Readability: Text and Context

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Preface

The roots of this book originate in an article, entitled "The Linguistic Assumptions Underlying Readability Formulae: A Critique," that we published in the journal *Language and Communication* in 2001. That article addressed serious shortcomings we had identified with readability formulas that were and continue to be widely used as the standard method for educators, librarians, and publishers to assess the reading levels of the texts that are used in schools. Readability formulas are also used by the developers of standardized tests to rank the difficulty of texts that are then used to assign reading levels to students. It hardly needs to be stated that the impact of standardized tests, although substantial when we wrote the article, has escalated significantly.

Our principal argument was that despite their widespread use, readability formulas were based on assumptions about linguistic complexity that simply were not supported by an understanding of what linguistic theory has taught us about language. Equally disturbing was the fundamental assumption behind readability formulas that readers' knowledge of vocabulary, as well as their more general background knowledge, were homogeneous and that this knowledge could be reflected in a score returned by a readability formula.

We were surprised by the interest this article was continuing to generate. Another fact surprised us. Although the original article was aimed primarily at educators and librarians, we found that it was being cited by researchers and practitioners from fields as diverse as psychology, applied health sciences, accounting, and business education—in addition, of course, to scholars in the field of education.

In reviewing the research that used our article, we observed a general frustration with a lack of guidance on how to create effective written communication for a readership with a wide diversity in education, backgrounds, and knowledge of English. Nevertheless, in the absence of anything more substantial, researchers and practitioners tended to resort to—sometimes tweaking to some degree—the only metrics that have been available: readability formulas.

Based on some of the research that used our article, as well as other research on readability, we believed there was a pressing need for researchers to explore a principled approach to readability that considered more than just superficial correlations among formal properties of

written communication. This book is an attempt to discover grammatical, semantic, and discourse properties of texts that either facilitate or impede readability, and to assess these properties relative to the contextual and prior knowledge that readers themselves bring to texts.

This book makes no claims at being a procedural manual for creating readable texts. What it does do is to examine a wide range of evidence pointing to factors that have an effect on readability. By identifying such factors, we believe the book can provide guidance to writers and educators. Although this book perhaps asks as many questions as it answers, it is an attempt to begin to establish a direction for a unified study of readability. It is our profound hope that this book will spark future research into this very important area.

We are indebted from the very early stages to two reviewers of our initial proposal that were selected by Palgrave Macmillan. Their observations were insightful and the questions they asked were influential in shaping this book. We have also benefited from discussions with our colleague, Professor Melanie Freese, whose knowledge of early reading instruction for the primary grades is considerable. We are eternally grateful to our friend and colleague, retired Professor Martha Kreisel, whose expertise in preparing bibliographies was invaluable and who meticulously compiled our reference list. Finally, we would like to acknowledge the proactive support and assistance of Libby Forrest, Assistant Editor for Language and Linguistics.

We dedicate this book to our daughters, Naomi and Rebecca, who have always recognized the value of effective written communication.

About the Authors

Both Alan Bailin (PhD, McGill) and Ann Grafstein (PhD, McGill) have extensive experience in research and writing about issues related to the communication of information. They have co-authored a book entitled *The Critical Assessment of Research: Traditional and New Methods of Evaluation* (2010), which received many positive reviews. In 2001, they published an article entitled "The Linguistic Assumptions Underlying Readability Formulae: A Critique" in the journal *Language and Communication*.

Alan Bailin is Professor of Library Services at Hofstra University. He has published a book, *Metaphor and the Logic of Language Use* (1998), and a number of articles on figurative language, including, most recently, "On the Characteristics of Verbal Irony" (*Semiotica* 2015). He co-authored an article on effective communication in Web tutorials entitled "Online Library Tutorials, Narratives and Scripts" (*Journal of Academic Librarianship* 2007, 33), which was considered one of the top twenty articles on instruction in 2007 by the American Library Association's Library Instruction Round Table.

Ann Grafstein is Associate Professor of Library Services at Hofstra University. She co-authored *An Ojibwa Lexicon* (1983). Her article "A Discipline-Based Approach to Information Literacy" (*Journal of Academic Librarianship* 2002) received the prestigious Association of College and Research Libraries Instruction Section Publication Award in 2004. She has also published articles in the field of theoretical linguistics, including "Disjoint Reference in a Free Word Order Language" (in *Theoretical Approaches to Native American Languages* 1989).

