Principles of Speed Reading

PETER ROESLER

EXCLAM!

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Peter Roesler has been studying speed reading since 2002, increasing his reading rate from 233 wpm (words per minute) to 450 wpm over two months in 2002. In 2005, he completed the most extensive individual training course available on the market, for learning what is called "purely visual speed reading."

From 2006 to 2009, in collaboration with Prof. Jochen Musch from the University of Düsseldorf, he reviewed a large part of the scientific publications on speed reading and all current and antiquarian German-language books for speed reading.

Peter Roesler is one of the founding members of the German Society for Speed Reading, and became its first chairman.

Peter Roesler is an expert in the field of "software reviews," a sub-area of software quality assurance. He tries to transfer the critical mindset and methodical approach common there to the field of "speed reading," which is characterized by marketing statements and wishful thinking.

Contents

Preface

PLANNING FOR THIS BOOK began in 2005. However, it is fortunate that this book has only just been completed, because in the last ten years we have learned a great deal about speed reading. Even if the “knowledge map” still contains a few blank spots, practical knowledge and scientific publications are gradually merging to form a unified picture.

Rotraut Michelmann and Walter Uwe Michelmann

The contributions made by Rotraut and Walter Uwe Michelmann to the development of speed reading from the late 1970s onwards deserves a special mention. According to current information, they were the first to realize that there are two fundamentally different ways of reading.

In addition to normal reading, a second “cultural reading technique” can be learned, the so-called “purely visual speed reading” (often referred to in this book as “advanced speed reading”). Without this knowledge (and without R. and W. U. Michelmann’s understanding of how one can teach purely visual speed reading), our understanding of speed reading would be insufficient and this book would never have been written.

Evelyn Nielsen Wood

Speed reading was examined by Evelyn Nielsen Wood in the 1950s, becoming known worldwide from the 1960s onwards. Evelyn Wood is probably the first to teach a significant proportion of her students purely visual speed reading. If we want to honor personalities for their contributions to speed reading, Evelyn Wood should be mentioned first and foremost.

Use of “we” and “I”

The book “Principles of Speed Reading” has only one author. This should not serve to obscure the fact that around forty other people have contributed to the findings presented herein. A smaller group of around five people have discussed various speed reading topics with me over the years, finally forming the core of the founding members of the German Society for Speed Reading. This is why both the personal pronouns “I” and “we” are used in this book, whichever is more appropriate. When criticism is voiced, the first person form is generally used (“this speed reading exercise is, in my opinion, ineffective”).

Gender-neutral language was not always perfectly adhered to in this book. Of course, women and men are always intended to be addressed equally.

This book presents the state of knowledge about speed reading that we have currently, in 2016. In the following years, new research may change our understanding of speed reading. Furthermore, like almost all other books, this book will also contain some errors. For this reason, there is a list of corrections ("errata") on the www.speed-reading-teacher.com website, in which all known errors are included and new findings are presented. It should therefore be possible to identify which parts of the book are still valid without changes.

My thanks go to Matthias Baur, Detlef Bielefeld, Michael Buse, Romilly Cocking, Richard Czerny, Oliver Devrient, Alexandra Enser, Peter Fäustle, Johann Flachs, Dr Tilo Fritzhanns, Pascal Gehlert, Thomas Gehlert, Stefan Götz, Johannes Haack, Frank Haferkorn, Jürgen Hampe, Ralf Hobmeier, Dr Norbert Holl, Patrick Jäger, Isabell Jaki, Stephan Jaki, Dominik Jung, Guido Kersten, Ellen Kahl, Ingrid Kleimenhagen, Annette Lehmann, Ralf Linck, Marianne May, Christian Mies, Johannes Nöbel, Valérie Nyffeler, Martin Obermayr, Dr Andrej Pietschker, Jürgen Pollwein, Monika Pollwein, Doris Präcklein, Alfred Rösler, Stephan Schirm, Bernhard Schneiderbauer, Matthias Schroeder, Roland Späht, Dr Sebastian Spörlein, Moritz Thiele, Dominikus Vogl and Gerhard Weileder, who I name on behalf of all those who have helped with the realization of this book, whether as idea givers, discussion partners, training participants or proofreaders.

Munich, January 2016
Peter Roesler

Preface for the English Edition

IT HAS TAKEN MORE THAN FIVE YEARS for the first English edition of this book to be published. Two publications that appeared during this time should be pointed out: Rayner et al. (2016) and Biederman (2019).

Rayner et al. (2016) write: “It is unlikely that readers will be able to double or triple their reading speeds (e.g., from around 250 to 500–750 words per minute) while still being able to understand the text as well as if they read at normal speed.” I agree with this statement in the context of speed reading courses, which only last one or two days. The data from page 177 onwards shows that, with training lasting several weeks, you can increase your speed to an average of 450 words per minute without any loss of comprehension. With even longer training (several months), some participants can even learn purely visual speed reading and read at a speed of significantly more than 600 words per minute (see data from page 211 onwards).

In 2019 Marcia Biederman published the book “Scan Artist: How Evelyn Wood Convinced the World that Speed-Reading Worked,” a biography that is well worth reading. It is exceptionally well researched: Biederman even reviewed original documents on Wood, which were archived at the Utah State Historical Society. However, I would disagree with the main conclusion of the book. Since Biederman assumes that speed reading does not work, she concludes that Evelyn Wood must have been a fraud. In our book, we take a somewhat different view and express the assumption that, in her 1967 courses, less than 10% of the participants successfully learned purely visual speed reading. Wood can be accused of stating an overly high success rate for the courses (“96% successful participants,” see page 92). However, Evelyn Wood is and remains the most important founder figure of speed reading and, in our opinion, deserves more recognition than she has received thus far.

Like the *New York Times*, we have replaced the German character “ß” with “ss” (e.g. “Schnauss” instead of “Schnauß”) and left the umlauts (ä, ö, ü) unchanged (e.g. “Höfer”). I have, however, written my own name “Rösler” as “Roesler,” which is the correct spelling when the umlaut “ö” is not available. Please cite this book with “Roesler, P. (2021). *Principles of speed reading.* Duesseldorf, Germany: exclam.”, not “Rosler . . .”).

My thanks go to Albert Lechner (without his help, the English edition would have been delayed for years) and to Tom Fontanazza, Rory Gaines, Vybhav Sinha and Nitish Tripathi, who helped with the English translation.

For supporting the English translation, I would also like to thank the ZEISS technology group. ("Our mission: As the pioneer of science in optics, we continue to challenge the limits of man's imagination.")

Munich, August 2021
Peter Roesler

An Interview

SPEED READING IS AN AREA in which the teachers do not agree on which methods and exercises work and which do not; neither do the teachers agree on the reading rates which are achievable.

Scientists whose area of expertise includes speed reading (experimental psychologists) show a certain reluctance when faced with the topic. Speed reading is not taken especially seriously by many. The (approximately) one hundred scientific publications known to us give a mixed picture.

Some researchers confirm that speed reading works, such as Brown et al. (1981), Cranney et al. (1982), McLaughlin (1969a), Schale (1969) and Stevens and Orem (1963). Other researchers claim the opposite: Homa (1983) found that the only extraordinary talent exhibited by the two speed readers he examined was the extraordinary rate with which they were able to turn pages. Carver (1971, 1990) is also unconvinced, and writes: "Speed reading is 95% nonsense and 5% sense."

In the following interview, a speed reader from near Munich, Monika Pollwein, asks Peter Roesler some questions about his judgment and experiences with speed reading.

Pollwein: There are people who master speed reading without ever having heard of it. Kim Peek, the autist who died in 2009, was such a natural. We call these people "natural speed readers." How many natural speed readers exist?

Roesler: Roughly estimated, one out of 500 people might have this talent.[1] At the moment, unfortunately, only one or two dozen natural speed readers are known to us by name.

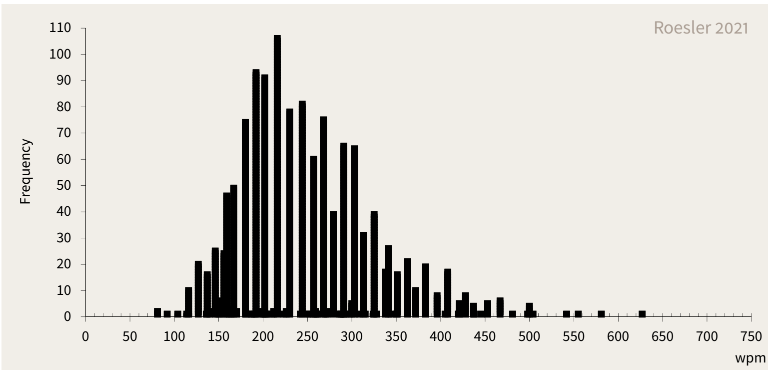
What is the reading rate of these natural speed readers?

Evelyn Wood (1960) examined over 50 natural speed readers. Reading speeds ranged from 1,500 to 6,000 wpm (words per minute), with good comprehension.

How does this compare to normal readers?

1 *The basis for this estimate will be explained later in the book. Most of the other statements in this interview chapter are also substantiated in the following chapters.*

Normal readers usually read at between 100 and 500 wpm, as we can see from Figure F 1.1. The mean value is approximately 250 wpm. This data comes from people who tend to read a lot at work, who account for around half of the population. An average member of the population would likely be a little closer to 200 wpm.



F 1.1
Reading rates for 1,326 adults, mostly graduate-level

If your normal reading rate is, say, 250 wpm, how can you improve it?

One way is to speed up normal reading. Normal reading is limited by the rate of "inner speech." You can practice your rate of inner speech and thus build it up to about 400 or 500 wpm. In this book, we'll label this "basic speed reading." 600 wpm or more is not possible. These figures are suggested by research carried out by Carver (1990), and also correspond to our own experiences.

Does "basic speed reading" work for everyone?

Certainly not. As we can see in Figure F 1.1, some readers already read at 400 to 500 wpm. Many of them have probably already reached their personal limitations. As far as we know today, at least 90% of readers with 350 wpm or less would benefit from such training.

