PART I: FOUNDATIONS OF READING

This first part comprises five chapters that, together, explain how comprehension works, how it can develop over time, and how various cognitive abilities contribute to reading comprehension. This part draws heavily on research in cognitive psychology and educational psychology, and the explanation of reading comprehension presented relies on research primarily carried out in first language (L1) contexts. The major research findings that explain reading comprehension rest primarily on research with learners reading in English as their L1, although there is also considerable and growing research on L1 reading comprehension in several other Indo-European languages as well as in Hebrew, Japanese, and Chinese.

One consequence of the emphasis on L1 reading-comprehension research is that this part is primarily oriented to reading ability more generally rather than to a specific explanation of second language (L2) reading comprehension. There are, in fact, many differences between L1 and L2 reading, and they are addressed in various ways in Part II of this book. However, the basic comprehension process is one that generalizes across L1 and L2 contexts, even if local processing details might vary across different L1s and across L1 and L2 contexts. Complex comprehension abilities are shared across the human species and these abilities apply to more than reading (e.g., listening comprehension, visual comprehension). So it should not be surprising that basic cognitive processes operate in consistent ways across modalities, across languages, and across multiple languages. This recognition of both the universal cognitive architecture for comprehension and specific variations in its operationalization in different language and multilanguage contexts has already been argued persuasively (Geva & Siegal, 2000; Geva & Wang, 2001; Koda, 2007).

It is important, however, to note that this generalization of the basic cognitive comprehension architecture is not equivalent to saying that reading abilities are the same in every language or multilanguage context (see Chapter 6). The cognitive processes underlying reading comprehension interact with specific orthographic systems, specific social contexts,

and, in many cases, multiple orthographic and social contexts. The result is that the basic cognitive processing system adapts to make maximal use of the available information from the orthographic system(s) and the social contexts. How cognitive processing for comprehension adapts to different language and social contexts is the purpose of Part II. In Part I, the primary goal is to identify the processes that contribute to reading-comprehension abilities regardless of context.

Chapter 1 introduces reading-comprehension abilities and defines reading in terms of component skills that underlie and support comprehension. These component skills, in effect, define reading comprehension. Reading abilities are also described in terms of goals for reading. There are many ways that people engage in reading, and different reading tasks call for distinct combinations of component skills. It is important to identify these variations in reading and explain how reading comprehension represents the core ability across these different goals for reading. Chapter 1 also connects reading-skills development with learning theory more generally because learning and comprehension are intimately related, and both have major implications for how reading is learned and should be taught.

Chapters 2 and 3 explain how reading comprehension emerges from the specific cognitive skills applied to a written text. Chapter 2 focuses on lower-level processing skills that convert the orthographic, morphological, lexical, and syntactic patterns on the page to mental resources that build comprehension. Chapter 3 focuses on higher-level processes of comprehension and describes how cognitive resources are used to build text comprehension. By the end of Chapter 3, the reader should have a strong sense of how text comprehension emerges from the various component skill processes.

Chapter 4 explores in greater detail the cognitive component skills that have been identified in Chapters 2 and 3. It also addresses a number of issues and controversies that have arisen around reading comprehension and integrates interpretations of these issues with the view of reading comprehension developed in Chapters 2 and 3. These issues not only include the contributions of implicit and explicit learning, but also the nature of automaticity, attention, inferencing, background knowledge, and schema theory.

Chapter 5 describes many efforts to present overall theories of reading abilities in terms of "models of reading." Such models provide ways to synthesize research findings, present coherent interpretations of reading abilities, and offer agendas for future research. For a model of reading to contribute significantly to our understanding of reading, it must offer descriptions that can be tested and validated by further investigations. Chapter 5 sketches 11 such models of reading and explains why the

Psycholinguistic Guessing Game Model of reading is not a valid alternative to any of the 11 models described in the chapter.

In each of these five chapters, a final section addresses implications for instruction. These sections are very much foundation-oriented, so implications reflect larger connections between research findings and instructional practices. Nonetheless, the connections are important for readers interested in the instructional implications.