1
Introduction to a New Approach to Readability

Why is something easy to read? Why is one text easier to understand than another? Are some works understandable only if you have achieved a certain level of reading ability? These are the kinds of basic questions with which the study of readability is concerned. The term "readability" has often been associated with readability formulas (Klare 1963: 29): statistical tools intended to objectively measure the relative difficulty of texts. However, on the most basic level it is an inquiry into what properties of texts help or hinder communication.

Readability is a topic of importance to both practitioners and scholars across a wide range of fields and interests, including education, applied and text linguistics, library science, and business, medical, and technical communications. On a practical level, readability criteria are needed for a wide variety of tasks, including selecting appropriate reading materials, effectively communicating technical, medical, and business information to both specialists and non-specialists, creating standardized tests, and teaching writing and communication skills. On a theoretical level, readability is relevant to areas such as applied linguistics, text and discourse theory, and natural language processing.

Although there are many articles concerned with readability from various perspectives, there have been no recent attempts to consider the field more generally, as an area of scholarly research, albeit one of practical import. This book is an attempt at such a study. It brings together the relevant literature and theories, and situates them within a unified account. We hope that it will serve as a one-stop resource for both scholars and practitioners who seek a single source that offers a comprehensive, principled discussion of the issues. While written from a linguistic perspective, the book also makes practical suggestions based on the wide range of research it examines.

Evidence

We look at readability as determined by a variety of linguistic factors, including syntactic, semantic, morphological, and textual (discourse) properties. We use a variety of different kinds of evidence to support and refute hypotheses in a number of areas of linguistic research and within different theoretical approaches to these areas. For example, contemporary theoretical approaches to syntactic theory (especially of the Chomskyan variety) often use the intuitions of the native "speaker/hearer," while other areas of linguistic research such as psycholinguistics and corpus linguistics use different kinds of evidence. Psycholinguistics tends to use evidence from controlled experiments, while corpus linguistics frequently examines naturally occurring texts, looking for statistical relationships. We are not concerned with which type of evidence—if any—is inherently superior. We believe that a study of readability calls for the use of all evidence that has bearing on the issues, and that claims about readability should be supported (and disputed) by whatever evidence is available.

However, as we will see when we review various attempts at creating readability formulas, examining evidence with the intent of building a theory based strictly on the degree of correlations is highly problematic. A standard maxim often taught to students when they are introduced to statistics is "correlation is not causation." Efforts to create readability formulas on the basis of simple correlation provide substantial evidence to support the saying. One of the major problems with an extreme empirical approach is that it tends to lead researchers to focus on correlations that may or may not be present outside of the texts they are examining. This is not to say that there may not be more general underlying processes responsible for a particular correlation in a specific corpus. Still, an examination of readability formulas clearly shows a tendency not to look for underlying processes but to focus on the surface co-occurrence of elements—a tendency that has led different researchers to tweak one factor or another in the hopes of creating a better formula. What tends to be lost is the search for the underlying processes.

To identify underlying processes, theories are necessary. However, theories are only as good as the evidence which they can account for, and claims made on the basis of a theory without evidence are not much more than idle speculation. On the other hand, frequently, evidence that supports one theory can also support many others as well, so in examining the plausibility of a theoretical claim it is important to look for more than one type of evidence to support it.

For example, consider the sentence "the horse raced past the barn died". In reading this sentence devoid of a particular context, a reader may well think that *raced* is the main verb until he or she reaches the end of the sentence and can identify *died* as the word that actually functions in that role. At that point the reader has no choice but to go back and to reanalyze *raced past the barn* as a participial phrase (or truncated subordinate clause, depending on the syntactic theory being used to understand the process). Some of the evidence that sentences with "garden path" interpretations are difficult to follow can be easily found in computational linguistic discussions. These computational discussions present evidence that relates to the operations of computational parsing mechanisms. However, the way a human being makes sense of a sentence is not necessarily the same as the way a formal parser does. Other kinds of evidence are necessary both to support a hypothesis and to gain a better understanding of the way in which such sentences are difficult for humans to understand. Fortunately, evidence about how humans approach garden path sentences is available from psycholinguistic research.

This is not to say that experimental tests cannot themselves be problematic. Reading comprehension tests, for example, may be affected by all kinds of factors, including the kinds of questions that are asked. So, for example, Shohamy (1984) concludes from her study of certain testing methods that

> [t]he results obtained in this study point to differences in students' scores on RC [reading comprehension] as a result of a different testing method and different language used based on the same L2 [second language] texts. Some methods were found to be more difficult than others, and to have a greater effect on students of low-level proficiency. (159)

In other words, Shohamy found that the testing methods could affect the results.