Let's talk about "advanced speed reading": the type of reading that natural speed readers can also master. Sometimes it will be labelled "purely visual speed reading," because the inner voice is completely suppressed in this type of reading. There is no longer a limiting factor, which reduces the speed to below 600 wpm. Is it therefore possible to read almost infinitely quickly?

This would be nice! Unfortunately, another limiting factor is the visual acuity of the human eyes. Visual speed readers try to get the most out of visual acuity by capturing multiple words from multiple lines at a glance. However, these views must then be distributed in a certain systematic way over the page.

These readers have a "two-dimensional view" and literally "scan" a page with few glances.

The possible reading rate is thus 1,500 to a maximum of 6,000 wpm, as we already know from natural speed readers. However, if the reader does not read with a two-dimensional view, but only reads words from one line at a time, as with normal reading, then only about 700 to 900 wpm is possible. This special form of speed reading will be labelled "visual line reading."

How high is the success rate for learning advanced speed reading?

Approximately 50% of participants learn it with the methods we are currently using. This is, of course, unsatisfactory.

Like a study with a 50% failure rate.

Even if you fail, at least you‘ve learned something during your studies. There is no intermediate benefit when it comes to advanced speed reading. It either works or it doesn't work at all.

How many months does it take to learn advanced speed reading?

It takes two to three months until the effect of purely visual speed reading works for the first time. Until then, the participant must invest roughly 30 to 60 hours for exercises and meetings. Additional hours are then needed to reliably repeat this effect and practice it in such a way that visual speed reading becomes a reading technique that can be used at any time.

What about basic speed reading?

The first few percentage increases can be seen within 30 or 60 minutes. A total of five to a maximum of fifteen hours is enough, spread over a period of several weeks, for you to reach your personal limit of inner speech.

Why a few weeks? Many training providers promise that after only one or two days of a seminar, you can read two or three times faster, and your comprehension is said to remain the same, or even improve.

I doubt this. When I attended a 2-day seminar in 2002, my reading rate increased by a factor of three, but I understood only one third.

The "effective reading rate" thus remained unchanged.

Only in the weeks following the seminar did something happen. With 450 wpm, I was able to read twice as fast as beforehand and, most importantly, with full comprehension.

Which exercises did you do after the seminar? Widening your vision span, metronome exercises, etc.?

As I recall, I did all of the exercises included in Buzan's 2002 guidebook. But I now believe that none of the exercises from any of the guidebooks brought about an increase in speed.

What then?

It was probably just the will to read faster. With that, I had apparently accelerated my inner voice in steps over weeks.

Is it really true that not one single exercise from the guidebooks contributed to your increase in speed? Such an implausible assertion needs a particularly good justification.

This point of view only became clear to us in 2011, when Ralph Radach presented his experiments at a German Society for Speed Reading conference. His subjects were able to double their reading rate within about two weeks without significant loss of comprehension (Radach et al., 2010).

Which exercises were used?

The experimental group had followed exercises and advice from the guidebooks. However, the control group did not. Surprisingly, the control group was able to increase its reading rate as much as the experimental group!

So it was not due to the well-known exercises and advice?

The common element of the experimental group and the control group was that only a moderate speed increase was attempted from session to session. In retrospect, we have termed this training format as "comprehension-maintaining speed training." I may have done the same thing intuitively in 2002.

What are your experiences with this training format?

Since then, we have trained almost twenty participants with a slightly modified format. As mentioned above, participants needed five to fifteen hours of practice. The average speed increase was 66%, from 269 to 443 Wpm[2]. And no participant used exercises from the guidebooks!

Then where do these exercises come from? Someone must have invented them.

Some of these exercises are useful for advanced speed reading. This is probably the origin of these exercises. As already mentioned, I think that they are completely superfluous for basic speed reading.

Let's get back to the training providers who promise to double or triple your speed within two days. These figures were certainly not plucked from the air, but measured.

In principle, yes. The reading rate can be measured easily and very accurately.

It is well known that the problem lies in measuring the comprehension level. How do experimental psychologists measure comprehension?

We'll discuss this later in the book. According to Musch and Roesler (2011), there is a serious lack of tests (particularly in German-speaking countries) to adequately assess the comprehension of speed readers. As a result, each training provider had to use their own home-made tests.

Multiple-choice questions are used mostly. Working out such tests can be as methodically complicated as you want them to be. Can a training provider properly manage this?

The questions are too simple in many tests, and can still be answered correctly if you only know the text in fragments. This means that if the participants have only comprehended half or one third in the final test of the seminar, i.e. they have got into "skimming," the test may not detect this, and mistakenly indicate a high comprehension level.

However, neither the participants nor the seminar instructor are aware of this, and everyone goes home happy.

2 *Wpm = standard length words per minute, for definition see page 11. wpm and Wpm differ only slightly.*

I occasionally take the pleasure of answering questions in a final test without having read the text beforehand. This sometimes results in a comprehension level of 50 or even 70%. A methodical, well-designed test should yield about 0%.

How should the teachers measure comprehension then? Do you have any constructive suggestions?

Quite simply, teachers should let their participants estimate what percentage they have comprehended.

And how accurate is this self-assessment? This is a purely subjective procedure.

Surprisingly, comprehension self-assessment is at least as good as other objective measurement methods. According to Carver (1974b, 1985c), it is slightly better even, because the values are less scattered than with other methods.

So your opinion of basic speed reading seems to be definite: You cannot increase your reading rate in a 2-day seminar without losing comprehension.

That's how I see it. Maybe a 20% speed increase can be achieved within two days, but I cannot imagine that you can double the speed of your inner voice within two days. Similarly, I can't imagine an effective muscle or strength training program that only lasts two days. One thing I hope that teachers take away from this book is the use of the self-assessment method for comprehension measurement. This would give teachers a clear indication as to whether or not their training works.

But what if, contrary to expectations, a teacher can prove that their training program can lead to a doubling of the reading rate within two days, without the comprehension suffering?

This training format would then be a candidate for all the science awards that experimental psychology has to offer!

There are many other promises in the guidebook literature. One speed reading method even claims to enable elementary school pupils to grasp the contents of entire books in seconds, even in languages that the pupils do not know! In addition, the students will develop paranormal abilities. What do you think of that?

To my shame, I must confess that I have not yet been able to do all this. But keep this between us, please…

Now on to another thought. We have talked a lot about basic and advanced speed reading. Reading time can be saved not only by reading more quickly, but also by reading less.

This is about "reading management" or, as Rotraut and Walter Uwe Michelmann call it, "planned non-reading." These are techniques that allow you to find the few relevant passages from large amounts of text that you really want to read. Reading management can be considered the "third pillar of speed reading."

Actually, any reader who has a lot of reading material to deal with uses reading management intuitively. Isn't that enough? Can't you get through life without basic and advanced speed reading?

That's easily possible! But no speed reading teacher likes to hear that.

To put it more clearly: It could be a reasonable decision not to take any interest in the topic of speed reading at all. We constantly face an optimizing craze, the eternal "faster—better—further." Does that even make sense?

Admittedly, this is a serious consideration. I do not want to delve into the subject, because I feel that our conversation is gradually taking an undesirable turn. I do want people to learn speed reading!

Will the purpose of speed reading be discussed later in the book?

Sure. At the very end in the book. For now, we are looking towards the exciting world of the speed reading techniques!

Introduction

Normal Reading

For normal reading, there are some basic facts that are no longer controversial in science. In this chapter, we will mainly follow Rayner (1998) and Carver (1990).

Eye movements

What eye movements look like during reading was investigated quite early on (in around 1879, by Hering and Lamare)[1]. When reading, the eye does not move along the line fluently, as one might naively think, but rather carries out jerky movements, i.e. alternating fixations and saccades.

In fixation, the view is fixed on a resting point, usually a word. A skilled reader achieves about four to five fixations per second.

Fixation duration

> The fixation duration for skilled readers is on average 200 to 250 ms[1], but with high variability. For one and the same reader, the fixation duration can range from under 100 ms to over 500 ms within a single passage of text.[2]
>
> 1 *Starr and Rayner (2001)*
> 2 *Rayner (1998, p. 376)*

A saccade is the jump from one fixation point to the next, and takes only a very short time compared to a fixation.

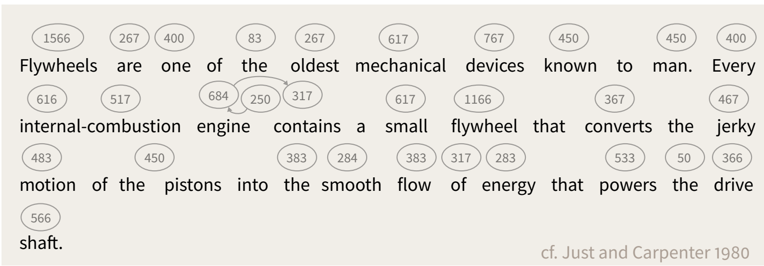
Saccade duration

> The average duration of a saccade is 30 ms.[1]
>
> 1 *Rayner (1998, p. 373)*

In simple terms, almost 90% of reading time is spent looking at words, and in slightly more than 10% of the time the eye moves. Incidentally, information is only recorded during fixation. During the saccade, on the other hand, the eye is "blind,"[2] which can be used for tricky experiments (more on this later).

1 *Wade and Tatler (2009)*
2 *Erdmann and Dodge (1898)*

Figure F 2.1 shows a college student being examined while reading a passage of text. The word "flywheels" was fixated on for 1,566 ms, i.e. more than 1.5 seconds. The eye then jumped to the word "are" (267 ms). The word "one" was fixated on for 400 ms. The following word "of" was not fixated at all, but skipped. Because the visual acuity of the eye is easily sufficient to capture two short words at a glance, the reader is most likely to have grasped and understood the word "of."



cf. Just and Carpenter 1980

F 2.1
Example with fixation durations

Regressions

The arrows in line 2 represent a so-called regression: The eye jumps back in the text. After the word "combustion," the eye jumped very far, i.e. to before the beginning of the word "contains" (250 ms). The preceding word "engine" may not have been correctly captured, and the reader has noticed this (consciously or unconsciously). The reader therefore jumped back to the word "engine" (684 ms) and proceeded with the word "contains" (317 ms).

