Thus, we suggest that any solicitation of proposals be formulated with enough flexibility to allow
273 the field to demonstrate what it can do well, while maintaining sufficient focus so that a coherent
274 research program develops.

275 3.4.6 Need to focus on OERI's competitive advantage. While it is tempting to think about
276 research priorities in the broadest possible way, we also were aware of our brief to advise OERI
277 about its research undertakings. The program of reading research that OERI undertakes should
278 fit into the larger context of research on reading in the U.S. There are robust efforts, funded in
279 large part through National Institute of Child Health and Human Development (NICHD), focused
280 on initial reading instruction. The Office of Bilingual Education and Minority Languages Affairs
281 (OBEMLA) has funded an initial study on bilingual readers, and NICHD together with OERI has
282 launched a substantial effort focused on analyzing transfer from Spanish to English reading. The
283 Interagency Education Research Initiative (IERI), funded jointly by the National Science
284 Foundation (NSF), OERI, and NICHD, is funding efforts that bring early research to scale with
285 some emphasis on the use of technology. Thus, the reading research program that OERI
286 eventually decides on should seek to fill gaps left by the existent research efforts, while being
287 coherently organized around a central set of issues facing practitioners.

288 **3.5 Next Steps**

289 This document will be disseminated in a number of ways and modified through a number
290 of channels:

291 Websites: The full document will be made available through appropriate websites,
292 together with an email address to which comments can be sent.

293 Conferences: Members of the RRSg will summarize the report, and distribute copies
294 of it, at the major research meetings that attract reading researchers
295 and practitioners, including NCTE, NRC, NABE, AERA, IRA, ST&D,
296 and SSSR. Discussion at those meetings will be recorded, and again
297 reactions will be solicited to the email address.

298 Shorter versions: After the initial comments from RRSg members are processed, an
299 executive summary will be written and distributed. The summary will
300 focus on the rationale for the initiative and the steps to be taken,
301 presenting only a non-technical version of the reading comprehension
302 model.

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303 Longer versions: If members of the RRSB wish to undertake elaboration of the reading
304 comprehension model, they might develop a longer publication, that
305 could serve as a background resource and support to OERI's efforts to
306 produce requests for proposals.

307 Conference: The RAND/OERI planning effort for reading will include a conference,
308 possibly to be held in June 2001 that will serve as a first step in
309 building the community of reading comprehension researchers. At this
310 meeting the RRSB members will process feedback and produce a final
311 version of their report.

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APPENDIX A: CRITERIA FOR A COMPREHENSIVE AND THEORETICALLY GROUNDED ASSESSMENT SYSTEM

Capacity to reflect authentic outcomes. While any particular assessment may not reflect the full array of outcomes, the inclusion of a wider array than currently tested is crucial.

Congruence between assessments and the processes/components. For many purposes, assessments need to target particular components of comprehension in the interest of revealing individual differences in given components that might inform our understanding of the comprehension process as well as individual differences on measures of comprehension.

Developmental sensitivity. Any assessment system needs to be sensitive across the full developmental range of interest.

Capacity to provide for the identification of individual children as poor comprehenders. An effective assessment system should be able to identify individual children as poor comprehenders, not only in terms of pre-requisite skills such as fluency in word identification and decoding, but also in terms of cognitive deficits and gaps in relevant knowledge (e.g. background, domain specific etc.) that might adversely affect reading and comprehension, even in children who have adequate word level skills. It is also critically important that such a system provide for early identification of children who are apt to encounter difficulties in reading comprehension because of inadequacies in one or another component of comprehension.

Capacity to identify subtypes of poor comprehenders. The model of reading comprehension outlined earlier makes it clear that this ability is complexly determined. It therefore follows that comprehension difficulties could come about because of deficiencies in one or another of the components of comprehension specified in the model. Thus, an effective assessment system should have the means for identifying subtypes of poor comprehenders in terms of the components and desired outcomes of comprehension, and both intra and interindividual differences in acquiring the knowledge and skills necessary for becoming a good comprehender.

Instructional sensitivity. A major purpose for assessments is to inform instruction, and to reflect the impact of instruction or intervention. Thus, an effective assessment system should not only provide important information about a child's relative standing in appropriate normative populations, (school, state, and/or national norms groups), but it should also provide important information about a child's relative strengths and weaknesses for purposes of educational planning.

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33 Openness to intra-individual differences. Understanding the performance of an individual
34 often requires attending to differences in performance across tasks.

35 Utility for instructional decision-making. Assessments can inform instructional practice if
36 they are designed to identify domains that instruction might target (i.e., components), rather than
37 providing summary scores useful only for comparison with other learners' scores.

38 Validity across social, linguistic, and cultural variation. Good tests of reading
39 comprehension will target authentic outcomes and reflect component processes. If performance
40 on the task reflects differences due to social, linguistic, or cultural variation that are not directly
41 related to reading comprehension performance, then the tests are inadequate for purposes of the
42 research agenda proposed here.

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APPENDIX B: BIBLIOGRAPHIC RESOURCES

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1 APPENDIX C: RESEARCH QUESTIONS CATEGORIZED BY 2 TOPIC*

3 Rand Reading Study Group Meeting

4 Breckenridge, CO

5 August 2000

6 7 ASSESSMENT

8 1. How do we assess reading comprehension so that we can identify poor
9 comprehenders and possible subgroups? (revised)

10 2. To what extent does high-stakes assessment impact reading comprehension in poor
11 comprehenders?

