Foreword

In this volume we celebrate the profound influence of Charles A. Perfetti on the world of reading and text comprehension. Among the chapter authors are four generations of scholars and researchers who Chuck mentored, guided, and inspired to contribute to an ever-increasing knowledge base about reading processes. Other authors represent some of the many contemporaries with whom Chuck has collaborated over the years. Chuck’s work on reading began a few years after he completed his Ph.D. at the University of Michigan and joined the faculty of the Psychology Department and the Learning Research and Development Center (LRDC) at the University of Pittsburgh. Now Director of LRDC, Chuck continues to play a leading national and international role in reading research and educating new reading researchers. Graduate students and post docs with whom Chuck has worked are distributed around the globe. The topics they address reflect the multiple levels of language and the range of methodologies that characterize Chuck’s scholarly work.

This book was conceived by the three of us at a conference where we had all participated in a symposium on comprehension of information from multiple texts. We reflected on our common ancestry in all having worked under Chuck’s tutelage, albeit one of us (SG) a generation earlier than the other two. As we thought about the many others who had developed their research legs with Chuck’s guidance, we commented on how rare it was for one individual to be engaged in research at multiple levels of language as Chuck was. While we worked at the single and multiple text level, many more of Chuck’s descendants worked at the word and sentence level. However, dichotomizing Chuck’s work in this way seemed to us to miss his overarching concern in elucidating the interplay between word, sentence, and text meaning. Indeed, in the mid-70s Chuck was publishing empirical and theoretical pieces on the interactive effects of discourse - , sentence - , and word - level processes. Thus we entertained the idea of bringing together under one “roof” representative examples of the work of Chuck’s students and colleagues. It seemed a fitting way to recognize the depth and breadth of the Perfetti legacy.

As we worked to develop the prospectus, we also realized that it was the 25th anniversary of Reading Ability (1985). In that book, Chuck used his seminal work on individual differences in reading to put forth verbal-efficiency as a foundational process mechanism of reading skill. The argument was that readers who have effortless, automatic retrieval of word identities (meaning, spelling, pronunciation, grammatical class) will have more resources for higher level comprehension processes, such as making inferences and understanding author perspectives. About 15 years later, with the Lexical Quality hypothesis, Chuck expanded the process emphasis by incorporating the role of knowledge. Lexical Quality (LQ) encompassed “the extent to which the reader’s knowledge of a given word represents the word’s form and meaning constituents and knowledge of word use that combines meaning with pragmatic features. Thus the vocabulary of a given language includes, for a given reader, words of widely varying LQ, from rare words never encountered to frequently encountered and well-known words” (Perfetti, 2007). This word knowledge includes information about a word’s orthographic, phonological, grammatical properties and its meaning.

In parallel with the emphasis on word and sentence level processes, Chuck nurtured a deep interest in the processes that characterize naturalistic text comprehension and learning. Just a few years after the publication of Reading Ability, Perfetti’s lab was busy with projects ranging from the role of phonology in word identification in several languages (including English, Hebrew and Chinese), to the role of prior knowledge and vocabulary in text comprehension, and even to an emerging new field, namely reasoning with and about multiple texts as part of problem-based learning activities. This diversity of approaches to reading was a reflection of Chuck’s intuition that a full understanding of the cognitive bases of reading literacy requires a multi-level approach that considers not just words but also sentences and full pieces of integrated discourse as units of processing and representation. Thus, the focal points of Chuck’s work for the past 45 years have been the role of orthographic, phonological, and grammatical processes in text comprehension, effects on understanding and learning of interactions among multiple levels of language, and elucidating sources of individual differences in reading skill.

The extensive list of publications, presentations and positions of national and international leadership indicate the widespread influence of Chuck's work. He has published over 130 refereed journal articles in the top-ranked journals in the fields of reading, cognition, and language; 75 book chapters; two books; and five edited books. Although Chuck has spent his entire career in one place, he has been a visiting scholar at several prestigious institutions, for example, the Max Planck Institute and the Netherlands Institute of Advanced Studies, The Netherlands; University of Auckland, New Zealand; University of Sussex, U.K. He received the University of Pittsburgh Chancellor's Distinguished Research Award (2000) and the Distinguished Scientific Contribution Award of the Society for the Scientific Study of Reading (2004). He has taken part in numerous editorial boards, and conference scientific committees over the years.