Regressions are not so rare:

Number of regressions

About 10 to 15% of the saccades are regressions (for skilled readers).[1]

1 *Rayner (1998, p. 374)*

Figure F 2.1 also clearly shows that the eye does not always jump the same distance during saccades. The saccade length is given in "letter spaces," whereby the space between two words also counts as one letter space.

Saccade length

Saccade length: For skilled readers, this is on average 7 to 9 letter spaces,[1] but with high variability: For one and the same reader, the saccade length can range from one to more than 15 letter spaces within a single passage of text.[2]

1 *Starr and Rayner (2001)*
2 *Rayner (1998, p. 376)*

Let's now look at the reading rates that are encountered during normal reading.

Reading rates for normal reading

The reading rate is usually expressed in words per minute (wpm). This is inaccurate insofar as a text with long words cannot be read as quickly as a text with short words. To compensate for this effect, Carver (1990) introduced the term "standard length word." Six letter spaces form a standard word, for example a word with five letters and the space behind it. Standard words per minute will now be referred to consistently with "Wpm" (with capital "W"), see Table T 2.1:

Term	Definition
word	Usual definition, i.e. a word is a string of characters between spaces (with the exception of two words separated by a hyphen being counted as two words, etc.)[1]
standard length word	6 letter spaces[2]
wpm	words per minute
Wpm	standard length words per minute

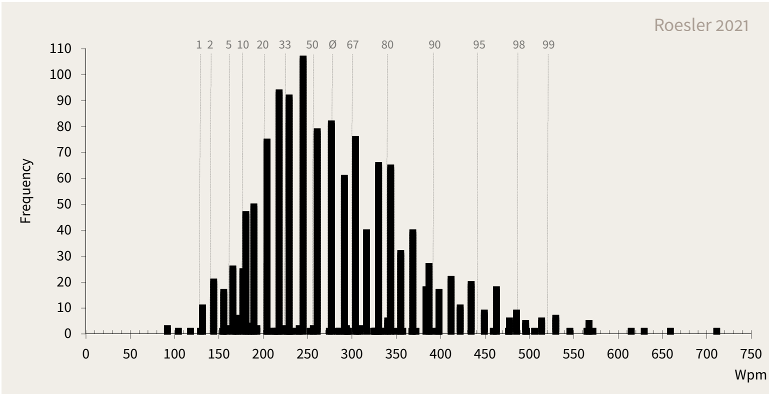
1 *cf. Carver (1990, p. 9)*
2 *Carver (1990, p. 8)*

T 2.1
Definition of word, standard length word, wpm and Wpm

For English texts that are of medium difficulty, the word count differs very little from the standard length word count. For example, the difference in the Wikipedia article on the history of London[3] is less than one percent. (In German, the words are on average a little longer than in English. For example, in the German-language Wikipedia article about the history of London[4], the word count and the standard length word count differ by 17%.)

Let's take another look at the reading rates of over one thousand readers. In contrast to Figure F 1.1 on page 2, in Figure F 2.2 on page 12 the reading rates are already converted to Wpm (standard length words per minute).[5]

3 *Accessed on: Sep 6th, 2011, from http://en.wikipedia.org/wiki/History_of_London*
4 *Accessed on: Sep 6th, 2011, from http://de.wikipedia.org/wiki/Geschichte_Londons*
5 *The Wpm for this German text is 13% higher than the wpm.*



F 2.2
Reading rates of 1,326 adults, mostly graduate-level (in Wpm)

The mean value lies at 281 Wpm and is marked in the number bar above with "Ø."[6] The other numbers denote the so-called quantiles. They are listed in more detail in Table T 2.2 and read as follows:

Whoever reads at least 132 Wpm exceeds 1% of readers. Whoever reads at least 261 Wpm exceeds 50% of readers. Whoever reads at least 530 Wpm exceeds 99% of readers.[7]

%	1	2	5	10	20	33	50	Ø	67	80	90	95	98	99
Wpm	132	144	166	180	204	229	261	281	304	344	398	449	496	530

T 2.2
Quantiles of reading rates

For comparison, you can determine your own reading rate by performing a test by yourself. Follow the instructions on page 274.

The instructions for this self-test are formulated in such a way that most participants will probably read at their normal reading rate, and only a few participants will get into "learning-oriented reading" or "skimming."[8]

The text comprehension is, of course, completely different for learning-oriented reading or skimming than for the normal reading rate. Carver (1990) has formulated a mathematically calculable relationship between reading rate and comprehension, which we will take a closer look at.

6 *The standard deviation is 87 Wpm.*
7 *It should be noted that the data comes from people who tend to read a lot in their jobs. These were mainly software developers and engineers, aged 25 to 65, of whom an estimated 95% learned German as their first language. The values measured were recorded in seminars on software reviews between 2004 and 2014. Because the values were converted from wpm to Wpm, they are probably also typical for native English speakers reading the text on page 274.*
8 *See Carver (1990, p. 18)*

Comprehension Curve and Rauding Rate

Rauding Rate

Sticht et al. (1974) have discussed the reading rate being limited by the speed at which people can speak or understand language through listening ("auding"). According to Carver (1977a, p. 119), during normal reading, each word is articulated internally.[9] Carver (1990) refers to the upper limit of a person's rate of inner speech as their "rauding rate."[10]

Figure F 2.3 on page 14 shows the comprehension curve of a quick, normal reader that Carver (1985a, p. 406) tested. In this illustration, please note that higher speeds are plotted to the left. The "bend" in the curve indicates the rauding rate. This subject has fully stretched normal reading at 492 Wpm and achieves a comprehension level of 79% at this rate.

Skimming

Let's look at the left branch of the curve, which we will label "skimming."[11] If our subject reads faster than 492 Wpm, then the comprehension of the text breaks down linearly along with the increase in speed. The extreme value is reached at the zero point of the diagram: At an infinitely high reading speed, i.e. when the subject does not get to see the text at all, the comprehension is (as expected) 0%. The fact that the left branch of the curve is a straight line running towards the zero point indicates a limiting factor, and leads us to the "effective reading rate."

Effective reading rate

Effective reading rate[1] = reading rate * comprehension level.[2]
Example: At reading rate of 250 Wpm and a comprehension level of 90%, the effective reading rate is 225 Wpm (= 250 Wpm * 90%).

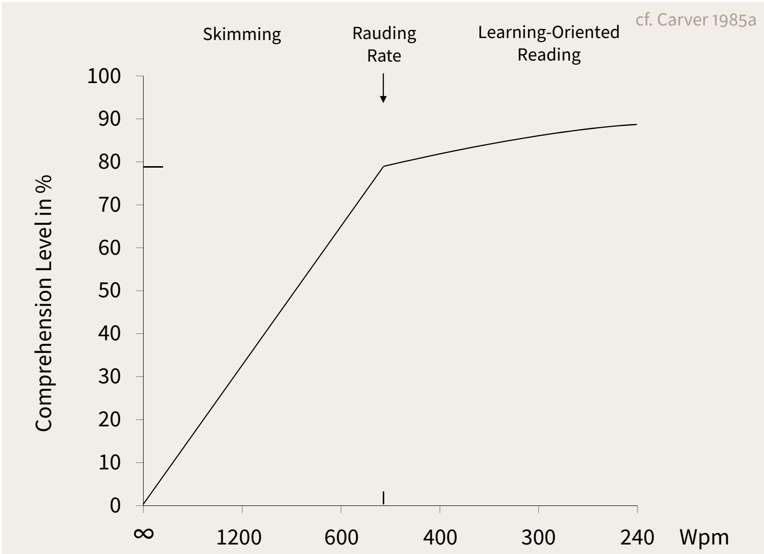
1 Termed "efficiency of comprehension" in Carver (1990, p. 24)
2 Carver (1990, p. 32)

Rauding rate as most efficient reading speed

If our subject reads at their rauding rate, i.e. 492 Wpm, then their effective reading rate is 389 Wpm.[12] Our subject cannot exceed this effective reading rate, even if they push themselves. To the extent that they are reading faster than their rauding rate, their comprehension level decreases linearly, so that it effectively remains at 389 Wpm. For example, at 1,000 Wpm they only understand 40% which, again, effectively

9 According to Carver, even for the words that were not fixated directly on with the eye, it is sufficient if the word is close enough to the fixation point, i.e. at a maximum distance of six letter spaces.
10 "Rauding" is an artificial word, derived from "reading" and "auding".
11 Carver (1990, p. 14) divides this branch more finely, namely into "scanning" and "skimming".
*12 492 * 79% = 389*

amounts to 389 Wpm. According to Carver (1990), you can't read more efficiently than at your rauding rate.



F 2.3
Comprehension curve of a quick, normal reader ("the curve with the bend")

We will call the right branch of the curve "learning-oriented reading."[13] If our subject reads slower than with their rauding rate, their comprehension level increases, but not by much more. At about 240 Wpm, our subject comprehends about 90%. This is more than the 79% at their rauding rate, or even noticeably more, because in our experience the subject perceives such a difference, but reading at this rate is not particularly efficient. The effective reading rate of our subject at a 240 Wpm reading rate, for example, is only approximately 216 Wpm.[14]

The right branch of the curve, by the way, is not a straight line but a slightly curved line, which runs gradually towards 100% comprehension.[15]

Individual differences

Normal readers spend roughly an estimated 90% of their time reading at their rauding rate.[16] Only 10% of their reading time is spent skimming or using learning-oriented reading. However, there is a subset of readers that usually read slower than the respective rauding rate would allow. This is the case for about 20% of college students.[17] Therefore, it is possible that a college student can read at a rauding rate of 250 Wpm, but in

13 Carver (1990, p. 14) subdivides this branch into "learning" and "memorizing."
*14 240 * 90% = 216*
15 The formula for the curved line is not very much fun for non-mathematicians. For those interested, we refer to Carver (1990, pp. 32–33).
16 Carver (1990, p. 449)
17 Carver (1990, p. 173)

practice they only read at 200 Wpm. Where on their comprehension curve a reader usually stays when reading differs, then, on an individual basis.