12 INSTRUCTION

- 13 • What does good comprehension instruction look like at different ages and reading
14 levels in terms of activities, materials, and practices?
- 15 • What are the instructional activities that promote comprehension of text? (strategy
16 instruction, questioning the author, what else?)
- 17 • What practices and activities promote long-term transfer and independent use of
18 cognitive strategies?
- 19 • What is the effect of reader-response type of instruction on comprehension?
- 20 • What is the effect of long-term *project* learning on comprehension?
- 21 • What difference does reading aloud make in reading comprehension over time?
22 (Does it make a difference by fourth grade?)
- 23 • What are the short and long term consequences of instruction in metalinguistics and
24 listening on young learners (prek-grade 2)?

* Drawn from Appendix D: Research Questions Generated at Breckenridge, Colorado Meeting, August 2000.

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- 25 • What are the elements of vocabulary instruction that make a difference in students'
26 comprehension?
- 27 • What contribution does each of the above instructional elements make on students'
28 reading comprehension?
- 29 2. What specific instructional practices are related to effective comprehension and
30 engagement of students of diverse cultural and linguistic backgrounds?
- 31 • How helpful is building students' school-based knowledge to improvements in their
32 reading comprehension?
- 33 • What is the relationship between the identification and utilization of students' cultural
34 knowledge to their reading comprehension?
- 35 • How does decoding instruction on words not known in L2 affect L2 students' reading
36 comprehension?
- 37 • What is effective vocabulary instruction for L2 students at different ages and
38 proficiency levels?
- 39 • What types of comprehension instruction and activities work best with L2 students at
40 different ages and language proficiency levels?
- 41 • How can transfer instruction improve the reading comprehension of L2 students?
- 42 • What instructional practices promote dialect speakers' comprehension?
- 43 • What instructional practices get students from diverse backgrounds involved and
44 engaged in reading comprehension?
- 45 3. Each of the following questions are in the service of the superordinate question: How
46 can students' comprehension of content-area materials be improved at elementary, middle, and
47 high school levels in domain-specific ways?
- 48 • What role are content area materials playing in contemporary content area
49 instruction?
- 50 • What are the long-term consequences (at the middle school and high school levels)
51 of supporting students to use informational text in the primary grades?
- 52 • What instructional practices can teachers use to effectively support students in their
53 reading of content area materials?

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- 54 ○ How can teachers be supported to evaluate content area materials for
55 their accessibility to diverse students?
- 56 ○ What does comprehension instruction look like when students are
57 supported to use the text in domain-specific ways (e.g., - when students
58 are taught to reason with text in domain-specific ways such as to use
59 science text to support their inquiry and take an inquiry stance to science
60 text? to take a historiographer's approach to history text?)
- 61 ○ What role does writing instruction play in the comprehension of content
62 materials and vice versa?
- 63 ○ What are the instructional opportunities and outcomes of peer discussion
64 when it is situated within content area instruction?
- 65 ○ What role can text productively play in supporting peer discussion, and
66 what role can peer discussion play in supporting students' reading of
67 content area materials?
- 68 ○ What are effective ways of supporting the development of students'
69 background knowledge (print, artifacts, multimedia) in a way that makes
70 a difference in learning from content area materials?
- 71 ○ What are the consequences of using interest-based textual materials as
72 a means of bridging to content area text? (Examples would include
73 materials related to extracurricular activities
- 74 ○ What are the differences between teaching students to read from content
75 area texts vs. from primary documents? When should primary
76 documents be introduced in the curriculum? What kinds of support do
77 students need to make effective use of diverse forms of text (e.g., the
78 internet)?
- 79 ○ What are the features of lecturing that effectively prepare students to
80 read and learn from content area materials?
- 81 ● What features of classroom climate might make content area reading and materials
82 more relevant to students?
- 83 ○ How can teachers tap into young people's non-traditional text and uses
84 of text for the purpose of enhancing engagement and comprehension?

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- 85 ○ How can students' non-traditional literacy practices be used to influence
86 teachers' expectations of adolescents?

87 **Instructional Variables**

- 88 1. How can teachers accommodate struggling readers' out of school interests so that in school
89 and out of school literacies are related?
- 90 2. Under what conditions does explicit vocabulary instruction benefit poor comprehenders?
- 91 3. Under what conditions does instruction aimed at improving fluency benefit poor
92 comprehenders? (Fluency includes automaticity of word recognition, fluency in decoding, and
93 fluency and expressiveness in reading connected text.)
- 94 4. What are the factors that contribute to loss of engagement and motivation in reading? How is
95 the role of these factors different for different ages and populations of students?
- 96 5. What are the effects of cognitive and metacognitive strategy instruction on comprehension in
97 poor comprehenders? (modified)
- 98 6. What are the effects of spelling instruction on poor readers' comprehension?
- 99 7. What types of writing instruction have a positive impact on the reading comprehension of
100 poor comprehenders?

101 **SOURCE OF POOR READING COMPREHENSION**

- 102 1. What are the processes and variables that go to make up skilled comprehension? How do
103 they interact with each other? How do they work as a system? Which one(s) contribute the
104 most to the overall processes of comprehension? Which one(s) are critical? What
105 compensatory processes affect these variables? What other processes and variables affect
106 comprehension variables?
- 107 2. What are the processes and variables involved in comprehension of electronic text,
108 multimedia text, or hypertext? How are these the same as or different from the processes and
109 variables involved in comprehension of conventional text?
- 110 3. What are the comprehension processes and variables involved in comprehension by learners
111 of English as a second language? How are they the same or different from those first
112 language processes and variables?

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113 4. Are there differences in comprehension in different contexts, e.g., studying vs reading or in
114 different genres of text, etc.? How much overlap is then among the processes necessary in
115 different contexts?