We were fortunate to secure contributions to this volume that allow us to illustrate the depth and breadth – theoretically, empirically, and methodologically - of Chuck's influence on the world of research on cognitive processes of reading and dimensions of reading skill. Some of the contributors were students or post-docs with Chuck at LRDC: Iris Berent (Ph.D. 1993), Anne Britt (Ph.D. 1991; Post-doc 1991-1993), Susan Goldman (Ph.D. 1978), Nicole Landi (Ph.D. 2005), Rob Mason (B.S. 1992), Deborah McCutchen (Ph.D. 1985), Jean-François Rouet (Post-doc 1991-1993) and Julie Van Dyke (Ph.D. 2002). Other authors collaborated with Chuck to develop projects or theoretical constructs focused on understanding individual differences in reading skill: Sally Andrews and Gemma Reynolds (School of Psychology, University of Sydney), Marcel Adam Just (Carnegie Mellon University), Walter Kintsch (University of Colorado), Jane Oakhill (University of Sussex) and Kate Cain (Lancaster University), Donald Shankweiler (Haskins Laboratory, Yale University), Paul van den Broek (Leiden University, University of Minnesota) and Ludo Verhoeven (Radboud University Nijmegen). Our discussants are Jenny Wiley, a graduate student at LRDC (Ph.D. 1996), and her advisor, James Voss, one of Chuck's very first faculty colleagues at LRDC.

The chapters are ordered in a way that roughly reflects the hierarchy of processes involved in dealing with written materials, from the lower-order phonological and orthographic processes, to higher-order coherence-building, inferencing and interpretation processes. Berent addresses the question of why phonology is central to reading. She considers the relationship between new cognitive systems and their predecessors in ontogeny and phylogeny. A central assumption is that any novel aspects of human cognition recycle ancient, inborn knowledge systems. Berent's chapter demonstrates that phonological grammar is a universal system of human knowledge.

Landi emphasizes that reading builds upon spoken language and requires processing and integration of the orthographic, phonological, and semantic information encoded within a word. How children perform this task is influenced by their basic linguistic ability, the quality of the overlapping word representations they have built thus far and the context in which the word is situated. Landi reviews and synthesizes the extant literature on how these variables affect word learning and discusses the contribution of basic behavioral and cognitive neuroscience approaches to understanding how children learn to read new words.

In the third chapter, Verhoeven discusses the acquisition of reading in Dutch, a language with a more regular orthography than English. Verhoeven focuses on the development of reading speed and accuracy, as well as the relationship between decoding abilities for different word patterns. In addition, he examines the role of morphology in learning to read. He concludes with some implications for educational practice.

McCutchen switches to a focus on reading instruction. She describes an intervention study designed to enhance teachers' knowledge of the role of phonology in reading. The rationale for this intervention is based in a theory of change that recognizes the role that explicit instruction and therefore teachers play in early reading instruction. Teachers participated in a ten-day summer institute focused on phonological aspects of reading. Throughout the ensuing academic year, learning was assessed for students of intervention teachers as well for same-aged peers in classrooms of teachers who had not participated in
the intervention. Students in intervention classrooms scored significantly higher than those in the control classrooms on multiple literacy measures.

Interactive processes in reading are the focus of the Andrews and Reynolds chapter. They report a study that used eye movement measures to investigate how top-down and bottom-up processes interact during skilled sentence reading. University students were assessed on measures of reading, spelling and vocabulary, and read sentences that factorially manipulated contextual predictability and lexical co-occurrence probability. Results showed an additive relationship between these factors across both early and late eye movement measures implying that contextual predictability and local lexical co-occurrence exert independent effects on sentence processing. However, these effects were modulated by individual differences: Higher lexical quality (Perfetti, 2007), indexed by vocabulary and spelling ability, was associated with reduced effects of contextual predictability.

Kintsch's chapter explores the question of whether what we know about computer models for natural language understanding might allow us to make interesting conclusions about human language understanding. The question is addressed through a review of Latent Semantic Analysis (Landauer & Dumais, 1997) and the Topic Model (Griffiths, Steyvers & Tanenbaum, 2007), as well as a recent extension thereof (Kintsch & Mangalath, 2011). Kintsch argues that these systems can give us hints about the information that must be available in long-term memory, at a minimum, to make language understanding possible. The argument is made that latent semantic structure is not sufficient, and that more detailed information must be available about how language is used.