Likewise, the point at which the comprehension curve shows the bend is also different individually, i.e. how high the rauding rate of a person is. It is interesting to note that there is an upper limit of the rauding rate that cannot be exceeded. According to Carver, nobody has a rauding rate above 600 Wpm, or at least such people are extremely rare.

Rauding rate upper limit

> Rauding rate upper limit: 600 Wpm[1]
>
> 1 Carver (1990, p. 402)

Carver came to this upper limit through reading rate measurements made by other researchers on thousands of subjects.[18] He also looked extensively for above-average readers in the USA, and none of the 16 very high-level readers selected had a rauding rate of more than 600 Wpm.[19]

Let's now compare the upper limit of 600 Wpm with the data from over one thousand readers on page 12, four of whom read more quickly than 600 Wpm, the fastest of which was 711 Wpm. Does this conflict with the upper limit of a 600 Wpm rauding rate?

Not necessarily, because this reading test was not accompanied by a comprehension measurement. In this way, it was not possible to detect whether participants had already fallen into skimming. The most likely explanation is that these four participants (and certainly a few others) read a little faster than with their rauding rates.

Many more participants most likely fell into learning-oriented reading. If, as mentioned above, about 20% of college students usually get into learning-oriented reading, this may well have been the case with over 200 of the 1,326 participants. The average of 281 Wpm reported on page 12 would be a little higher if one could get all participants to read at their rauding rates.

This value of 281 Wpm fits well with Carver's statement that the rauding rate for college students[20] is typically 300 Wpm:

Typical Rauding Rate

> Typical Rauding Rate: 300 Wpm (for college students)[1]
>
> 1 Carver (1990, p. 16)

18 Taylor (1965)
19 Carver (1985a)
20 When Carver speaks of "college students" and Rayner of "experienced readers," they probably mean the same population of subjects.

My guess is that 300 Wpm is not only a typical value for college students, but also pretty much the average value. Unfortunately, we do not have, from the literature, a diagram showing the distribution of the rauding rate of several hundred readers similar to Figure F 2.2 on page 12. However, it is to be assumed that this diagram would look almost exactly like Figure F 2.2, except that a few data points at the high rates (above 500 Wpm) and some data points at the low rates (up to 200 Wpm) would be missing, and instead more data points at the medium rates would be found.

Influence of text difficulty

The comprehension level with which a subject can read and understand a text passage of course also depends on how difficult the text passage is. In the "curve with the bend" (page 14), our subject understood 79% of a text A when it was read at the rauding rate. Another text of equal length, text B, would be understood by maybe 83% if text B had a lower difficulty level than text A.

Relative difficulty level

The formulas used by Carver (1990, pp. 30 ff.) to predict the comprehension level are based on the so-called "relative difficulty level." This indicates how difficult the text passage is for a specific subject. For example, the (absolute) difficulty level[21] of a text passage is 7 if the text is appropriate for the 7th school grade. If the subject is an average 10th grade student, this subject reads with a "rauding accuracy level"[22] of 10. The relative difficulty level would be +3 in this case. The higher this value is, the easier it is for the subject to read the text.[23] Carver estimates[24] that for each relative difficulty point, the subject understands about 4 percentage points more of the text. In the above example, text B is probably a "grade level easier" than text A because 83% was understood instead of 79%.

It is interesting to note that, according to Carver, the rauding rate is independent of the difficulty level of the text. Contrary to intuition, easy texts cannot be read more quickly by a subject than difficult texts! ***Although the subject understands more about an easy text, they cannot use faster inner speech with this text.*** (In my opinion, this is different once a text becomes very difficult for a subject, because there are words in the text that are not familiar to the subject. In this case, the rate of inner speech will probably suffer.)

21 Termed "grade equivalent unit" in Carver (1990, p. 9)
22 Carver (1990, p. 31)
23 "Relative level of easiness" would thus be a better term.
24 Carver (1990, p. 33, formula 2.14)

For speed reading teachers, it is certainly best to use texts that are relatively easy for the participants. In this case, it is more likely that the participants will read at their respective rauding rate (and not fall into learning-oriented reading) and thus the measured values can be interpreted better.

Speed Reading Overview

AFTER HAVING LEARNED SOME FACTS about normal reading, we will move to an initial overview of speed reading. We are not yet talking about how to learn speed reading, but rather what speed reading is. Table T 3.1 shows us the different types of speed reading.

No.	Name	Description
1	(purely) visual speed reading	"Advanced speed reading," which is also mastered by natural speed readers. Reading without an inner voice and generally with "two-dimensional vision" (so that several words from several lines are captured per view).
1.2	visual line reading	Special form of visual speed reading. Reading without an inner voice but, as with normal reading, only words from a single line are captured.
2	fast normal reading	"Basic speed reading" Training the rauding rate, i.e. the tempo of the inner voice. Otherwise, like normal reading.
3	reading management	Techniques to identify the relevant passages that one wants to read from large amounts of text.

T 3.1
Speed reading types

This table is not the result of scientific publications, but represents our current empirical knowledge. Unfortunately, and in contrast to normal reading, speed reading remains little-researched. Therefore, in this book, we have to rely on the experience gained by some selected speed reading teachers. Sometimes we even have to deal with verbally transmitted anecdotes (which is pretty much the weakest degree of scientific evidence you can imagine).

However, we have made every effort not to include every piece of nonsense unfiltered in this book, but have made a selection from the sources and taken into account which information is plausible and at least compatible with the current state of research. As the most important sources, we have used the teachers who have studied or trained "real," i.e. visual speed readers:

- Rotraut and Walter Uwe Michelmann (where I learned visual speed reading in 2005)[1],
- George Stancliffe, who specialized in speed reading for kids,[2]
- Evelyn Wood, who has examined 53 natural speed readers[3] (and is arguably the best-known speed reading teacher of all),
- George L. Stevens and Reginald C. Orem, who were able to teach visual speed reading to about 200 course participants.[4]

In addition, the book also includes our own experiences and data that we have gained since 2008 from training a number of test subjects.

Visual Speed Reading

Visual speed reading is the "master discipline" among the speed reading types. Reading speeds that are several times higher than the reading speed of normal reading can be achieved.

With visual speed reading, each fixation does not only capture one or two words from a line, as is the case with normal reading. With visual speed reading, the maximum number of word possible that the visual acuity allows is captured with every gaze, i.e. up to 10 or maybe 20 words from about three to five lines.[5] In order to read a page with 300 words, for example, you no longer need around 150 to 300 fixations, but only around 15 to 30 fixations.

Finger sweeps

These fixations must then be distributed across the page in a particular, systematic way. Usually, they are guided over the side in a meandering pattern. In order to place them correctly, many speed readers use the so-called "swinging finger": They perform several finger sweeps with the index finger over the side at a proper pace. The view follows the tip of the index finger, so that the fixations automatically lie on a meandering line.

In order to learn visual speed reading, the following learning goals or "elementary skills" from Table T 3.2 must be mastered, according to the current state of knowledge:

1 R. and W. U. Michelmann (2005)
2 Stancliffe (2003)
3 Wood (1960, p. 116), Agardy (1981, p. 27)
4 Stevens and Orem (1963). Approximately 2,000 individuals participated in the courses.
5 Whether these values based on experience are compatible with what research says about our vision will be discussed later, starting on page 29.

No.	Learning goal	Description
A	omit subvocalization	The inner speech ("subvocalization") has to be omitted when reading.
B	grasp meaning purely visually	The brain must be able to comprehend the seen words and sentences without any help of sub-vocalizing.
C	see with two-dimensional vision	During normal reading, the reader has collo-quially formulated a "tunnel vision" and only recognizes the word that has just been fixated on, and possibly the following word. The rest of the viewing circle that the visual acuity would normally allow is masked out. The reader must learn to see "two-dimensionally" again.
D	set fixations precisely	The page must be filled with viewing circles so that the type area is completely covered. If the fixations are not set exactly, there are "blind spots" on the page and the text cannot be com-pletely captured.

T 3.2
Critical learning goals for visual speed reading

Page turning

We have only included critical learning goals in this table. We have not included, for example, the fact that a visual reader must also learn to turn the pages of a book quickly and without problems. Should we get to know of a participant who has achieved learning goals A to D but has failed to turn the pages quickly enough, the learning goal list will be extended to include "E: Learn to turn pages quickly."[6]

Linearization process

The same applies to the fact that, in a kind of "linearization process," the words from several fixations have to be brought into a correct order of words and sentences in the brain. We do not consider this to be a critical learning goal at present, because we do not yet know of any participant who have had problems with it.[7]

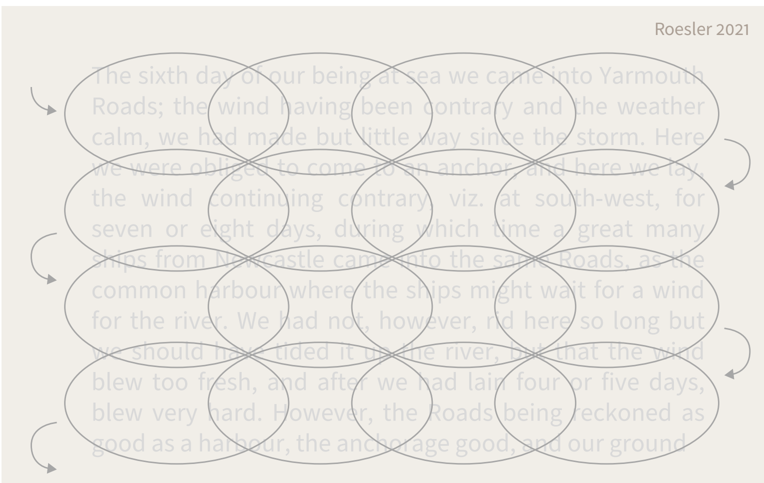
In speed reading guidebooks, learning goal A (omit subvocalization) and learning goal C (see with two-dimensional vision) have always been considered important. Learning goal B (grasp meaning purely visually) was only identified as a further critical learning goal in 2009, because there were participants who mastered the other three learning goals but were unable to make sense of the words seen. Learning goal D (set fixations precisely) is difficult to achieve, especially for speed readers who read without finger sweeps. What I have observed in my own practice is

6 According to Agardy (1981, p. 26), there is a bibliographic reference to the economist John Stuart Mill (1806–1873), who complained that he couldn't turn pages as quickly as he could read them.