116 5. What are the subgroups of poor comprehenders?

117 **Text Characteristics**

118 1. To what extent is poor reading comprehension affected by different types of texts, tasks and
119 situations? What are the factors (child factors, text factors, situational factors) that make
120 electronic/hypertext/multimedia and conventional text differentially comprehensible to poor
121 comprehenders?

122 2. How does the nature of the texts which poor comprehenders are asked to read impact their
123 reading comprehension ability (genre - including electronic/hypertext/multimedia -, diversity of
124 texts, difficulty levels, predictability, decodability, vocabulary, etc.)? How does the nature of
125 the texts, which students listen to affect their reading comprehension ability (genre, difficulty
126 level, vocabulary, diversity)?

127 **Learner Characteristics**

128 1. How do learner characteristics impact students' level of reading comprehension?

- 129 • Oral language characteristics (e.g.- phonology, morphology, syntax, vocabulary)
- 130 • Awareness of language structures (syntactic awareness, pragmatic awareness, concept
131 of word as a unit of form, sensitivity of word meanings)
- 132 • Nonlinguistic abilities and processes (e.g., attention, visualization, inferencing, reasoning)
- 133 • Affective and motivational factors
- 134 • Social, cultural, and home background

135 2. What types of compensatory strategies do poor comprehenders use that impact reading
136 comprehension positively or negatively?

137 **Social, Interpersonal, and Interactional Variables**

138 1. What is the effect of the social climate and patterns of interaction in and out of classrooms on
139 the reading comprehension of struggling readers? (with special consideration for subject
140 matter text)

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- 141 2. What kinds of interactional patterns enhance or diminish struggling readers' comprehension
142 of subject matter text?

143 **TEACHER EDUCATION & PROFESSIONAL GROWTH**

- 144 1. Teacher Education: What are the various models of teacher education and forms of teacher
145 support that promote high-level comprehension instruction? What do we know about the
146 efficacy of these models and forms of support? How should these models be differentiated
147 across teachers with different years of experience?

- 148 • What are the relationships among teacher's knowledge about reading comprehension,
149 enactment of high-quality comprehension instruction and actual students'
150 comprehension?
- 151 • What knowledge base do teachers need to have to make principled decisions regarding
152 reading comprehension instruction?
- 153 • What are effective models of bringing about changes in educational practice (instruction,
154 administration, policy) to promote improved comprehension?

155 156 **What we know:**

157 Teachers who have more professional training (including preservice and inservice) are
158 more likely to use teaching practices that are associated with higher reading achievement on
159 NAEP Student outcomes are highly correlated with teacher training.

160 We know that one-shot, short-term inservice programs are not effective.

161 162 **What we don't know:**

163 **Preservice**

164 There aren't any studies to link preservice teacher education in reading comprehension
165 to student performance. We need to know which components of preservice instruction lead to
166 improved student comprehension. We need answers to these questions:

167 What do we know about the content and experiences relative to reading comprehension
168 that are part of the teacher education curriculum (i.e., methods courses in reading and language
169 arts, science, math, social studies)?

- 170 • What kinds of field experiences best promote reading comprehension instruction?

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- 171 • What do we know about the knowledge base of the instructors of courses involving
172 reading comprehension?
- 173 • What do we know about the background knowledge and the quality of field
174 supervision?
- 175 • What do we know about the most beneficial field placements?

176
177 **Inservice**

178 We know very little about the duration and intensity of inservice (professional
179 development) that lead to improved student comprehension. What little research exists is
180 descriptive in nature. Longitudinal studies are needed that indicate what kinds of instruction lead
181 to sustained effects in reading comprehension. We need answers to these questions:

- 182 • What support is needed for beginning teachers of reading comprehension?
- 183 • What are the kinds and qualities of on-going teacher development that lead to
184 improved instruction in reading comprehension?
- 185 • How much does inservice training in reading comprehension affect teacher practice
186 and lead to improved student comprehension?

187 **INSTITUTIONAL STRUCTURES & POLICY**

188 **School organization and policy variables**

- 189 1. What are the school level variables, policies and instructional programs (regular,
190 compensatory, and supplementary) that have an impact on the reading of poor
191 comprehenders?
- 192 2. What are the effects of classification practices and special educational programming on the
193 development of functional literacy and reading comprehension skills?

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APPENDIX D: RESEARCH QUESTIONS GENERATED AT BRECKENRIDGE, COLORADO MEETING IN AUGUST 2000

Group 1 Question Prioritization

Question 1

What are the processes and variables that go to make up skilled comprehension? How do they interact with each other? How do they work as a system? Which one(s) contribute the most to the overall processes of comprehension? Which one(s) are critical? What compensatory processes affect these variables? What other processes and variables affect comprehension variables?

- This is a top priority.
- This is very relevant to the mission of the panel.
- Broad but important
- There are major holes in our knowledge.
- This question relates too much of the remaining work of the panel.

Question 2

What are the processes and variables involved in comprehension of electronic text, multimedia text, or hypertext? How are these the same as or different from the processes and variables involved in comprehension of conventional text?

- This is a top priority.
- This is very relevant to the mission of the panel.
- Broad but important
- There are major holes in our knowledge.
- This question relates too much of the remaining work of the panel.

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Group 1 Question Prioritization

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27 Question 3

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What are the comprehension processes and variables involved in comprehension by learners of English as a second language? How are they the same or different from those first language processes and variables?

31

- This is a top priority.

32

- It's in our territory.

33

- Broad but important

34

- There are major holes in our knowledge.