Again, it is important to emphasize that since every kind of evidence has inherent limitations, robust theoretical claims can only be based on a wide range of different kinds of data. One may argue that evidence used to support linguistic theories is less viable because it is frequently based on intuitions which may have been influenced by the theories they are intended to support. Each kind of evidence has limitations, but a theory that can account for many kinds of data, we would argue, is less likely to be affected by the limitations of a particular type of evidence.

This is not to say that readability research is often able to find more than one kind of evidence to support a contention. However, to the extent that the claims made here and elsewhere fall short of this standard, this should be understood as an invitation for more and different kinds of studies to confirm or refute the claims.

We have hoped and assumed that the readers of this book will come from a diverse range of disciplines and that the book will be accessible to anyone with a professional interest in the principles of effective written communication. Consequently, although we use evidence from a number of technical disciplines, including linguistics and psycholinguistics, we have attempted not to presuppose that our readers are equipped with any specialized knowledge prior to reading this book, or that their interest is necessarily in any way theoretical. Nevertheless, in order to make our arguments in a sufficiently rigorous manner, technical details were necessary. Readers for whom this amounts to too much information, however, can focus exclusively on the general discussion: we have tried to ensure throughout that the arguments we make will be clear even for those who cannot or do not wish to follow the more technical details. While we believe these technical aspects enrich the discussion substantially, the work is intended to be comprehensible to the less technically inclined.

Some basic concepts

There are some basic concepts on which this work depends. The first of these is the concept of text. For our purposes a text is a body of written language containing one or more words, phrases, or sentences used for the purpose of communicating. So, a book comprised of a set of random words generated by a computer would not qualify as a text for us. On the other hand, two words written down for the purpose of passing information from one person to another would qualify.

By the word *written* we mean any visually comprehensible encoding of language, including alphabetic, ideogrammatic, or hieroglyphic systems. The material form in which the writing is encoded—for example, print, digital, or handwriting—is of no concern to us here. We are not suggesting that the material presentation can have no effect on communication. However, it is not the focus of this book. Our concern here is only with the language that has been written down for the purpose of communicating something to somebody—and not with the physical form in which it happens to be presented.

A variety of linguistic studies have identified properties of texts and contexts that can affect comprehension. In order to move the study of

readability beyond correlations, we propose examining these properties with an eye to constructing a theory of readability. More specifically, we propose that readability can best be understood through three basic concepts related to textual comprehension: (i) linking of units of information, (ii) ambiguity, and (iii) background knowledge. Let us look a little more closely at each of these concepts.

Linking

Linking refers to the ability of a reader to connect units of information on the word, sentence, or discourse level. One example which can pertain to readability is what is sometimes called in syntactic theory a "self-embedded structure." One example of such a structure is (1):

(1) The boy the girl the men left watched then left.

Sentences like (1) are nearly impossible to understand. While we go into more detail in the third chapter (see the "Syntactic complexity" section), for the moment it is sufficient to say that people find such sentences difficult because it is difficult to link each of the three noun phrases (*the boy*, *the girl*, *the men*) with the correct verb (*left*, *watched*, *left*). Here the issue of linking relates to syntactic units of information: how noun phrases are linked to verbs.

What is true of sentences is also true of other aspects of texts. In particular, we will show that linking can play an important role in our comprehension of texts. So, for example, narratives can contain stories embedded within stories that are in turn embedded within stories. This can make it difficult for readers to link together units of information so that they can understand the text (see Chapter 5, "Domains").

Ambiguity

Ambiguity is another property of texts, we will argue, that can affect their comprehensibility. Ambiguity refers to the possibility of multiple meanings and, like complexity, may be a property of the word, sentence, or discourse. The most familiar kind of ambiguity is lexical. Take, for example, the word *chair*. Taken as a noun, it can refer to something one sits on which has a back, or it can refer to a person who is functioning as the head of an organizational unit such as a committee or academic department. Ambiguity may also be a property of a sentence. In sentences, ambiguity is caused either by an ambiguous grammatical structure, or by one or more words or phrases in the sentence having more than one meaning. Syntactic ambiguity is exemplified by the rather well-known sentence

(2) Flying planes can be dangerous.

Depending on whether *flying* is interpreted as an adjective modifying *planes* or as a verb (in what is called a gerundive form), (2) can mean either mean (3a) or (3b):

(3a) Planes that are flying can be dangerous.
(3b) It can be dangerous to fly planes.