7 There is more about the "linearization process" on page 112.

that, without finger sweeps, you have to use a fraction of your attention to deliberately set your fixations on the right places. If this doesn't work out correctly, a few words of a paragraph aren't seen and text comprehension decreases (you could call this "skimming speed reading").

Figure F 3.1 shows us how to position fixations perfectly, so that the page is completely covered. In the center of each oval "viewing circle," one must assume the fixation point of the eye. We can see 16 fixations arranged in a meandering pattern. The first four fixations run from left to right. The next four fixations run, a few lines down, from right to left, and so on. R. and W. U. Michelmann named the corresponding finger sweep, which leads the eyes accordingly, a "slalom finger sweep."



F 3.1
Ideal type of fixation sequence for visual speed reading (approx. 1,900 Wpm)

According to the observations of visual speed readers, visual acuity is sufficient for recognizing all the words in these viewing circles well enough. The reading rate in Figure F 3.1 is approximately 1,900 Wpm.[8] This is over six times faster than the reading rate of a normal reader with a rauding rate of 300 Wpm.

The viewing circles in Figure F 3.1 are shown to be less high than wide. This was done because we do not know for sure whether "two-dimensional vision" can be driven to such an extent that the visual acuity can be used in vertical direction as far as in horizontal direction (i.e. whether the viewing circles can be completely round).

8 *Calculated from the following parameters: text length 113 standard length words, 16 fixations, fixation duration 225 ms.*

The opposite is also possible: A visual speed reader can make less use of two-dimensional vision and, for example, can only pick up words from three, two or, in extreme cases, only one line with a fixation. For the speed reader, this is a way of slowing down the pace. This can make sense for a difficult text, because it allows the reading rate to be reduced to the "thinking rate" appropriate to the text.

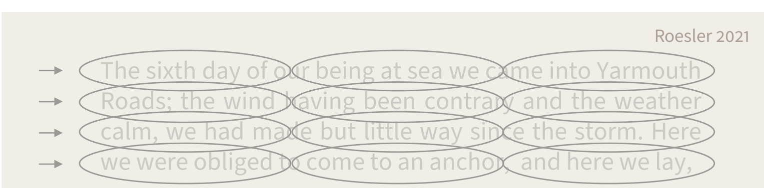
Visual line reading

If a speed reader does not use two-dimensional vision at all, this is what we call visual line reading. The following learning goals from Table T 3.3 are relevant:

No.	Learning goals of visual speed reading	Required for visual line reading?
A	omit subvocalization	Yes, absolutely necessary
B	grasp meaning purely visually	Yes, absolutely necessary
C	see with two-dimensional vision	No. By definition, in visual line reading only words from a single line are captured (as with normal reading).
D	set fixations precisely	No (or non-essential), because the fixations are set just as for normal reading (except with, on average, longer saccades)

T 3.3
Critical learning goals for visual line reading

The fixations are not set in a meandering pattern during visual line reading. As with normal reading, the eye jumps from left to right in the reading direction for each line, see Figure F 3.2.



F 3.2
Ideal type of fixation sequence for visual line reading (approx. 780 Wpm)

For a text like this, with about nine words per line, it is usually sufficient for visual acuity to set three fixations in each line. The reading rate in Figure F 3.2 is approximately 780 Wpm.[9]

The fact that there is something like visual line reading only became clear to us in 2009. While learning visual speed reading, Johannes Nöbel,

9 *Calculated from the following parameters: text length 35 standard length words, 12 fixations, fixation duration 225 ms.*

who later co-founded the German Society for Speed Reading, wanted to see whether he "could read normally without subvocalization." This worked, and this speed reading effect could be understood and interpreted relatively quickly using the learning goal list (A to D).

It was only later that we noticed that this effect had already been described by Wolfgang Zielke, probably the first speed reading teacher in Germany.[10] He had reported that by overcoming the "boundary drawn by speech motor skills," participants in his reading courses often reached 700 to 800 wpm.[11]

Fast normal reading

Fast normal reading is all about optimizing normal reading. There is no attempt at all to lose the inner voice or to achieve other learning goals of visual speed reading. We only try to train the speed of the inner voice, i.e. the rauding rate.

Figure F 3.3 shows us the comprehension curve of a normal reader. "Rauding Rate t_0" indicates how high the rauding rate is before training, in this example 300 Wpm. After training, at time t_1, the rauding rate should be at a higher level. The figure shows the rauding rate t_1 at 450 Wpm. In our experience, this is the average value after training.

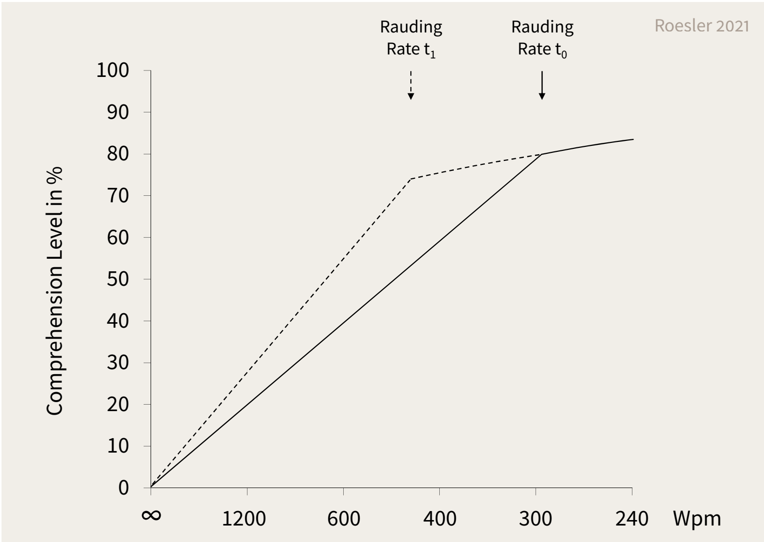
Compared to the reading speeds that can be achieved with visual speed reading, 450 Wpm does not seem to be particularly impressive. However, it should be noted that only 5% of readers can read at 450 Wpm or more, see Table T 2.2 on page 12.

How much time now lies between t_0 and t_1? The 27 subjects from Radach et al. (2010) had been given about two weeks to get from t_0 to t_1. The 16 participants I taught between 2011 and 2014 could take as much time as they wanted until it was clear that their rauding rate could not be increased further. The rise phase of the rauding rate usually lasted several weeks, and at least 20 days.

For "precautionary reasons," the comprehension level in t_1 is slightly lower than in t_0 for Figure F 3.3, while data from my participants does not indicate that the comprehension level must decrease.[12]

We have not provided a separate figure for the fixation sequence for fast normal reading here, because the fixation sequence looks similar to Figure F 2.1 on page 10, at least in principle.[13]

10 Steiner (1966)
11 Zielke (1991, p. 66)
12 97% post-training comprehension versus 96% prior to training.
13 The Figure F 2.1 reader on page 10 read the text at 160 Wpm (30 fixations with an average duration of 477 ms). For a reader with 450 Wpm, 20 fixations with an average duration of 250 ms would be more typical.



F3.3
Fast normal reading through training the rauding rate

Reading management

Reading more quickly (calculated in Wpm) is only one of two ways of saving time when reading. The other is to read less. Reading management is about selecting what you want to read. For this reason, the structure and other "surface characteristics" of the reading material are used to identify the points of interest. Only these parts of the text are then read. Many non-fiction books are already structured in such a way that reading management is easy, because these books include headings, a table of contents, introductory chapters, a glossary, an index, etc.

When it comes to reading management, there is always a residual risk that something important will be overlooked. With limited reading time and extensive reading material, however, reading management is still the best way to minimize this risk. Just reading on and stopping when time runs out is a much worse strategy.

Unlike the speed reading types "visual speed reading" and "fast normal reading," which can only be learned with a certain amount of time and effort, reading management is immediately applicable and also saves, in our experience, considerable time.

Definitions and Terms

The different types of speed reading do not make it easy to define who can and cannot be called a speed reader.

It is indisputable that someone who uses reading management is not a speed reader for this reason alone. On the other hand, it is unclear whether "fast normal reading" is sufficient to designate a person as a speed reader, or whether "visual speed reading" is necessary. There are good reasons for both points of view. We do not commit ourselves to either in this book, and therefore propose two definitions, one "hard" and one "soft."

"Hard" definition of a speed reader

> Speed reader:
> A person who masters visual speed reading (at least visual line reading).

This definition has the advantage of making it comparatively easy to measure who is a speed reader and who is a normal reader. Those who are able to read more than 600 Wpm with a good level of comprehension are speed readers.[14] Anyone who can't do that is a normal reader. Similarly, it can be assumed that when using imaging methods (e.g. magnetic resonance imaging), it is easy to distinguish between those who are speed readers and those who are normal readers. Language areas[15] of the brain are likely to be much less active in speed readers than in normal readers.

Now to the soft definition of speed reader:

"Soft" definition of a speed reader

> Speed reader:
> A person who masters visual speed reading (at least visual line reading) and/or can read normally at an increased rauding rate.

This definition also has its advantages. For reasons of time and cost, the vast majority of people interested in speed reading will not learn visual speed reading, but will increase their rauding rate from, let's say, 300 Wpm to between 400 and 500 Wpm. The soft definition allows these people, who have undoubtedly dealt seriously and successfully with the topic of "speed reading," to call themselves "speed readers."

14 *The 600 Wpm limit was chosen by Musch and Roesler (2011), based on Carver (1990).*
15 *For the moment, we will not define which areas are meant.*

The disadvantage of the soft definition is obvious: It is impossible to draw a clear line between “speed reader” and “normal reader” by using Wpm. Is someone who has gone from 200 to 220 Wpm a speed reader? Most likely not. But what if 350 Wpm were reached? Given this significant (75%) increase in speed, the soft definition would certainly allow for the title of “speed reader.” However, there are plenty of readers who already read at 350 Wpm without training (see Table T 2.2 on page 12), but hardly anyone would call them “speed readers.”