35

- This question relates to much of the remaining work of the panel

36

37 Question 4

38

39

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Are there differences in comprehension in different contexts, e.g., studying vs reading or in different genres of text, etc.? How much overlap is there among the processes necessary in different contexts?

41

- This is a top priority.

42

- It's in our territory.

43

- Broad but important

44

- There are major holes in our knowledge.

45

- This question relates to much of the remaining work of the panel

46

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47

Group 2 Question Prioritization

48

49 1. What does good comprehension instruction look like at different ages and reading
50 levels in terms of activities, materials, and practices?

51 Priority 4

52 Knowledge 3

53 Practice 2

54 • What are the instructional activities that promote comprehension of text? (strategy
55 instruction, questioning the author, what else?)

56 • What practices and activities promote long-term transfer and independent use of
57 cognitive strategies?

58 • What is the effect of reader-response type of instruction on comprehension?

59 • What is the effect of long-term project learning on comprehension?

60 • What difference does reading aloud make in reading comprehension over time?
61 (Does it make a difference by fourth grade?)

62 • What are the short and long term consequences of instruction in metalinguistics and
63 listening on young learners (prek-grade 2)?

64 • What are the elements of vocabulary instruction that make a difference in students'
65 comprehension?

66 • What contribution does each of the above instructional elements make on students'
67 reading comprehension?

68 2. What specific instructional practices are related to effective comprehension and
69 engagement of students of diverse cultural and linguistic backgrounds?

70 Priority 4

71 Knowledge 2

72 Practice 1.5

73 • How helpful is building students' school-based knowledge to improvements in their
74 reading comprehension?

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Group 2 Question Prioritization

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- What is the relationship between the identification and utilization of students' cultural knowledge to their reading comprehension?

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- How does decoding instruction on words not known in L2 affect L2 students' reading comprehension?

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- What is effective vocabulary instruction for L2 students at different ages and proficiency levels?

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- What types of comprehension instruction and activities work best with L2 students at different ages and language proficiency levels?

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86

- How can transfer instruction improve the reading comprehension of L2 students?

87

- What instructional practices promote dialect speakers' comprehension?

88

- What instructional practices get students from diverse backgrounds involved and engaged in reading comprehension?

89

90

3. Each of the following questions are in the service of the superordinate question: How can students' comprehension of content-area materials be improved at elementary, middle, and high school levels in domain-specific ways?

91

92

93

Priority 4

94

Knowledge 2

95

Practice 1.5

96

- What role are content area materials playing in contemporary content area instruction?

97

98

- What are the long-term consequences (at the middle school and high school levels) of supporting students to use informational text in the primary grades?

99

100

- What instructional practices can teachers use to effectively support students in their reading of content area materials?

101

102

- How can teachers be supported to evaluate content area materials for their accessibility to diverse students?

103

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104

Group 2 Question Prioritization

105

106

○ What does comprehension instruction look like when students are supported to use the text in domain-specific ways (e.g., - when students are taught to reason with text in domain-specific ways such as to use science text to support their inquiry and take an inquiry stance to science text? to take a historiographer's approach to history text?)

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○ What role does writing instruction play in the comprehension of content materials and vice versa?

112

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○ What are the instructional opportunities and outcomes of peer discussion when it is situated within content area instruction?

114

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○ What role can text productively play in supporting peer discussion, and what role can peer discussion play in supporting students' reading of content area materials?

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○ What are effective ways of supporting the development of students' background knowledge (print, artifacts, multimedia) in a way that makes a difference in learning from content area materials?

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○ What are the consequences of using interest-based textual materials as a means of bridging to content area text? (Examples would include materials related to extracurricular activities)

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○ What are the differences between teaching students to read from content area texts vs. from primary documents? When should primary documents be introduced in the curriculum? What kinds of support do students need to make effective use of diverse forms of text (e.g., the internet)?

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○ What are the features of lecturing that effectively prepare students to read and learn from content area materials?

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131 Group 2 Question Prioritization

132

133 • What features of classroom climate might make content area reading and materials
134 more relevant to students?

135 ○ How can teachers tap into young people's non-traditional text and uses
136 of text for the purpose of enhancing engagement and comprehension?

137 ○ How can students' non-traditional literacy practices be used to influence
138 teachers' expectations of adolescents?

139 4. Teacher Education: What are the various models of teacher education and forms of
140 teacher support that promotes high-level comprehension instruction? What do we know about the
141 efficacy of these models and forms of support? How should these models be differentiated across
142 teachers with different years of experience?

143 Priority 4

144 Knowledge 2

145 Practice 1

146 • What are the relationships among teacher's knowledge about reading
147 comprehension, enactment of high-quality comprehension instruction and actual
148 students' comprehension?

149 • What knowledge base do teachers need to have to make principled decisions
150 regarding reading comprehension instruction?

151 • What are effective models of bringing about changes in educational practice
152 (instruction, administration, policy) to promote improved comprehension?

153

154 What we know:

155 Teachers who have more professional training (including preservice and inservice) are
156 more likely to use teaching practices that are associated with higher reading achievement on
157 NAEP Student outcomes are highly correlated with teacher training.

158 We know that one-shot, short-term inservice programs are not effective.

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159

Group 2 Question Prioritization

160

161 **What we don't know:**

162 **Preservice**

163

164

165

There aren't any studies to link preservice teacher education in reading comprehension to student performance. We need to know which components of preservice instruction lead to improved student comprehension. We need answers to these questions:

166

167

168

- What do we know about the content and experiences relative to reading comprehension that are part of the teacher education curriculum (i.e., methods courses in reading and language arts, science, math, social studies)?

169

170

171

- What kinds of field experiences best promote reading comprehension instruction?
- What do we know about the knowledge base of the instructors of courses involving reading comprehension?

