

READING RATE

A Review of Research and Theory

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*School of Education
University of Missouri—Kansas City
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READING RATE

To Mary Lou

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PREFACE

What do we know about reading rate? This book is a long answer to that question.

Prior research on reading rate has had little impact on current research or practice in reading, probably because there has been no organizing conceptual framework. Reading rate typically has been viewed as peculiar to the situation, rather than lawful. In this book, I have reviewed 100 years of reading rate research, including such areas as eye movements, silent speech, comprehension, word recognition, oral reading, textual presentation, automaticity, and speed reading. A theoretical framework has been used to organize and interpret this research. Contrary to the prevailing view, I have found reading rate to be highly lawful and predictable.

Chapter 1 contains an overview of the research reviewed in Chapters 3–20. Chapter 2 contains the theoretical foundation necessary for comprehending the lawfulness underlying all of this research. Chapter 21, the last chapter, is a summary of my findings.

The book is for all those who want to learn what science can tell us about reading rate. Therefore, it should be of interest to researchers in reading, language arts, psychology, and education, as well as teachers, clinicians, college study skills specialists, lay persons, and those who teach speed reading courses to people in business.

Reading rate has been a favorite research interest of mine during the past 25 years. I have long wished that someone would review all the research that has been conducted on this topic, but always found excuses why I should not be the one to do it. About five years ago, I finally gave in to my sense of duty and requested a research leave for one semester to start on this task. When the University of Missouri–Kansas City (UMKC) actually granted my request for leave, I had mixed feelings. I greatly

appreciated their gift of time but there were no excuses left. I could no longer avoid this laborious and time-consuming task.

After I started reviewing articles, I was surprised to find I actually enjoyed it. The research data were not very difficult to organize and made a great deal of sense from my theoretical framework. I became engrossed in the wealth of empirical data collected by researchers over the years, many of whom are now dead. My hat goes off to all those persons who understand that the scientific method only works when our theories, ideas, and hypotheses are tested by collecting data, facts, and empirical evidence.

I could never have written this book without the patience and support of my wife, Mary Lou. Besides her, UMKC, and hundreds of researchers, I must acknowledge the help I received from colleagues who criticized draft chapters. Fortunately, I have good friends who will tell me when I have food on my face and *faux pas* in my manuscript. They know that the manuscript would never have been published if they had not given me their best advice. They are as follows: Ed Coleman, Mark Condon, Donald Doehring, Donna Emery, Linda Gambrell, Arthur Graesser, Frank Greene, Martha Haggard, Mark Jackson, George Klare, Patricia Koskinen, Betty Ann Levy, Michael Masson, George McConkie, Larry Mikulecky, and Edward Sipay.

A great deal of credit also goes to Suzan Murphy, Betty Jean Green, Lois Nesbit, and Felicia Stewart. They typed and corrected the manuscript innumerable times over the past few years. They were able to take my messy handwritten pages and make them bookworthy; I am grateful.

During the time I spent working on this book, I think I increased my knowledge about reading rate one hundred-fold. I hope those who read it can do the same.

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Part I

The First Part

This book contains a review of research and theory relevant to reading rate; it is divided into five parts. Part I, which follows, contains two introductory chapters. Chapter 1 describes how research studies on reading rate were selected for review, and how the entire book is organized. Chapter 2 introduces the reader to the essentials of reading rate; it contains the prerequisites for understanding the remaining chapters.

1

INTRODUCTION

Reading rate has been of great interest to researchers at least as long ago as Huey (1908) who considered reading rate to be “. . . of the greatest importance practically and pedagogically . . .” (p. 170). One purpose of this book will be to review the research literature and summarize what we have learned about reading rate since Huey. This review will be organized around the theoretical framework afforded by reading theory (Carver, 1981). After the research has been reviewed, methodological techniques will be recommended for designing future research.

The readers of this book are no doubt expecting to find that prior research on reading rate has been reviewed with great thoroughness. They should not be disappointed. However, they may be surprised when they find out how closely the research has been related to theory. The readers may also be surprised when they find that the content extends well beyond reading rate into how all future research on reading could be conceptualized, designed, and interpreted. For example, an attempt has been made to clarify the concept of reading comprehension; ways of measuring it are also made more explicit.

The readers will find numerous reanalyses of previously collected data, providing new results and interpretations that are sometimes completely counter to conventional wisdom. For example, good readers generally do not change their rate with the difficulty level of material—as Woodworth (1938) contended. And, good readers generally do not change their rate from moment to moment with the difficulty of words or phrases—as Just and Carpenter (1980) have suggested.