1 *The nature of reading: Defining reading*

We were never born to read. Human beings invented reading only a few thousand years ago. And with this invention, we rearranged the very organization of our brain, which in turn expanded the ways we were able to think, which altered the intellectual evolution of our species. (Wolf, 2007: 3)

Reading is something many of us take for granted. We read with what appears to be little effort and little planning. And it is remarkable that so much of the world's population can read – a little more than 80 percent of the world's population can read to some extent (Elley, 2001; Tucker, 2000; UNESCO, 2007). They can read basic forms, read advertisements, read newspapers, and use basic reading skills in their work and daily lives when needed. Some percentage of these people can read at a much higher level of comprehension, learning new conceptual information from texts, synthesizing new information from multiple texts, critiquing information in texts, and using their comprehension skills to reinterpret texts (Elley, 1992; Kirsch et al., 2002; NAAL, 2005; NAEP, 2007). Universal literacy is an ideal goal that is an ongoing priority among UNESCO, nation states, and many nongovernmental organizations, and efforts need to be made to reduce illiteracy levels.

It is also important to recognize that many people around the world read in more than one language. Large populations of people have learned to read in second or third languages for a variety of reasons, including interactions within and across heterogeneous multilingual countries, large-scale immigration movements, global transportation, advanced education opportunities, and the spread of languages of wider communication. As the nature of reading is explored more fully in this chapter, and the true complexity of reading emerges, the large numbers of readers who can function well in more than one language will seem remarkable. (And it is remarkable.) In almost all cases, these readers have learned to read in their first languages (L1), but they have also learned to be second-language (L2, subsuming both second and foreign language) readers, often under very different (and sometimes difficult) circumstances. In the first five chapters of this book, we focus on those who

can read, and who can read *well*. What is it that they do to comprehend a text? What specific skills and abilities do they use, and in what ways? How do we define reading? How do we read differently for different purposes? What makes a person a fluent reader?

Ways we read and why we read

As fluent readers, we read many different types of texts, some that we consciously intend to read, and some that we just seem to pick up or encounter. We read throughout the day in modern societies because print is all around us, and we use it in many more ways than we are aware of. We read magazines during the day, whether relaxing or waiting in some office. We read newspapers, flyers, and ads. We also read at night before going to sleep. But we read much more than this. We read when we look at products while shopping. We read posters, billboards, and displays when we travel on public transportation. We read forms in order to fill them out. We read when we receive and send e-mails and text messages, and when we search the Web for information. We read when we browse movie titles in a DVD-rental store. We read when we look at the TV guide to decide what we want to watch. We read (and reread) whenever we write anything.

In more formal settings, we expect to read in academic contexts or in workplace environments as part of learning or engaging in our jobs. Many of us also engage in reading that may be quite demanding in educational, professional, and occupational settings. In these latter settings, a great deal of learning occurs; part of that learning requires that we read and interpret informational texts in line with the tasks that we engage in and the goals that we set (or that are set for us). These settings often require us to synthesize, interpret, evaluate, and selectively use information from texts. Moreover, we often encounter competing or contradictory information on a regular basis. It is a fact of modern life that almost any issue or topic can be discussed, addressed, or argued from multiple viewpoints, and it is routinely our task to decide among these alternative sources of information. How we learn to negotiate this world of print and achieve our goals is a large part of many professional and academic lives.

Citizens of modern societies must be good readers to be successful. Reading skills do not guarantee success for anyone, but success is much harder to come by without being a skilled reader. The advent of the computer and the Internet does nothing to change this fact about reading. If anything, electronic communication only increases the need for effective reading skills and strategies as we try to cope with the large quantities of information made available to us.

A very large percentage of people around the world also learn to read a second language, usually as students in formal academic settings. Students may learn to read a second language as a school subject with little further use outside of the classroom. However, many students use their L2 reading skills to engage in advanced studies, get a good job, travel, gain access to information, become more cross-culturally aware, communicate with others, or be entertained. Moreover, events over the past 100 years have placed greater demands on people to become literate in an L2. The twentieth and early twenty-first centuries have been a time of massive migrations around the world as well as growth in the use of world languages (e.g., English, Chinese, Spanish, Arabic, French; see McGroarty, 2006). Many people have moved to new countries for various reasons. They and their children have had to, and continue to, learn to function in societies and school systems where their significant reading experiences are often primarily in a second language. Modern societies are becoming more complex all the time. The level of expectation for a person to function well in a modern print environment is higher than ever before. This pressure will only continue to grow for people wanting to be active and successful participants in these societies. Electronic communication growth, rather than compensating for weak literacy skills, only amplifies the need for skilled reading abilities.