Sentence ambiguity can also result from word ambiguity as in (4):

(4) The bat flew through the air.

Two of the possible meanings of example (4) are that a living animal called a bat flew, or that a nonliving (baseball or cricket) bat flew through the air. The set of inferences that follow from (4) depend to some extent on which meaning of *bat* is understood. In standard contexts, if the first meaning is chosen, one would infer that the entity was animate while if the second is chosen one would, to the contrary, infer it is inanimate. If the first is understood, then we might infer that the bat was flying using its wings; if the second, we would likely infer that something other than the bat caused it to fly. In other words, the two choices can result in inferences that are inconsistent with each other.

It should be noted that this kind of word ambiguity results in ambiguous reference in a text. In (4) it poses the question of what *bat* refers to. However, ambiguous reference in a text is not necessarily a function of word ambiguity. It can occur any time the reference of a word or phrase is unclear.

(5) The boy and the dog were playing in the park. He ran into a tree.

Here the word *he* can be referentially ambiguous. Does it refer to the dog or the boy? The meaning of *he* is not the issue. It is purely a question of what the pronoun refers to.

No matter what the source of the ambiguity, it is resolved by context in most cases. However, as we will see, when context does not resolve ambiguity (and sometimes even when it does), a text may be more difficult to read as a result.

Contextual (background) knowledge

For the purposes of this book, contextual knowledge refers to any information that the reader uses to make inferences from a segment of the

text. It includes readers' knowledge of word meanings as well as general information relevant to interpreting a text.

Contextual knowledge is not static from our perspective. It includes not only the prior knowledge and assumptions that readers bring to a text, but also the inferences from the text that readers use in interpreting subsequent parts of the text. In Dostoyevsky's (1978) novel *Crime and Punishment*, for example, readers use the information that the protagonist commits a murder in understanding subsequent parts of the novel. In many scholarly and scientific works, the meanings of words and terms are assigned specific definitions for use in the text. Readers use these technical definitions in understanding the rest of text. Although in some cases the kinds of inferences you can make depend on where the background knowledge comes from (see the discussion of garden path sentences in Chapter 3), for the most part we will not differentiate between contextual knowledge readers bring independently to the text and contextual knowledge they infer from elsewhere in the text. What you have read previously in a text and what you know independently of the text are both part of what you use to understand other parts of the text.

We will argue that if readers lack the contextual knowledge to understand the text, either because they did not begin with sufficient information or because they failed to understand parts of the text, the text may be more difficult for them to read. This is rather clear in the case of vocabulary. If readers do not know the meanings of many of the words in a text, that text will be difficult for them to read. In subsequent chapters, we will see, however, that this is by no means the only way contextual knowledge may impact readability.

The chapters: an outline

In the next chapter, we look at some of the more well-known readability formulas and place them within a historical context. We trace the roots of readability to classical rhetoric and show how the focus changed from argumentation to communication. We also show that the focus on the formal features of texts is not an exclusively modern concern. In the medieval period rhetoricians developed formulaic templates that have echoes in the modern period. In discussing modern readability formulas we show that their sole focus on ranking texts and trying to match texts to readers has encountered significant difficulties. We conclude the chapter with a critique of the general approach of modern readability formulas, specifically with respect to their ways of calculating levels of difficulty, the kinds of variables they use for measurement, and their inability to provide writers with useful guidance in producing more readable texts.

Each of the subsequent chapters focuses on how different aspects of text and context impact readability from the perspectives of linking, ambiguity, and background knowledge.

In Chapters 3 and 4 we look at two of the traditional areas of concern for readability formulas: grammar, and word and sentence meaning. In Chapter 3 we examine the issue of grammatical complexity and offer various criticisms of the way it is frequently conceptualized in readability formulas. We begin by distinguishing between syntactic complexity and sentence length, and show that neither by themselves is a readability issue. We then develop a conception of problematic grammatical structures consistent with current linguistic and psycholinguistic research on syntax and morphology. More specifically, we examine how certain kinds of grammatical structures can interfere with comprehension and reading ease, and argue that all of these structures pose problems in linking together grammatical units. Chapter 3 also examines syntactic ambiguity and the role that context plays in helping to resolve ambiguities that might otherwise be problematic. We show that context can mitigate the effects of grammatical complexity and ambiguity. We note, however, the interesting evidence that for certain sentences (commonly considered "garden paths") there are times when comprehension is affected by the ambiguity even when the ambiguity is resolved.