172

173

- What do we know about the background knowledge and the quality of field supervision?

174

- What do we know about the most beneficial field placements?

175

176 **Inservice**

177

178

179

180

We know very little about the duration and intensity of inservice (professional development) that lead to improved student comprehension. What little research exists is descriptive in nature. Longitudinal studies are needed that indicate what kinds of instruction lead to sustained effects in reading comprehension. We need answers to these questions:

181

182

183

- What support is needed for beginning teachers of reading comprehension?
- What are the kinds and qualities of on-going teacher development that lead to improved instruction in reading comprehension?
- How much does inservice training in reading comprehension affect teacher practice and lead to improved student comprehension?

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186 Group 3 Question Prioritization

187

188 **Scales:**

189 **Priorities**

190 4. Top priority

191 3. Definitely include

192 2. Maybe / questionable

193 1. Definitely exclude

194 **Knowledge**

195 4. Solid knowledge base

196 3. Emerging knowledge base

197 2. Promising findings

198 1. We don't know very much yet

199 **Definition and Classification**

200 1. How do we assess reading comprehension so that we can identify poor comprehenders and
201 possible subgroups? (revised)

202 Priority 4

203 Knowledge 2

204 2. What are the subgroups of poor comprehenders?

205 Priority 1 (because it's subsumed under Questions 1 and 5)

206 Knowledge 2

207

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207 Group 3 Question Prioritization

208 Text Characteristics

209 1. To what extent is poor reading comprehension affected by different types of texts,
210 tasks, and situations? What are the factors (child factors, text factors, situational factors) that
211 make electronic/hypertext/multimedia and conventional text differentially comprehensible to poor
212 comprehenders?

213 Priority 1 (because it is now subsumed under Question 4)

214 Knowledge 2

215 2. How does the nature of the texts which poor comprehenders are asked to read impact
216 their reading comprehension ability (genre - including electronic/hypertext/multimedia -, diversity
217 of texts, difficulty levels, predictability, decodability, vocabulary, etc.)? How does the nature of the
218 texts, which students listen to affect their reading comprehension ability (genre, difficulty level,
219 vocabulary, diversity)?

220 Priority 4

221 Knowledge 2

222 Learner Characteristics

223 1. How do learner characteristics impact students' level of reading comprehension?

- 224 • Oral language characteristics (e.g.- phonology, morphology, syntax, vocabulary)

225 Priority 3.8

226 Knowledge 3

- 227 • Awareness of language structures (syntactic awareness, pragmatic awareness,
228 concept of word as a unit of form, sensitivity of word meanings)

229 Priority 3

230 Knowledge 2

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234

Group 3 Question Prioritization

235

236

- Nonlinguistic abilities and processes (e.g., attention, visualization, inferencing, reasoning)

237

238

Priority 3.5

239

Knowledge 2

240

241

Affective and motivational factors

242

Priority 3

243

Knowledge 3

244

245

Social, cultural, and home background

246

Priority 3

247

Knowledge 2

248

2. What types of compensatory strategies do poor comprehenders use that impact reading

249

comprehension positively or negatively?

250

Priority 3

251

Knowledge 2

252

253

Social, Interpersonal, and Interactional Variables

254

1. What is the effect of the social climate and patterns of interaction in and out of classrooms on

255

the reading comprehension of struggling readers? (with special consideration for subject matter

256

text) (revised)

257

Priority 3

258

Knowledge 2

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259 Group 3 Question Prioritization

260

261 2. What kinds of interactional patterns enhance or diminish struggling readers' comprehension of
262 subject matter text?

263 Priority 1 (because it is now subsumed under Question 7)

264 Knowledge 2

265

266 Instructional Variables

267 1. How can teachers accommodate struggling readers' out of school interests so that in school
268 and out of school literacies are related?

269 Priority 3

270 Knowledge 1

271 2. Under what conditions does explicit vocabulary instruction benefit poor comprehenders?

272 Priority 4

273 Knowledge 3

274 3. Under what conditions does instruction aimed at improving fluency benefit poor
275 comprehenders? (Fluency includes automaticity of word recognition, fluency in decoding, and
276 fluency and expressiveness in reading connected text.)

277 Priority 4

278 Knowledge 2

279 4. What are the factors that contribute to loss of engagement and motivation in reading? How is
280 the role of these factors different for different ages and populations of students?

281 Priority 4

282 Knowledge 2

283 5. What are the effects of cognitive and metacognitive strategy instruction on comprehension in
284 poor comprehenders? (modified)

285 Priority 3

286 Knowledge 3

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287 6. What are the effects of spelling instruction on poor readers' comprehension?

288 Priority 3

289 Knowledge 1

290 7. What types of writing instruction have a positive impact on the reading comprehension of poor
291 comprehenders?

292 Priority 4

293 Knowledge 1

294 **School Organization and Policy Variables**

295 1. What are the school level variables, policies and instructional programs (regular,
296 compensatory. and supplementary) that have an impact on the reading of poor comprehenders?

297 Priority 4

298 Knowledge 2

299 2. To what extent does high-stakes assessment impact reading comprehension in poor
300 comprehenders?

301 Priority 2

302 Knowledge 1

303 3. What are the effects of classification practices and special educational programming on the
304 development of functional literacy and reading comprehension skills?