Aside from massive waves of migration and relocation, the rise of English as a global language has had a major impact on educational systems around the world and the demands for reading in a second language. In countries around the world, school systems require students to learn English for access to information and for the eventual ability to compete economically and professionally. For good or for bad, this situation reflects a reality of the early twenty-first century (Crystal, 1995; McGroarty, 2006). Millions of students are expected to learn English as an additional language to some extent. Reading in English provides one of the few avenues for these students to develop their English L2 abilities to the point at which advanced academic curricular goals can be achieved.

It is evident that citizens of modern societies will benefit from being skilled L1 readers now and in the future. But it is also fair to say that, for millions of people, L2 reading skills represent a significant concern as these people negotiate careers and seek advancement in modern economies. A person's future opportunities for success and prosperity will be even more entwined with skilled reading abilities. It is therefore an important societal responsibility to offer every person the opportunity to become a skilled reader, and in many cases, this means becoming a skilled L2 reader.

There are many contexts in which people develop reading abilities. Students in K–12 education systems are taught to read their L1 as a primary goal. Adults who, for whatever reason, did not learn to read as children, often learn to read their L1s through adult education and adult literacy classes, many funded by regional and national institutions, others sponsored by local school systems or volunteer organizations. L2 students can also be divided into those who learn to read in a K–12 educational system and those who take adult education classes (for either vocational or academic purposes). Moreover, there is a real difference between adults who want to gain access to significant academic training and those who need basic, or survival, L2 reading skills. There are also major distinctions among K–12 students who *are required* to learn to read in a second language (as in many foreign-language settings), those who *want* to learn to read in a second language (in many foreign- and second-language settings) and those who *need* to read in a second language (in mostly second-language settings).

No book can address all these major contexts equally well, and this book focuses much more on academic reading contexts, although it also includes reading for entertainment and general comprehension as they are central issues for the development of academic reading. While survival reading skills for adult literacy and citizenship goals are not explicitly addressed, many facets of the discussions in this book will be informative for these areas as well. Lest one think that this book is narrowly conceptualized, it is safe to say that the demands of reading development in academic contexts, as indicated by the above discussion, are varied and extensive. Even reading in contexts outside the academic classroom, such as daily encounters with newspapers and e-mails, or reading novels for entertainment, represent important aspects of the development of academic reading skills.

Reading for different purposes: Types of reading

Reading ability can be improved by teaching how to read for particular purposes. (Anderson, 2000a: 397)

The combination of our daily encounters with texts and our needs to read in different ways in educational and professional settings requires that we read differently depending on the context and our goals (and motivations). When we read for different purposes, we engage in many types of reading, particularly in academics settings. Six major purposes are listed in Table 1.1.

Table 1.1. *Academic purposes for reading*

1. Reading to search for information (scanning and skimming)
2. Reading for quick understanding (skimming)
3. Reading to learn
4. Reading to integrate information
5. Reading to evaluate, critique, and use information
6. Reading for general comprehension (in many cases, reading for interest or reading to entertain)

There are certainly other ways to classify purposes for reading aside from the six listed, and we acknowledge that this list does not identify every possible purpose (cf. Alderson, 2000; Carver, 1992a; Grabe, 2000; Linderholm & van den Broek, 2002; Lorch, Kluzewitz, & Lorch, 1995; Urquhart & Weir, 1998). Our list does, however, make the point that, as fluent readers, we read for different purposes. Different purposes for reading also tend to impose differing levels of demand on the reader in order to maintain an acceptable "standard of coherence" (Linderholm et al., 2004); that is, our ability to establish an understanding that makes sense and is suitable to the level of detail required by a specific purpose for reading (see Chapter 3). We need to account for these differing purposes when we consider any definition of reading.

When we want to locate some specific information, we engage in *search processes* that usually include *scanning* and *skimming* (cf. Guthrie, 1988; Guthrie & Kirsch, 1987). If we have read a chapter in a book and want to check when James Watt invented his version of the steam engine, we might first try to recall the context in which that discussion had occurred, then skim through the chapter to find the most likely pages, and then scan those pages for suitable information. Both skimming and scanning are processes carried out at very high speed (with high rates of words per minute [wpm], cf. Carver, 1990, 1992a). The combination of scanning (identifying a specific graphic form) and skimming (building a simple quick understanding of the text) allows a reader to search for information.