Chapter 4 examines how the ability of a reader to understand the meaning of words and sentences affects the readability of a text. Here we consider word and sentence meaning in relation to familiarity, context, and reference. We begin by examining the issue of word difficulty and argue that the number of syllables does not necessarily affect difficulty. Readability formulas often assume a basic uniformity of vocabulary across various demographic and interest groups. We present evidence that contests this assumption with particular reference to reader background knowledge. We consider the implications of this evidence for readability research. We also examine semantic ambiguity and how it can interfere with comprehension even when the reader is unaware that there is an ambiguity.

Chapter 5 discusses coherence and discourse. Coherence is often discussed in relation to readability as simply a matter of using connecting words, word repetitions, and similar devices. This chapter, however, explores the issue of coherence in greater depth, examining not only mechanical devices such as connecting words, but also a number of factors that enable readers to understand the relationships among the different parts of a text. Some of these factors operate on the macro level, while others have more local effects. Of particular interest are the

notions of genre, frames, scripts, and domains, and the ways in which they relate to the readability of a text. The chapter also considers metaphorical language and the ways in which metaphor can both impede and facilitate the comprehension of a text.

The final chapter discusses how the properties and concepts we have developed throughout the book can be used to build a more robust conception of readability. Such a theory will not rely on the incidental correlations of properties, but rather will be part of a theoretically and empirically based theory of text. We review the ways in which properties of background knowledge and assumptions, grammatical structure, and textual organization can affect readability. We argue that a robust theory needs to account not only for the role in readability of properties in each of these areas, but also for the impact on readability of their interactions. Readability formulas have too many flaws to even offer sound practical advice. We suggest various ways that the concepts we have developed in our study can be used for practical purposes.

2
Readability Formulas

Historical background

In the most general terms, readability is concerned with effective communication of ideas and information. It is not, however, simply another term for communication studies. Its focus is not primarily the process of communication, nor even more specifically the process of communication as it relates to the reading of written texts. The study of readability is the study of those properties of written texts that aid or hinder the effective communication of ideas and information.

The focus of this book is to a substantial degree particularly modern. While classical rhetoric was concerned with communication, its focus was primarily on oral rather than written texts (Perelman 1991), and the study was directed not at achieving effective communication but rather at creating persuasive arguments. With this focus in mind, Aristotle notes in his *Rhetoric* that "The modes of persuasion are the only true constituents of the art: everything else is merely accessory." He writes:

> to a certain extent all men attempt to discuss statements and to maintain them, to defend themselves and to attack others. Ordinary people do this either at random or through practice and from acquired habit. Both ways being possible, the subject can plainly be handled systematically, for it is possible to inquire the reason why some speakers succeed through practice and others spontaneously; and every one will at once agree that such an inquiry is the function of an art.
>
> (Aristotle 1941: 1325; I: 1354a)

Aristotle criticizes other writers for concentrating on "[t]he arousing of prejudice, pity, anger, and similar emotions" not because they are

irrelevant to the art of persuasion but because for him they have "nothing to do with the essential facts"—that is, to the contestation of the facts of the argument.

Although clearly more concerned than Aristotle with elements related to arousing emotion, Cicero too clearly believes that the focus of rhetoric is argumentation and persuasion, noting that the parts of rhetoric are

> … Invention, Arrangement, Expression, Memory, Delivery. Invention is the discovery of valid or seemingly valid arguments to render one's cause plausible. Arrangement is the distribution of arguments thus discovered in the proper order. Expression is the fitting of the proper language to the invented matter. Memory is the firm mental grasp of matter and words. Delivery is the control of voice and body in a manner suitable to the dignity of the subject matter and the style. (Cicero 1949: *De Inventione*, 19 and 21; I: VII, 9)

While sophists may have been more concerned with the eloquence and persuasion than the truth of what they were saying, they too were part of the tradition of *logos*—"thought-plus-expression" (Murphy 1972: 7)—which focused on persuasion, suggesting in at least one case that students "debate both sides of a question in order to train them to understand the nature of controversy and to defend themselves better" (Murphy 1972: 9).

The art of persuasion in oral communication was perhaps the primary focus of the early rhetorical tradition, but it would not always remain exclusively so. During the medieval period, forms of rhetoric developed that focused on written rather than oral communication. The art of letter writing, *ars dictaminis*, is of particular note here because, like many approaches to readability in the modern era, it focused not on content but on the formal aspects of communication.