Disadvantages of this kind cannot be avoided, even if the soft definition is put differently. Instead of an “increased rauding rate,” you could demand a “high rauding rate.” One could also quantify the requirement and, for example, demand to “increase the rauding rate by 50%” or “have a rauding rate above 350 Wpm.” However, each of these delimitations would remain arbitrary and unsatisfactory. For these reasons, I tend to prefer the hard definition of speed readers.

Let’s now discuss the definition of natural speed readers, i.e. people who have discovered visual speed reading themselves, without any guidance:

Definition of a natural speed reader

> Natural speed reader:
> A person who masters visual speed reading (or at least visual line reading) without ever having been trained accordingly.

Natural speed readers therefore meet the hard definition of speed readers. Visual speed reading has to work. Fast normal reading is not enough.

So far, many speed reading terms have been used in the book, some of which are even synonymous. For a better overview, Table T 3.4 on page 28 summarizes these terms in a “classification of reading and speed reading types.” There is a good chance that this classification is comprehensive.

No.	Name	Description (see also Table T 3.1 on page 19)
1	visual speed reading	Reading without an inner voice and generally with “two-dimensional vision.” Not an entirely exact term, since every type of reading is, of course, “visual.”
	purely visual speed reading	Synonym and exact term for “visual speed reading.” “Purely visual” emphasizes the fact that information is only captured and processed visually (without an inner voice).
	advanced speed reading	Synonym for “visual speed reading.” Together with “basic speed reading” forms an easy-to-remember pair of terms.
1.1	two-dimensional (speed) reading	The main form of visual speed reading, reading with “two-dimensional vision.”
	visual-vertical reading	Synonym for “two-dimensional speed reading,” and used in some guidebooks. “Visual” indicates that no inner voice is used, and “vertical” stresses the fact that eye movements and viewing circles have a vertical component.
1.2	visual line reading	Special form of visual speed reading, where only words from a single line are captured.
1.3	skimming speed reading	Visual speed reading with so few fixations per page that the viewing circles no longer completely cover the text, which means that a low to severe loss of comprehension is accepted.
1.4	accurate speed reading	Visual speed reading, where the viewing circles completely cover the text.
1. 5	cinematic reading	Effect that was reported for visual speed reading at over 10,000 wpm (see page 103).
2	fast normal reading	Normal reading at which the rauding rate has been increased by appropriate means.
	basic speed reading	Synonym for “fast normal reading”
3	reading management	Techniques for identifying the relevant passages to read from large amounts of text.
	planned non-reading	Synonym for “reading management”
4	normal reading	Reading with an inner voice, as practiced by the vast majority of readers. It ranges from learning-oriented reading to reading with rauding rate to skimming. (Sometimes also used with the limited meaning “reading with rauding rate.”)
4.1	learning-oriented reading	Normal reading at a rate lower than the rauding rate, so that the text can be comprehended and/or retained even better than at rauding rate.
4.2	skimming	Normal reading at a rate higher than the rauding rate, where a low to severe loss of comprehension is accepted. (For particularly fast skimming, the term “diagonal reading” is sometimes used.)

T 3.4
Classification of reading and speed reading types

Limiting Factors

WHEN WE CONSIDER THE FACTORS which can limit the reading rate, three obvious parameters come to mind:

- the parameters of the visual system (visual acuity, etc.);
- the speed of the inner voice (rauding rate); and
- the difficulty level of the text (or the thinking speed required for the text).

Visual system

The visual system related to reading is the focus of this chapter. We will try to express this limiting factor quantitatively in Wpm.

Rauding rate

We already know the rate of inner speech (rauding rate), which is typically 300 Wpm for college students. The upper limit of the rauding rate is 600 Wpm.

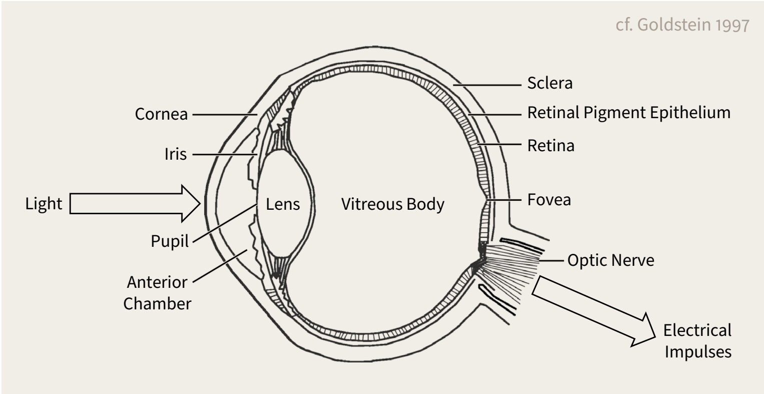
Difficulty level of the text

The difficulty level of a text (or more precisely, the relative difficulty level for a particular reader) varies greatly. From experience, there are texts that are so complicated for a reader that they can only be comprehended at, for example, 10 Wpm. On the other hand, there are texts that are so simple that they could be comprehended with several thousand Wpm (as long as no other limiting factors prevent this).

In professional practice, many readers experience the entire range of different text difficulties. Speed reading can mostly only be applied to the part of the material that allows this in terms of difficulty. The limiting factor “text difficulty” is often eliminated during speed reading training (but also in scientific studies) by presenting only easy texts to the participants. Then, the other limiting factors can become effective and be measured undisturbed. In this chapter, we will only compare the limiting factors “visual system” and “rauding rate.”

Visual system

Figure F 4.1 shows us the anatomy of the eye. The lens refracts (bends) incoming light onto the retina. The retina converts this light into nerve impulses, which are then transmitted to the brain via the optic nerve.



F 4.1
Anatomy of the eye

There are two types of photoreceptors on the retina: rods and cones. We are only interested in the cones here, as they are responsible for daytime vision. Cones have their highest density in the fovea, which is the center of sharpest vision. This “foveal area” of the visual field corresponds to up to a 2° viewing angle. This is followed by the “parafoveal area,” with a viewing angle of up to 5°, and the “peripheral” field of view, which reaches almost 180°.

Vision span

How many letters or words can you see sharply enough with one glance (a fixation), so that the words can be identified? First of all, we will make the magnitude of this “vision span” clear with a test from the guidebooks. Afterwards, we will look at results that were obtained by research using the “moving window technique.” In doing so, we will learn about the terms “perceptual span” and “word identity span.” The term “word identity span” used in reading research has the same meaning as the term “vision span” used in the guidebook literature.

You can determine your own vision span by performing the test on page 272. Table T 4.1 shows the results of 24 participants:

	Vision span
Mean value	20.2 letter spaces[1] (converted 3.4 standard length words)
Minimum	13.5 letter spaces[2] (2.3 standard length words)
Maximum	35 letter spaces (5.8 standard length words)

1 The standard deviation was 5.4 letter spaces.
2 Most participants made two measurements and reported the average, so non-integer values may result.

T 4.1
Vision span of 24 participants (“manually” acquired)

On average, the participants reported that they could identify about 10 letters from the fixation point to the left, and about 10 to the right. Only one participant disagreed, stating: “To the left it becomes more quickly blurred than to the right.” However, the results of the test can only be regarded as rough benchmarks, as the test itself has some weaknesses:

- Participants can look at the line for several seconds, but with real reading, only the time of a fixation (average 200 to 250 ms) is left to identify the letters or words.
- There is a danger that some participants do not always fixate exactly upon the same spot, sometimes to the left and sometimes to the right of it, and therefore report a span of vision which is too wide.
- Generally, measuring accuracy leaves much to be desired in this “experimental set-up.”

Perceptual span and word identity span

Let’s take a look at a more precise experimental set-up. With the so-called “moving window technique,” which we will explain in a moment, the methodical weaknesses mentioned above (and some others) are avoided. With the appearance of computers, reading research was able to use methods that were not previously possible. McConkie and Rayner (1975) developed the first computer-aided moving window technique, which took advantage of the fact that the eye is blind during the saccade. During the saccade, the screen contents can be changed without the subject realizing.

Figure F 4.2 first shows a normal line on the screen. The fixation point is marked with a “*” symbol. In the experiment, the letters on the left and right edges of the line can now be made illegible by replacing them with, for example, an “X,” or another meaningless letter, so that only a certain window remains visible in the middle of the line, which in our example is a window with a 17 letter width.

```
during a saccade because the eyes are moving so        Normal Text
                    *
_______________________________________________

XXXXXX X XXXcade because the XXXX XXX XXXXXX XX
                    *                                  Moving Window

XXXXXX X XXXXXXX XXXXXse the eyes are mXXXXX XX
                              *
```

cf. Rayner 1998

F 4.2
Moving Window

While the eye performs a saccade (in our case from "because" to "eyes"), the screen content is changed in a flash, and the visible window is placed around the new fixation point. This is the basic principle of the moving window technique. In several experimental runs the width of the window was varied, and its influence on the subjects' reading process was measured (to see whether the saccade lengths, fixation durations and reading rates would change). Similarly, the position of the window was varied relative to the fixation point. In some experimental runs, more letters remained visible to the right than to the left of the fixation point.

Through these investigations, it was possible to see how broad the so-called "perceptual span" is. It comprises the area from which meaningful information can be obtained for reading during a fixation. Surprisingly, the perceptual span is asymmetrical.

> The perceptual span extends from the beginning of the word being fixated upon (but no more than 3–4 letters to the left of the fixation) to about 14–15 letter spaces to the right of the fixation.[1]
>
> *1 Starr and Rayner (2001, p. 159)*

Perceptual span

The asymmetrical nature of the perceptual span is not due to the "hardware" of the visual system. In writing systems which move from right to left, such as Hebrew and Arabic, the perceptual span is also the other way round.[1] The brain obviously actively suppresses part of what is seen, or as Rayner et al. (2010) put it: ". . . the asymmetry of the span is a function of attention . . ."

The perceptual span does not mean that a reader can identify all the words within it, but only that reading is impaired as soon as the window provided by the moving window technique becomes smaller. In fact, a reader can only identify words within the so-called "word identity span." This only reaches around 7 or 8 letter spaces to the right of the fixation.