Skimming is also used for a variety of other reasons (and so may be seen as a superordinate purpose). We skim when we want to determine what a text is about and whether or not we want to spend more time reading it. We skim when we are expected to read a more difficult text so that we have a sense of where the text will lead us and what we may need to know to understand it. We skim when we need to work through many texts and want to make decisions about which texts to focus more attention on. We also skim when we are under intense time pressure and

need to reach some decision about the usefulness of information in a text.

Reading to learn is often carried out in academic and professional settings. We read to learn when the information in a text is identified as important (often by a teacher or textbook) and when that information will be used for some task or may be needed in the future. Reading to learn places more processing demands on the reader because the reader is expected to remember the main ideas and many supporting ideas and be able to recall this information as needed (Carver, 1992a; Chall, 1983 [stage 3]; Enright et al., 2000). We usually read to learn at a relatively slower speed (about 200 wpm; Carver, 1992a), and normally for relatively shorter text segments at any one time. The effective reader organizes the content within a frame that is coherent and accurate with respect to the information presented in the text (Linderholm & van den Broek, 2002; Rapp et al., 2007). The reader also has to connect the text content with information established in the reader's long-term memory (i.e., prior knowledge). It is true that readers also learn when they read for general comprehension, but the expectations for using supporting information, for creating an organizing frame of reference (e.g. organizing information by cause–effect, comparison–contrast), and for building a close integration with prior knowledge are not usually assumed.

Reading to integrate information requires that the reader synthesize (and learn) information from multiple texts or bring together information from different parts of a long text, such as a long and complex chapter in a textbook (Perfetti, Rouet, & Britt, 1999). This purpose represents a more complex and more difficult task for readers in academic and professional settings than reading to learn (Chall, 1983 [stage 4]). The effort to build a strong organizing frame in reading to learn is increased significantly when there are multiple texts that refer to related information but that may present conflicting or incompatible facts and explanations. In the case of multiple texts, the reader must decide how to create his or her own organizing frame for the information because none is provided by the combined set of texts. In the case of a long, complex text, the information may have been presented through multiple organizing frames (comparison–contrast, descriptive listing, problem–solution). For example, a set of texts may include a description of a situation, a comparison of competing views, a narrative of discovery, and extensions of a theory. Readers often have to decide which aspects to select, prioritize, and highlight, and then create a coherent organizational frame around the full set of information to be synthesized. The key differences from reading to learn are that the reader typically must evaluate the information and create his or her own organizational

structure rather than follow an organization structure provided by one of the texts.

Reading to evaluate, critique, and use information often also represents an increased level of demand and a more complex interaction of reading processes. In academic and professional settings, readers are at times asked to evaluate and critique information from multiple texts, or from one long text, requiring them to make decisions about which aspects of the text are most important, most persuasive, least persuasive, or most controversial. Moreover, readers need to decide how to relate the text information to other information intertextually and to their prior knowledge and beliefs. Perhaps the greatest demand of this type of reading, aside from the ability to construct a careful understanding of the text, involves the application, and especially rhetorical control, of a reader's attitudes, emotional responses, interests, and preferences to the interpretation of the text (when evaluation or critique is done well). At this level of reading, extensive inferencing and background knowledge come into play, and the reader engages very actively in reinterpreting the text for his or her own purposes (Chall, 1983 [stage 5]). In many cases, this intensive level of critical reading usually accompanies some further goal that involves the use of the output from the critique or evaluation for some other task.

Reading for general comprehension is the most common purpose for reading among fluent readers, and it is the default assumption for the term reading comprehension (Carver, 1992a). This is the reading that takes place when we read a good novel, an interesting newspaper story or feature article, or a magazine when we are relaxing. It is saved for last in this discussion because it is both fundamental to reading and most often misunderstood as easy reading – but it is not easy. In fact, reading for general comprehension involves a complex set of processes when carried out by fluent readers. It is true that general comprehension processes provide a foundation for other reading purposes, such as reading to learn and reading to evaluate. But reading for general comprehension is also a type of reading that is carried out automatically for extended periods of time and with apparently few processing difficulties. Reading for general comprehension evolves over time for L1 readers to become seemingly effortless because of the extraordinary number of hours devoted to automatic word recognition, syntactic parsing, meaning formation, and text-building comprehension processes, all of which take place under very intense time constraints. It is this fluency under intense time constraints that makes reading for general comprehension difficult for L2 readers who generally have far less exposure to L2 print.