305 Priority 4

306 Knowledge 3

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APPENDIX E: RAND READING STUDY GROUP CAMEOS

MEMBERS

DONNA E. ALVERMANN is Research Professor of Reading Education at the University of Georgia and Professor of Reading Education. Her research focuses on adolescent literacy. Currently, she is completing data collection on a Spencer Foundation major grant that includes a 15-week intervention aimed at teaching media literacy to a group of 30 middle and high school students. From 1992-1997, Dr. Alvermann co-directed the National Reading Research Center and conducted 3 long-term studies of adolescents' perceptions of reading and learning from text-based discussions. At the start of that research program, the literature on adolescent literacy development contained very little information on what it means to be a motivated, or even disinterested, reader from an adolescent's perspective. This perspective is important because teachers generally tend to act more readily upon students' perceptions than they do upon the research and theorizing of those of us in the academy. Dr. Alvermann is past president of the National Reading Conference and served co-chair of the International Reading Association's Commission on Adolescent Literacy from 1997-2000. Currently, she is a member of the Board of Directors of the College Reading Association, the Chair of the Board of Directors of the American Reading Forum, and a co-editor of the *Journal of Literacy Research*. In 1997, she was awarded the Oscar S. Causey Award for Outstanding Contributions to Reading Research.

JANICE DOLE is currently an Associate Professor of Reading Education at the University of Utah. After several years as a primary-grade teacher, Janice completed her M. A. and Ph. D. at the University of Colorado. Subsequently, she held positions at the University of Denver, the Center for the Study of Reading at the University of Illinois at Urbana-Champaign and Michigan State University. Janice's work has appeared in the *Reading Research Quarterly*, *Review of Educational Research*, *The Elementary School Journal*, and the *Journal of Reading*). She is currently on the Reading Development Panel for the National Assessment of Educational Progress and has worked for the Research and Development section of the American Federation for Teachers for the last five years. Three years ago, Jan took a leave of absence from the University to work for the Utah State Office of Education. There she served as the Director of the Governor's Literacy Initiative for Utah, and directed a successful proposal for the Reading Excellence Act. She now serves as co-director of that project in Utah. Her current research interests include comprehension instruction at the K-3 level and reading professional development for K-3 teachers in at-risk schools.

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JACK M. FLETCHER, Ph.D., is a professor in the Department of Pediatrics at the University of Texas-Houston Health Science Center, and Associate Director, Center for Academic and Reading Skills. For the past 20 years, Dr. Fletcher, a child neuropsychologist, has completed research on many aspects of the development of reading, language, and other cognitive skills in children. He has worked extensively on issues related to learning and attention problems, including definition and classification, neurobiological correlates, and most recently, intervention. He collaborates on several grants on reading and attention, including a multi-disciplinary grant funded by the National Institute of Child Health and Human Development, the U.S. Department of Education, and the National Science Foundation under the Interagency Educational Research Initiative. Dr. Fletcher is also Principal Investigator or Co-Principal Investigator on NIH-funded research projects involving children with brain injuries, including a program project on spina bifida. Dr. Fletcher served on and chaired the NICHD Mental Retardation/Developmental Disabilities study section and is a former member of the NICHD Maternal and Child Health study section. He chaired a committee on children with persistent reading disability for the Houston Independent School District (HISD) and served on a task force on reading for HISD that produced a report widely cited within the state of Texas as a model for enhancing reading instruction in elementary school children. Dr. Fletcher has received several service awards from local school districts. Dr. Fletcher is part of a large consortium of investigators from the University of Houston, University of Texas-Houston, University of Texas-Austin, and California State University-Long Beach who recently received a program project grant involving the development of literacy skills in Spanish-speaking and bilingual children under the recent NICHD/Department of Education Bilingual Research Initiative.

GEORGIA EARNEST GARCÍA is Associate Professor and Associate Head of the Department of Curriculum and Instruction at the University of Illinois at Urbana-Champaign. She holds a zero-time appointment in the Department of Educational Policy Studies and is a faculty affiliate with the Latina/Latinos Studies Program. A former Title VII Bilingual Education Fellow, she obtained her Ph.D. in Education from the University of Illinois in 1988. She currently teaches courses in reading, bilingual education/ESL, sociolinguistics, and multicultural education. Her research focuses on the literacy development, instruction, and assessment of students from culturally, linguistically, and economically diverse backgrounds, with much of her current research focusing on bilingual reading. She has published her work in the *American Educational Research Journal*, *Anthropology and Education Quarterly*, *Review of Research in Education*, *Reading*

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Research Quarterly, and *Journal of Literacy Research*. She was named a College of Education Distinguished Scholar in 1997, and awarded the Faculty Award for Excellence in Graduate Teaching, Advising, and Research by the Council of Graduate Students in Education in 1993. Dr. García was a Senior Research Scientist at the Center for the Study of Reading for six years. She currently serves on the Board of Directors for the National Reading Conference.

IRENE W. GASKINS, a school administrator and founder of Benchmark School, is above all a teacher and instructional leader. Throughout her career she has been involved in many aspects of reading education. Gaskins taught in the public schools in Virginia and Pennsylvania. In 1965 she received her masters degree in Reading Education from the University of Pennsylvania and became a research assistant in the Reading Clinic there. As a research assistant she tracked the characteristics and progress of struggling readers in Penn's dyslexia study. This experience piqued Gaskins' interest in bright children who have great difficulty learning to read. Her dissertation research addressed this topic. Stints as a district reading consultant, college teacher, and consultant with a publishing company; were followed by Gaskins receiving her doctorate in Educational Psychology in 1970 from the University of Pennsylvania. Sparked by her interest in children who have profound difficulties in learning to read, Irene founded Benchmark School in Media, Pennsylvania in 1970. Gaskins designed Benchmark not only to be a special school for helping struggling readers, but she also wanted it to be a laboratory for designing instruction that works for all students. Collaborating with her energetic and dedicated faculty, as well as major consultants from around the country, Gaskins has worked on such significant problems as designing word recognition instruction that works for students who previously made little progress in this area, improving reading performance by increasing students' awareness and control of cognitive styles and other personal factors that impact on reading, and designing programs that teach strategies for understanding and learning from texts. During the years 1988-1994 the strategies research at Benchmark was funded by the James S. McDonnell Foundation and Benchmark was the Foundation's National Demonstration School. One of the parts of her job that Gaskins likes most is being the teacher, or co-teacher, who pilots and fine tunes the new programs being developed at Benchmark. The results of this work have been published in journals such as *The Reading Teacher*,