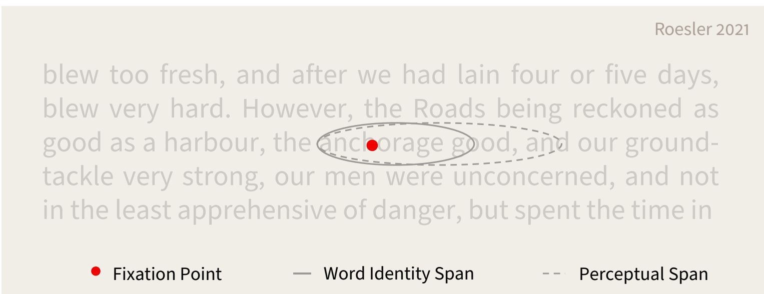
> The word identification span reaches around 7 or 8 letter spaces to the right of the fixation.[1]
>
> *1 According to Starr and Rayner (2001, p. 159)*

Word identity span
(or "letter recognition span")

1 *Pollatsek et al. (1981), Jordan et al. (2014)*

As mentioned above, the term “vision span” is used instead of “word identity span” in the guidebooks. Table T 4.1 on page 30 shows that the manual test provides more optimistic values than the moving window technique. On average, 20 letter spaces are reported for vision span in the test: 10 to the left and 10 to the right of the fixation.

So far, we have stayed within one line and considered what can be identified to the right and left of the fixation. But what if we consider the lines above and below the fixation? The answer is clear: With variants of the moving window technique, it was found that readers ignore the line above and the line below the fixation.[2] Only a small part of the (most likely) circular area, which the eye captures with a fixation, is used (see Figure F 4.3).



F 4.3
Word identity and perceptual span

One can conclude from this that the brain of an experienced reader limits attention to the part of the visual information that is of interest for a fixation. The lines above the fixation point are not interesting, because the reader already knows these lines. Likewise, the words to the left of the fixation are already known and therefore uninteresting. What is interesting is the word that is being fixated upon, and a certain part to the right of it (so that the optimum length of the saccade to the next fixation point can be estimated). The words in the line below the fixation are not yet familiar to the reader, but they are probably uninteresting for the current fixation because they are too far “in the future.”

“Tunnel vision”

In this book, we use the colloquial term “tunnel vision” to describe this kind of attention control during normal reading.

This is the case with normal reading, which has already been well-researched, scientifically. On the other hand, corresponding investigations for speed reading have not been done. Nonetheless, this should not prevent us from checking the plausibility of the speed readers’ statements.

2 *Inhoff and Briihl (1991), Inhoff and Topolski (1992), Pollatsek et al. (1993)*

Expected reading rate for speed reading

Speed readers report that they have learned to discard their “tunnel vision” and to “see with two-dimensional vision” when speed reading. We have taken this statement as a working hypothesis, and tried to extrapolate from it the maximum speed that can be expected for accurate speed reading (see Figure F 4.4 on page 35).

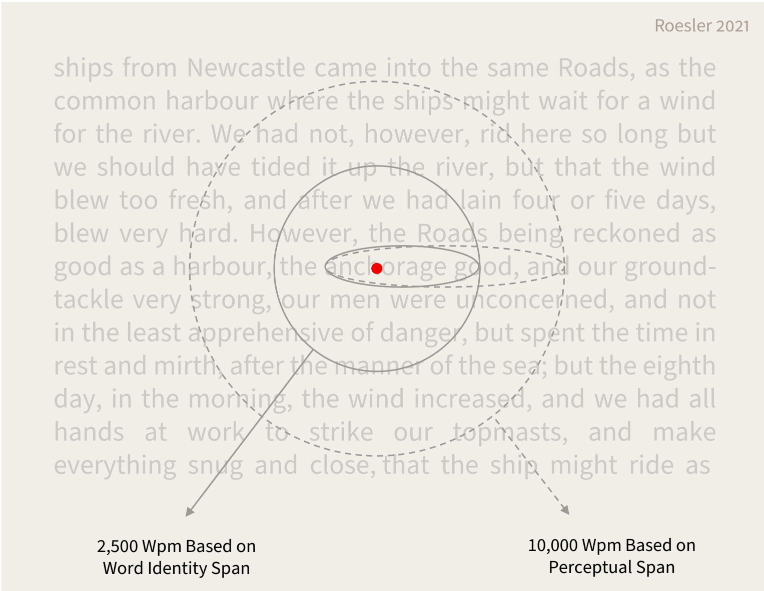
Around the fixation point, a circle is drawn with a radius of 8 letter spaces, which corresponds to the word identity span—extended into two dimensions. This circle covers about 62 letter spaces from about 5 lines, which amounts to 10.3 (standard length) words. With a fixation, little more than 10 words can be captured. With an average fixation duration of 250 ms, this results in a reading rate of about 2,500 Wpm[3], which is conceivable under ideal conditions.

In this extrapolation, we neglected to mention that the viewing circles of successive fixations will overlap, at least a little, and therefore the real speed will be lower. Secondly, we simply assumed that a speed reader would be able to extend the word identity span vertically as well as horizontally. And finally, when letter counting, we also included letters from “truncated” words and dodged the discussion about whether this is justified.

Regardless of whether one assumes a slightly lower value or the full 2,500 Wpm, it is certain that the visual system, in principle, allows reading rates well above the rauding rate, which typically amounts to 300 Wpm and cannot exceed 600 Wpm.

In the chapter “Achievable Reading Speeds,” we will analyze the data provided by speed reading teachers and researchers, and come to the conclusion that every (“two-dimensional”) speed reader can most likely read at least 1,500 wpm, and a certain fraction of the speed readers 2,000 to 3,000 wpm. Our extrapolation with 2,500 Wpm is exactly in this order of magnitude, and in this respect does not contradict the empirical values.

3 *10.3 W * 60 s / 250 ms = 2,480 Wpm*



F 4.4
Extrapolated maximum reading rates based on word identity span and perceptual span

The problem with this extrapolation, however, is that there are almost certainly speed readers who can read faster than 3,000 wpm. The fastest of Evelyn Wood's natural speed readers read at 6,000 wpm (Wood, 1960). Anne Jones, the multiple world champion in speed reading, read the newly published book "Harry Potter and the Deathly Hallows" with 4,250 wpm[4], according to various media reports.

In order to explain these values, one must go beyond the word identity span and assume that some speed readers can also use the perceptual span at least partially for word recognition.[5] Figure F 4.4 shows that 10,000 Wpm would be possible if the perceptual span could be used entirely for word recognition.[6]

From the outset, it should not be ruled out that there are people whose word identity span extends beyond 8 letter spaces, or whose perceptual span extends beyond 15 letter spaces from a fixation. There are considerable individual differences in visual acuity. Ashwin et al. (2009) showed, for example, that autistic people can have a medium visual acuity that almost reaches that of birds of prey. Radach et al. (2015) showed that

4 *199,900 words in 47 minutes and 1 second (Michalsky, 2007)*
5 *On page 174, another explanatory approach is discussed in the context of "panoramic vision," which does not require questioning the word identity span.*
6 *About 250 letter spaces (= 41.7 W) in about 11 lines. 41.7 W * 60 s / 250 ms = 10,000 Wpm*

two speed readers were able to identify triple combinations of letters at a much greater distance from the fixation point than normal readers.[7]

Finally, it is also questionable whether word identity span and perceptual span are determined solely by visual acuity, and therefore cannot be improved. Rayner et al. (2010) state, based on Miellet et al.'s (2009) findings, that the perceptual span is not simply the result of limited visual acuity. Miellet et al. (2009) have shown that the span to the right of the fixation remains unchanged at 14 to 15 letter spaces, even if the visual acuity limits were eliminated (which was achieved by using a "parafoveal magnification technique," in which the letters are represented larger, the further away from the fixation point they are). My suspicion is that, during normal reading, the word identity span and perceptual span are already somewhat influenced by "tunnel vision."

Visual line reading

We have just extrapolated the maximum speed that is conceivable with the visual system when performing two-dimensional speed reading. We will now try to do the same for a special form of visual speed reading: visual line reading.

In this extrapolation, we assume that a visual line reader only picks up words within the line being fixated upon, but at least succeeds in breaking "left-sided tunnel vision," i.e. extending the word identity span and the perceptual span to the left of the fixation as far as to the right.

Up to 16 letter spaces based on the word identity span and up to 30 letter spaces based on the perceptual span can then be captured per fixation. Converted to a reading rate, this is 640 or 1,200 Wpm.[8]

The experience values for visual line reading are about 700 to 900 wpm.[9] This information is only based on a handful of people, because we have only known about visual line reading since 2009. However, it seems certain (similarly to two-dimensional speed reading): The empirical values cannot be explained with the word identity span alone, but one has to assume that visual line readers can also use the perceptual span, at least partially, for word recognition. The possible explanations have already been discussed above for two-dimensional speed reading, and also apply to visual line reading.

7 *The subjects were two board members of the German Society for Speed Reading (a natural speed reader and a trained speed reader).*

8 *16 letter spaces = 2.7 W. 2.7 W * 60 s / 250 ms = 640 Wpm*
*30 letter spaces = 5.0 W. 5.0 W * 60 s / 250 ms = 1,200 Wpm*

9 *In 2021, one participant (PN67) even reached 1,023 Wpm (standard deviation 11%, comprehension level 99.9%, 54 measurements).*

Summary

We can gain two insights from what has been stated thus far. Firstly, the reading rates reported by visual speed readers are where they would be expected to be, given the limitations of the visual system. This gives some credibility to the speed reader's statements, and also supports our assumption that the limiting factors in visual speed reading are visual acuity and other parameters of the visual system.

Secondly, for normal reading and basic speed reading, we can conclude that the limiting factor is the inner voice and not the visual system. This is because the highest conceivable rauding rate of 600 Wpm is still below the most cautious extrapolation of 640 Wpm based on the word identity span, which is achievable for reading without a two-dimensional component ("line reading").

For the training of basic speed reading, this means that exercises with a visual focus, e.g. exercises for "widening the vision span," will probably not bring about any benefits. In the next chapter, we will look at which training format has been proven to work for basic speed reading.