Research on reading rate has not been given much attention in recent years. Many researchers seem to treat reading rate as a nuisance that can be safely avoided; for example, reading rate is hardly mentioned in the

Handbook of Reading Research (Pearson, 1984). Perhaps this is because rate is generally considered to vary with purpose, difficulty, and a host of other variables in unpredictable ways. One purpose of this book is to explicate the lawfulness of reading rate, showing that it can be predicted with surprising accuracy under most experimental conditions. An attempt will be made to demonstrate the importance of reading rate when theorizing, designing, and analyzing, even when the focus is on reading comprehension. Rate is an inextricable dimension of what happens during comprehension; the accuracy of comprehension can be increased by decreasing rate, and rate can be increased by decreasing the accuracy of comprehension.

The present investigation was initiated by ordering a computer search of three data bases: Educational Resources Information Center (ERIC), PsycINFO (formally known as Psychological Abstracts), and Language and Language Behavior Abstracts (LLBA). English language articles were selected that had "reading rate" or "reading speed" as a key word descriptor. From printouts containing over 600 citations, about half were eventually disregarded. Citations were almost always disregarded if they were in any of the following categories: (a) duplications; (b) dissertations; (c) foreign language journals; (d) newsletters; (e) regional, state, or local journals; (f) convention presentations or proceedings; (g) technical or progress reports; (h) unpublished papers; (i) involved special problem students such as blind, deaf, stutterers, learning disabled, and foreign language; (j) primarily involved speech production; (k) involved reading graphs, tables, and visual displays; and (l) were focused on nonreading factors such as body movements, shyness, hypnosis, coronary-prone, and transcendental meditation. Also excluded were articles that measured time instead of rate unless: (a) it was possible to calculate rate from other information given, or (b) the article was uniquely important for some other reason.

Dissertations have not been reviewed for the following reasons: (a) they are not published research that has successfully withstood the rigors of review by editors and researchers in that area, (b) the higher quality dissertation data are ordinarily published, and (c) dissertation studies are not regarded as being on the same level of quality as published research in most fields of science. Certainly, some exceptions may be found; however, there is little reason to expect that omitting dissertation data constitutes a systematic bias.

A review of the selected articles led to other relevant cited articles which were obtained and also reviewed. In addition, some articles were located from prior reviews of the literature (Berger, 1966; Hanson,

1968; Harris, 1968; D. Miller, 1966) and various annotated bibliographies (Berger, 1967; 1968b; Berger & Peebles, 1976).

The above sources, plus others personally collected through the years, were sorted into common topics, and a chapter has been devoted to each topic. In the following chapter the case will be made for separating reading activities into five basic processing types prior to reviewing reading rate. Chapter 2 contains the essentials for understanding much of the material contained in the remaining four parts of this book.

Part II will focus on such fundamental factors as effects of context, individual differences, tasks, and materials (Chapter 3); silent speech (Chapter 4); and eye movements (Chapter 5).

Part III will review research relevant to the five basic reading processes—scanning and skimming (Chapter 6); rauding (Chapter 7); learning and memorizing (Chapter 8)—and then relevant theory will be treated in more detail (Chapter 9).

Part IV covers factors influencing reading rate, that is, flexibility (Chapter 10); growth (Chapter 11); word recognition and cognitive speed (Chapter 12); rauding (Chapter 13); oral reading (Chapter 14); textual presentation (Chapter 15); comprehension (Chapter 16); automaticity and practice (Chapter 17); and rapid reading training (Chapter 18).

Part V, the last part, is a miscellaneous collection of three chapters. Chapter 19 is a review of research on speed readers; Chapter 20 contains recommendations about methodology; and Chapter 21 contains conclusions drawn from all the theory and research reviewed.

After the last chapter, Appendix A contains a short article by E. B. Coleman that is relevant to Chapter 5 on eye movements, and Appendix B contains a table for converting reading rate into grade equivalents. Then a glossary has been provided. Finally, the references for all chapters are presented.

The term “rauding” is a new term for many readers (see Glossary). In its simplest form, rauding means reading with comprehension. More precisely, rauding means to attend to each consecutive word and understand the complete thoughts in the successive sentences of passages. In rauding theory, mentioned earlier, rauding rate plays a prominent role (Carver, 1981). Rauding rate is the fastest rate at which the rauding process can successfully operate on relatively easy material. Throughout the remaining chapters, rauding theory will provide a framework for reviewing the research on rate. This theoretical framework will make it easier to organize results so as to answer many important questions. A list of such questions is presented next; these questions will be answered in the last chapter.