In the seventh chapter, Oakhill, Cain, McCarthy and Nightingale consider the relation between children’s depth of vocabulary knowledge and their reading comprehension. They assessed depth by the ability to produce and evaluate synonyms and superordinate terms (hyponyms). They found that both accuracy and speed of semantic access to vocabulary knowledge were related to reading skill (word reading and comprehension). They discuss the need for additional work to examine how depth of vocabulary (as opposed to breadth) might support comprehension by enabling children to identify relations between words in text, which underpin inference and gist extraction.

Van Dyke and Shankweiler revisit Perfetti's (1985) assumption that the subprocesses of comprehension must be maximally efficient in order to preserve memory capacity for higher-order language operations. Based on empirical data and a computational architecture, they show that many of these higher-order operations are in fact not so costly because they operate via a content-addressable direct access retrieval mechanism. Therefore, the amount of retrieval interference, as opposed to memory capacity determines comprehension success. Their view is consistent with Perfetti's work emphasizing the "Lexical Quality Hypothesis."

In Chapter 9, Van den Broek and Van Leijenhorst's chapter introduces the concept of a reader's sensitivity to structural centrality (SSC), i.e., the extent to which a reader identifies and processes information that is central to the semantic structure of a text, as an indicator of comprehension skill. Through a review of their and other researchers’ work, the chapter describes how this construct can be measured, how it can be used to understand developmental and individual differences in reading comprehension skills, and how it can aid in the development of educational interventions.

Turning to the cognitive neuroscience methodologies, Mason and Just point out that the diverse cognitive processes that participate in text comprehension are supported by highly interactive cortical networks. They demonstrate that a factor analysis approach to examining the time course of the hemodynamic responses enables specification of underlying cognitive processes during comprehension. This novel technique can be applied across diverse discourse experiments and has the potential utility of examining individual differences in reading ability.

Britt, Rouet, and Braasch highlight the contribution of the Documents Model Framework (Britt, Perfetti, Sandak, & Rouet, 1999; Perfetti, Rouet, & Britt, 1999) to research on text comprehension. The chapter elaborates on the primary assumption of the Documents Model Framework: documents are experienced and represented as “entities”, or social artifacts that can be identified through source as well as content
features. The chapter identifies several factors that will likely influence whether or not readers experience documents as entities, including text and environmental factors, as well as reader goals, knowledge and skill. The extent to which readers experience “documents as entities” plays a critical role in multiple document comprehension and processing.

Goldman, Lawless, and Manning take up the challenge incumbent on researchers of complex comprehension processes, especially when they involve multiple texts: the need to clearly specify the constructs under investigation. They argue that Evidence-Centered-Design (ECD; Mislevy, Steinberg, & Almond, 2003) is a useful tool for achieving this conceptual clarity and creating assessments that make the constructs visible in observable performance. They specifically illustrate the use of ECD to develop assessments for analysis, synthesis, and integration across multiple texts. Fifth, sixth, and seventh grade students read and wrote essays about a historical topic using three texts provided to them. Essays were scored for inclusion of selected information (analysis), as well as connections inferred across texts (synthesis and integration). Three distinct approaches to completing the task were identified, suggesting different starting points for instruction.

Finally, Voss and Wiley bring us full circle back to LRDC/Pittsburgh roots in their discussion of the volume as a whole. Jim Voss was at LRDC when Chuck arrived and is in a unique position to provide a well-informed overview of the evolution of Chuck’s thinking and research. In addition to summaries of the chapters in this book, the Voss and Wiley chapter puts the chapters in a larger context and makes interesting connections across the various chapters.

Several of these chapters are based on talks that were presented at a Festschrift symposium we held immediately prior to the Annual Meeting of the Society for Text and Discourse in Poitiers, France on July 10, 2011 (Figure 1). In addition to some of the book contributors, the symposium gathered a number of scholars who knew Perfetti’s work and were delighted to have the opportunity to celebrate his career. Speakers included M. Anne Britt, Peter Foltz, Susan Goldman, Art Graesser, Rob Mason, Jean-François Rouet, Paul van den Broek, and Jenny Wiley. The symposium was a happy, lively, and intellectually stimulating event, which set the tone of this book. We followed up with solicitation of chapters, reviews and rewrites, to assemble this volume. Everyone was incredibly responsive to timelines and the revision process so we could move this volume to fruition in a timely manner. Although the final product could not possibly include everyone on whom Chuck has had an impact, we hope that it provides a healthy sample of the breadth and depth of his influence. It has been a labor of joy for us.

—Anne Britt, Susan Goldman, and Jean-François Rouet (May 15, 2012)

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Figure 1. Cover slide of the festschrift symposium in honor of Charles Perfetti held in Poitiers, France, July 10, 2011.