In the early medieval period, form letters were often used to communicate in writing for certain recurring social and legal situations (Murphy 1974: 199) which were often of a contractual nature, such as a letter stating a subordinate's loyalty to a superior (Murphy 1974: 201) or providing the particulars of a land transaction (Perelman 1991: 99). *Ars dictaminis* focused on such formal elements as appropriate salutations rather than substantive elements related to content such as the logic of persuasion.

Most elements of these forms were fixed, allowing what were in effect blanks for the particulars of person and place to be filled in. In fact, the

art of letter writing may have developed because the simple formulas in which a writer could fill in the blanks could not handle all of the evolving complexity of written communication (Murphy 1974: 202–3). The fixed elements even came to include a rhythmical prose system called *cursus* in which the number of syllables in particular sections was counted in order to achieve specific rhetorical effects. When we begin to examine readability formulas we will encounter in some a similar concern with syllable counting (Murphy 1974: 253).

The increasing uniformity of this rhetorical tradition eventually resulted in a template from which a letter could be created by selecting an item for each part from a fixed set, thus creating a letter in an almost completely mechanical manner (Murphy 1974: 260–3): "… there is no longer any need for invention of materials, for arrangement of parts, or for devising language. Communication … is simply a matter of completing a predetermined checklist" (Murphy 1974: 261).

While the whole move towards the mechanical may well have reached a dead end with this extreme approach, nevertheless, the medieval rhetorical tradition of letter writing has been considered an early prototype of handbooks on effective business writing, with its emphasis on a formulaic approach to communication (Perelman 1991: 98). We may add that with its emphasis on formal elements and de-emphasis of content, in particular of the logic of argumentation, it may also be considered a precursor, at least in spirit, of many modern approaches to readability. Indeed, readability formulas, a modern invention, also often focus on similar formal properties, including appropriate vocabulary items and syllable counting.

However, while readability formulas focus on the ease or difficulty of understanding what is communicated, the Western rhetorical tradition, whether we look at it in its classical or medieval garb, or any of its more modern variants, is primarily concerned with developing strategies for writers to produce texts, not mechanisms for assessing difficulty from the reader's perspective. Whether or not it is primarily concerned with the logic of persuasion or simply the ability to communicate, ease of comprehension is at most assumed.

The rhetorical interest in formal properties did not end with the medieval period. In fact, in the late nineteenth century one scholar notably identified such purely formal analyses with a scientific rather than a medieval approach. A number of readability researchers view L.A. Sherman's *The Analytics of Literature* (1893) as being a historical antecedent to the use of statistical analyses of texts in readability

Thorndike's description of the corpus from which he selected these 10,000 words is instructive. It consists of

> the 10,000 words which are found to occur most widely in a count of about 625,000 words from literature for children; about 3,000,000 words from the Bible and English classics; about 300,000 words from elementary-school text books; about 50,000 words from books about cooking, sewing, farming, the trades, and the like; about 90,000 words from the daily newspapers; and about 500,000 words from correspondence. (Thorndike 1921: iii).

Thorndike's common words are heavily weighted towards the Bible and English classics, as well as children's literature and textbooks. All of the words Thorndike includes are taken from written texts. There is no attempt to discover the words that are actually used by children in everyday speech. This omission is particularly significant because the book is explicitly targeted to school teachers to help them address children's reading difficulties (Thorndike 1921: iv).

Thorndike appears to be completely unaware that a corpus in which the Bible and classical literary works are mainstays may not be the best corpus for identifying the words that are most important for children in understanding their reading material. The assumption underlying Thorndike's vocabulary selection is that a humanist education steeped in literary classics and the Bible was the norm for school children in the 1920s.

Even a brief examination of the word list itself provides examples of questionable credit numbers assigned as a measure of frequency in his word list. *Achieve* has a number of 14, making it one of the most difficult words on the list. *Achievement* comes out even lower (and so more difficult) at a 7, as does *activity*. *Farmer*, at 59 is considered one of the more easy words, as is *farm* at 67, but *farmhouse* at 6 and *farmyard* at 7 are considered quite difficult. Even given differences between standard contemporary vocabularies and those at the beginning of the last century, these rankings would seem counterintuitive.

As already noted, the core assumption underlying Thorndike's list is that the frequency with which a word occurs in the corpus correlates with familiarity for school children. There is, however, no evidence that word frequency in a corpus of printed works—especially one including the Bible and literary classics—has much relation to how familiar these words are to school children (or, for that matter, anyone else).

Thorndike does not provide details about how he selected the words in the *Word Book*. He informs the reader that a full explanation of the methods used for selecting the words could be found in an article

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