Reading Research Quarterly, *Journal of Reading Behavior*, *Language Arts*, *Elementary School Journal*, *Remedial and Special Education*, and *Journal of Learning Disabilities*.

ARTHUR C. GRAESSER is a full professor in the Department of Psychology and an adjunct professor in Mathematical Sciences at The University of Memphis. He is currently a co-director of the Institute for Intelligent Systems and director of the Center for Applied Psychological

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Research. In 1977 Dr. Graesser received his Ph.D. in psychology from the University of California at San Diego. Dr. Graesser's primary research interests are in cognitive science and discourse processing. More specific interests include knowledge representation, question asking and answering, tutoring, text comprehension, inference generation, conversation, reading, education, memory, expert systems, artificial intelligence, and human-computer interaction. His primary interest in reading focus on deeper levels of comprehension, such as inference generation, questioning, summarization, rhetorical organization, and pragmatics. He is currently editor of the journal *Discourse Processes*, and on the editorial board of *Journal of Educational Psychology*, *Journal of the Scientific Studies of Reading*, *Cognition & Instruction*, *Applied Cognitive Psychology*, *Poetics*, and the *International Journal of Speech Technologies*). In addition to publishing over 200 articles in journals and books, he has written two books and has edited six books.

JOHN GUTHRIE is a professor of Human Development at the University of Maryland at College Park. He received his Ph.D. from the University of Illinois in Educational Psychology. From 1992-1997 he was Co-Director of the National Reading Research Center (NRRC), which conducted studies of skilled reading, writing, and knowledge development. His current research addresses cognitive and motivational processes in learning conceptual knowledge from text among elementary students. Based on this work, he developed an engagement model of classroom context, processes of engagement in reading, and reading outcomes. From the model, he developed Concept-Oriented Reading Instruction (CORI) and conducted quasi-experiments showing that this intervention increases reading comprehension, reading motivation and science knowledge. He has performed structural equation modeling to show that reading engagement (e.g., cognition and motivation) mediated the effects of instruction on reading strategies and knowledge outcomes. His studies are published in peer-reviewed research journals. He currently holds two grants from the National Center for Educational Statistics (NCES) for secondary analyses of NAEP data examining reading instructional effects on reading achievement. He served on the expert panel for the Reading Excellence Act in 1999-2000. He was a member of one National Reading Council (NRC) committee that monitored the development of the Voluntary National Tests, and a second NRC committee that conducted a study of common metrics for reading achievement in 1998-2000.

MICHAEL L. KAMIL is Professor of Education at Stanford University. He is a member of the Psychological Studies in Education Committee and is on the faculty of the Learning, Design, and Technology Program. His research explores the effects of a variety of technologies on literacy and the acquisition of literacy in both first and second languages. He has worked

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extensively in schools, reading clinics, and other learning environments to determine the appropriate balance between applications of technology and the demands of literacy. One current line of research involves a comparison of processes used by adults in reading hypertext and conventional texts. This work is being extended to similar work with young children. He is also conducting instructional research focusing on the uses of expository text for reading instruction in first and second grade. The results suggest a benefit over other instructional methods that are based almost exclusively in story or narrative text. He is a co-editor of the *Handbook of Reading Research*, Vols. 1, 2, and 3 and has been editor of *Reading Research Quarterly* and *Journal of Reading Behavior*. For the past two years he has been a member of the National Reading Panel, producing a synthesis of instructional research in reading. He chaired the National Reading Panel subgroups working on Comprehension, Technology, and Teacher Education.

WILLIAM NAGY received his PhD in linguistics from the University of California, San Diego. He spent 18 years at the Center for the Study of Reading at the University of Illinois, Urbana-Champaign, and since 1996 has been a professor of education at Seattle Pacific University, where he teaches graduate courses in reading. His interests include vocabulary acquisition and instruction, the role of vocabulary knowledge in first- and second-language reading, and the contributions of metalinguistic awareness to learning to read. His research has focused primarily on incidental word learning from context during reading, bilingual students' recognition of cognate relationships between English and Spanish, the acquisition of English derivational morphology and the role of morphology in word learning and reading comprehension, and the role of morphological awareness in the literacy development of children learning to read in China. He recently contributed a chapter on vocabulary acquisition processes to Volume III of the *Handbook of Reading Research*.

ANNEMARIE SULLIVAN PALINCSAR is the Jean and Charles Walgreen Jr. Chair of Literacy, Associate Dean for Graduate Affairs, and a teacher educator at the University of Michigan in the Educational Studies Department. Her research has focused on the design of learning environments that support self-regulation in learning activity, especially for children who experience difficulty learning in school. Her initial research (with A. Brown) was the design and investigation of reciprocal teaching dialogues to enhance reading comprehension with middle school students. Subsequent research focused on the use of this instruction to introduce primary-grade children to comprehension monitoring as they were learning to read. With co-principal investigator, C.S. Englert, she conducted four years of research, working with special educators, to design literacy curricula and instruction that would engage special education students in using

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oral, written, and print literacy to accelerate their literacy learning. In current research, conducted with science educator, S.J. Magnusson, she studies how children use literacy in the context of guided inquiry science instruction, what types of text support children's inquiry, and what support students who are identified as atypical learners require to be successful in this instruction.