1. Do most individuals read at a relatively constant rate?
2. Is silent speech—covertly talking to oneself—harmful to reading, and does it slow down reading rate?
3. Is reading done by looking at each word, or can reading rate be increased by skipping the less informative words with no loss in comprehension?
4. When individuals read at their typical, normal, natural, or ordinary rate, is that their most efficient rate?
5. Is there only one reading process, or are there several different processes that can all be legitimately called reading processes?
6. What determines how fast individuals typically read?
7. Are good readers also flexible readers in that they automatically adjust their rate to the difficulty of the material and to their purpose for reading?
8. Is there more growth in reading rate each year during the early grades of school as compared to the later grades?
9. To what extent is reading rate influenced by word recognition speed?
10. What is the relationship between the rate of comprehension during reading and the rate of comprehension during auditing?
11. What is the relationship between oral reading rate and auditing rate?
12. Can the rate at which the auditing process operates be increased by grouping the words in passages into more meaningful units or phrases?
13. What is the relationship between rate and comprehension?
14. What does automaticity have to do with auditing rate?
15. Does rapid reading training increase auditing rate so that individuals can increase their rate of comprehension on passages without any loss in their accuracy of comprehension?
16. Are there individuals who can successfully operate their auditing process at rates greater than 600 words per minute, or stated differently, are there speed readers or super readers who have auditing rates greater than 600 words per minute?

The following 20 chapters contain research and theory relevant to the above questions. Approximately 500 articles and books have been cited, and over 250 research studies have been summarized in considerable detail. After reviewing this research, the last chapter answers the above questions and summarizes the most important conclusions relevant to reading rate.

READING RATE ESSENTIALS

INTRODUCTION

The concepts and constructs discussed in this chapter are essential for understanding the review of research and theory presented in the remaining chapters. There is a great deal of lawfulness associated with rate, but it is apparent only to those who are willing to deal with the complexities involved. The prerequisites for dealing with these complexities are explained in this chapter.

Reading rate is a concept that refers to how fast words are covered while reading. Ordinarily, the words are in the form of sentences that make up paragraphs or passages. Ordinarily, reading means nothing more precise than looking at the words from beginning to end in approximately serial order. So, reading rate can be measured quite simply by counting the number of words in the passage that have been covered during the length of time that a reading process has been operating. For example, if 300 words were covered in 2 minutes, then one way to express reading rate would be $300/2$ or 150 words per minute (wpm). However, reading rate has also been measured in other ways, such as syllables per minute and letters per second. Much of the lawfulness of reading rate does not become apparent unless reading rate is measured in standard length words. So it is essential that the reader understand standard words and how they are measured.

Another essential idea required for understanding rate is that reading can involve more than one process. These processes have been divided into five basic types called scanning, skimming, rauding, learning, and memorizing. The rauding process is the one that operates normally, but individuals are often induced to shift out of this process by the instructions, the objective consequences, and the relative difficulty of the mate-

rials used in an experiment. The concept of shifting gears from one basic process to another is also essential to understanding reading rate.

Since the most important reading rate is that associated with the rauding process, it is essential that the existing constructs and laws associated with that process be introduced. The concept of reading rate will be refined into several precise constructs of rauding theory, and then the laws interrelating these constructs will be presented in the form of mathematical equations.

The following sections contain more detailed explanations of measuring reading rate, the five basic reading processes, shifting gears from one process to another, and the relevant constructs and laws of rauding theory. Unless the traditionally global concepts of reading rate and reading comprehension are precisely defined using several theoretical constructs, the lawful nature of reading rate will continue to elude us. Furthermore, successfully dealing with the complexities presented in this chapter is essential for understanding the empirical data reviewed in the remaining chapters.

MEASURING RATE

Introduction

Reading rate can be measured in many different ways. A common metric is needed so that research that, for example, measures rate in words per minute can be compared to research that measures rate in syllables per minute. Standard length words are used to provide a common metric. Formulas are given for converting from one metric to another. Then, normative data is presented which indicate what reading rate can be expected for students in each grade of school.

Standard Length Words

Most studies that measure reading rate do so by counting the actual number of words covered, as noted earlier. The word and its length are basic units in reading (e.g., see Friedrich, Shadler, & Juola, 1979). However, easier material has shorter words on the average (see Carver, 1976). Therefore, 150 words on passages at the first grade level of difficulty represent less material covered than 150 words on passages at grade level 12 in difficulty. One solution to this problem would be to count syllables and report rate in syllables per minute. For example, there may be 225 syllables in the 150 words of a grade 1 passage and 275 syllables in the 150 words of a grade 12 passage. However, syllables are difficult to count and even more difficult to count accurately.