Annemarie served as a member of the NRC's Council on the Prevention of Reading Difficulty in Young Children; the National Education Goals Panel, the Schooling Task Force of the MacArthur Pathways Project, and the National Advisory Board to Children's Television Workshop.

***CATHERINE SNOW** is the Henry Lee Shattuck Professor of Education at the Harvard Graduate School of Education. She received her Ph.D. in psychology from McGill and worked for several years in the linguistics department of the University of Amsterdam. Her research interests include children's language development as influenced by interaction with adults in home and preschool settings, literacy development as related to language skills and as influenced by home and school factors, and issues related to the acquisition of English oral and literacy skills by language minority children. She has co-authored books on language development (e.g., *Pragmatic Development* with Anat Ninio) and on literacy development (e.g., *Unfulfilled Expectations: Home and School Influences on Literacy*, with W. Barnes, J. Chandler, I. Goodman & L. Hemphill), and published widely on these topics in refereed journals and edited volumes. Snow's contributions to the field include membership on several journal editorial boards, co-directorship for several years of the Child Language Data Exchange System, and editorship of *Applied Psycholinguistics*. She served as a board member at the Center for Applied Linguistics and a member of the National Research Council Committee on Establishing a Research Agenda on Schooling for Language Minority Children. She chaired the National Research Council Committee on Preventing Reading Difficulties in Young Children, which produced a report that has been widely adopted as a basis for reform of reading instruction and professional development. She currently serves on the NRC's Council for the Behavioral and Social Sciences and Education, and as president of the American Educational Research Association. A member of the National Academy of Education, Snow has held visiting appointments at the University of Cambridge, England, Universidad Autonoma in Madrid, and The Institute of Advanced Studies at Hebrew University in Jerusalem, and has guest taught at Universidad Central de Caracas, El Colegio de Mexico, Odense University in Denmark, and several institutions in The Netherlands.

* RAND Reading Study Group Chair

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DOROTHY S. STRICKLAND is the State of New Jersey Professor of Reading at Rutgers University. She is past president of both the International Reading Association and the Reading Hall of Fame. Her research and practice interests include: early literacy learning and teaching in classrooms from preschool through the middle school years; early intervention policy and practice from pre kindergarten through grade three; focused intervention at the upper elementary and middle school levels; and the special needs of low achieving poor and minority children. Current activities related to the work of the Reading Group include membership on several teacher standards boards: National Board for Professional Teaching Standards, Middle Childhood/Generalist Committee; ETS/Praxis Reading National Advisory Committee; INTASC/Council of State School Officers Panel on Reading. She was a panel member of the report, Preventing Reading Difficulties in Young Children and is now working on a funded project to articulate teacher standards from pre kindergarten through grade four with the design and implementation of appropriate and consistent teacher education. Relevant publications include: The Administration and Supervision of Reading Programs; Emerging Literacy, Language, Literacy, and the Child, Teaching Phonics Today, Beginning Reading and Writing, and three chapters in press on classroom intervention for low achieving students, one of which focuses on low-performing African American children.

FRANK R. VELLUTINO is a Professor of Psychology at the University at Albany, State University of New York. He currently holds joint faculty appointments in the Department of Psychology (Cognitive Psychology Program), the Department of Educational and Counseling Psychology, and the Program in Linguistics and Cognitive Science of the Department of Anthropology. He is also Director of the Child Research and Study Center, a research and student training center. He currently teaches a graduate course in children's learning that emphasizes intellectual, perceptual, memory, and language development, as well as a graduate seminar in human development that focuses on the relationship between language and cognitive development. His research has been concerned with the cognitive underpinnings of reading development as well as the relationship between reading difficulties and various aspects of language and other cognitive functions. It has generated numerous articles in refereed journals, in addition to a book, and numerous book chapters addressing the causes and correlates of reading difficulties in young children. Dr. Vellutino's most recent research seeks to develop models of early intervention that effectively reduce the number of children who continue to have long term reading difficulties, and, thereby, further our understanding of reading development.

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JOANNA WILLIAMS is Professor of Psychology and Education at Teachers College, Columbia University. She holds an Ed.M. degree from Harvard University and a Ph.D. in experimental psychology from Yale University. Her research interests include the processes involved in beginning reading and in comprehension and reading instruction for students with learning disabilities and other students at risk for school failure. In the late 1970s Dr. Williams developed a program to teach phonemic awareness to students with learning disabilities (*The ABDs of Reading*). Her work has explored differences in the comprehension patterns of normally-developing students and students with learning disabilities, and she has demonstrated a link between the editing difficulties during listening and reading (inability to inhibit competing associations) of students with learning disabilities and their comprehension performance. Recently she developed a program, *The Theme Scheme*, that helps children go beyond plot-level comprehension to a more abstract understanding of story themes and how they to a more abstract understanding of story themes and how they relate to real-life experiences. Dr. Williams has also been active in training and curriculum-development projects related to the professional development of teachers. She was editor of the *Journal of Educational Psychology* from 1973 to 1978, and she is the founding editor of *Scientific Studies of Reading* (1997-). She was a member of the National Reading Panel. Currently she is on the Board of Directors of the Society for the Study of Scientific Reading, a member of the Expert Strategy Panel, U.S. Department of Education--Office of Special Education Programs, and a principal investigator in the Center on Accelerating School Learning.