Training Format for Basic Speed Reading

"BASIC SPEED READING" MEANS that the speed of the inner voice has been trained, for example, from 250 to 450 Wpm. The interesting question is which training format can be used to best achieve this increase. A training format is characterized by the fact that it determines which methods and exercises are used with which duration, and which time interval.[1]

Essentially, several different training formats are conceivable for increasing the speed of the inner voice, i.e. the rauding rate. To the best of our knowledge, some of these training formats have never been tried out, although according to the current level of theoretical knowledge they are likely promising. We will present some of them later.

Comprehension-maintaining speed training

In this chapter, we will concentrate on a training format which we will call "comprehension-maintaining speed training" and which came to light through the experiments of Radach et al. (2010). Incidentally, this experiment is the only methodologically sound study known to us that is sufficiently documented and demonstrates the effectiveness of a speed reading training program.

As already reported in the interview chapter, the control group in this experiment were able to increase their reading rates just as much as the experimental group (from about 180 to about 340 wpm, without significant loss of comprehension). Therefore, the effective core elements of this training could only lie in the common elements of both the experimental and control group training formats. These common elements were manageable:

- There were four training sessions, 90 minutes each, that were spread over about two weeks.
- In each session, a 20% increase in speed was attempted (starting from the individual level of a subject).

1 *The appropriate term for "training format" used in research methodology is "treatment" (which sounds a little unpleasant, because of the association with "medical treatment")*

- The texts read per session consisted of approximately 8,000 words (roughly 30 pages). After each page, the subject received feedback on whether they should read more quickly or slowly, i.e. whether the 20% increase was met. Comprehension questions had to be answered after each page.

What is the effective core element of this training format? Our hypothesis is that it is sufficient for a subject to make an effort to read faster than they otherwise would, but without getting into skimming. The basic instructions for the subject, therefore, are as follows:

> Read as quickly as possible (try hard!), but you still have to comprehend everything!

Instructions for comprehension-maintaining speed training

If a subject practices such exercises over many days, their rauding rate will gradually increase. Using this assumption, we have trained several people since 2011. The training format of Radach et al. (2010) was changed in some respects:

- The format was one-to-one training, so that the learning pace of each participant and the time and holiday planning could be better taken into account. The participants were mainly employees of a technology group, for which I worked as an external quality assurance consultant. Some participants were only accompanied by telephone and desktop sharing[2].
- For each session, a 20% increase in speed was not attempted, but an increase that was considered feasible for the participant. This could have been more or less than 20%, but in most cases it was less.
- Unlike Radach et al. (2010), the instructions for the above exercise were explicitly explained to the participants as a basic training principle.
- Comprehension self-assessments were used as measurements (instead of comprehension questions at the end of each page).[3]
- Another difference to Radach et al. (2010) was that we did not conduct four sessions but a variable number of sessions. The training was simply stopped when no further speed increase could be achieved for several sessions.

2 Participant and teacher could see each other's screen content.
3 The chapter "Comprehension Measurement" from page 125 onwards explains why this is a permissible and accurate procedure.

Training schedule

The main tool for the training consisted of an Excel file which was provided with a simple user interface via macro programming. The file contained about 500 text passages, each about half a page long. Such passages can be read in about 30 seconds (as an average reader with a rauding rate of 250 Wpm). All the text passages were taken from an easy-to-read novel.

Starting measurements

At the beginning of the training, a determination of the current rauding rate of the participant was attempted. To achieve this, the participant read 10 to 15 text passages. These measurements were often spread over two to three days, to compensate for variations in the daily form. The average of these measurements was considered the participant's current rauding rate.

There are several ways to formulate instructions to the participants so that they are likely to fall into their rauding rate. Such instructions can be found in the test on page 272. In our training, we mostly used the following instructions, which in our experience serve the same purpose:

Instructions for rauding rate measurement

> Read at the highest speed you can reach with minimal effort! (And, of course, you have to comprehend everything.)

After each of these measurements, the participant had to estimate their comprehension level. This usually resulted in values of 90 to 100% (which is not surprising, because the instructions guided the reader in such a way that the text was fully understood, and the text was of a low difficulty level). The instructions for the comprehension self-assessments were:

Instructions for the comprehension self-assessments

> What percentage of the text content do you think you comprehended? (Not how much you can remember, but how much you understood while reading.)

After the first 10 to 15 measurements, the current rauding rate of the participant was now fixed. This rauding rate before training will be referred to as the "start value."

Exercises

The first exercise followed. One exercise consisted of 25 text passages, meaning one exercise took about 25 times longer than a measurement. One exercise comprised about 3,200 standard length words. At a rauding rate of 250 Wpm, a participant needed about 10 to 15 minutes for an exercise.

Before each exercise, the teacher and the participant defined the reading rate to be used for the exercise ("target Wpm"). In the first exercise, this was usually 20% above the start value.[4] After each of the 25 text passages, the user interface gave the participant feedback on how quickly the passage was read.

Set target Wpm

- "Tempo okay" was displayed if the target Wpm was hit exactly or within a 5% deviation.
- "Please speed up (7%)" was displayed if the passage was not read 20% faster than at the start value, but only 13%.
- "Please slow down (7%)" was displayed if the passage was not read 20% faster than at the start value, but 27%.

Display of reading rate

After having trained about half of the participants, we started to change what was meant by the messages "Please slow down" and "Please speed up" (another difference to Radach et al., 2010). Participants were told that they did not necessarily have to follow the "Please slow down" and "Please speed up" messages.

- "Please slow down" is only meant to mean:
  "You may have fallen into skimming. If so, please slow down. If not, you may still read faster than with the target Wpm. We apparently haven't set the target Wpm high enough."
- "Please speed up" is just meant to mean:
  "You may not have tried hard enough to be fast. If so, try harder on the next passage! If not, you need to maintain your pace. This seems to be the maximum speed that is possible today, and we seem to have set the target Wpm too high."

At the end of an exercise, the participant had to estimate the percentage of the text they had understood. This usually resulted in values of 90 to 100%.

Comprehension self-assessment

The next exercise should be carried out two to three days later. This corresponds approximately to the time interval between the practice sessions at Radach et al. (2010). In reality, due to project stress and vacations, many participants left, on average, twice as much time between the exercises.

Time interval between practice session

4 In real terms, the participants managed slightly less: mean value 17%, minimum -2%, maximum 26%, standard deviation 7% ("percentage points").

Between exercises, the participant could intersperse some measurements so that the (hopefully increased) rauding rate of the participant was measured and it was easier for teacher and participant to determine the target Wpm for the next exercise.

Measurements between exercises

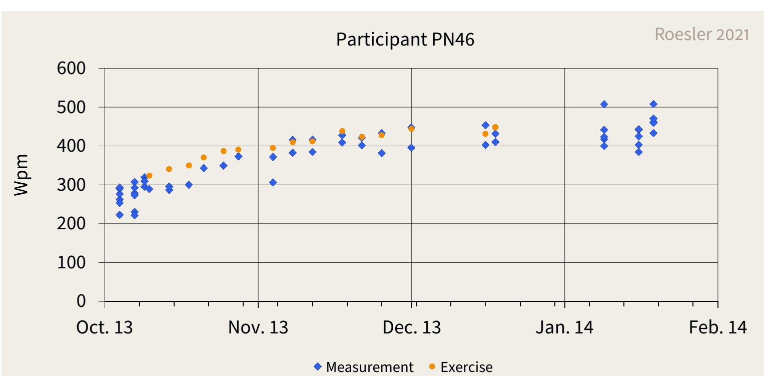
We are now of the opinion that these measurements between the exercises are no longer necessary. Since the meaning of the messages "Please slow down" and "Please speed up" has been weakened, the target Wpm for the next exercise does not have to be hit very precisely. In our experience, participant and teacher quickly develop a feel for how many percentage points the target value of an exercise should be raised by.

End criterion, final measurements, benefit estimation

If no further speed increase could be achieved for a number of exercises, the training was completed. This was followed by approximately 10 to 15 final measurements and an estimate of how much reading time the participant can save annually from the increased reading speed.

Example

Figure F 5.1 shows the training progress of a typical participant. The training lasted from the beginning of October 2013 until mid-January 2014. The orange circles show the exercises and the blue diamonds the measurements. This participant performed 15 measurements prior to the first exercise (October 4th, 7th and 9th). The mean value was 275 Wpm, with a comprehension level of 99% (comprehension levels are not shown in the figure).



F 5.1
Typical training progress

The first exercise (left orange dot on Oct 10th) was attempted with the target Wpm "20% over the start value." In real terms, the participant achieved an increase of 18% over the start value, to 324 Wpm (the real values are always given in the figure). In the next exercises, only relatively small increases were achieved: Exercise 2 only showed an improvement of another 6 percentage points, to a total of 24% over the start value. The biggest leap was made between Nov 12th and 18th, from 50 to 60%. This is an improvement of 10 percentage points.

From mid-November, the figures fluctuated between 54 and 63% over the start value. Therefore, it was decided to end the training in mid-December.

In January 2014, 15 final measurements were carried out. The final value (or the rauding rate after training) for this participant was 441 Wpm, at a 100% comprehension level. Table T 5.1 shows the results of the participant:

	Reading rate	Effective reading rate	Comprehension level
Start value	275 Wpm [1]	271 Wpm	99%
Final value	441 Wpm [2]	441 Wpm	100%
Increase	61%	63%	

1 Standard deviation 11%, 15 measurements
2 Standard deviation 8%, 15 measurements

T 5.1
Training results of Participant PN46

Course duration and core duration

His whole training lasted three and a half months. His actual increase in reading rate ("core duration") took place within 40 days, i.e. in the period from Oct 10th to Nov 18th 2013.

In addition to the course duration, the time spent on training is another important parameter. Participant PN46 spent just under five and a half hours in total, see Table T 5.2.

Activity	Time in hh:mm	Comment
Measurements	00:50	A total of 55 measurements on 21 days
Exercises	02:54	A total of 15 exercises on 15 days
Phone calls	00:00	
Meetings	01:35	A total of 5 meetings on 5 days
Other	00:00	Among other things, travel time for meetings can be recorded under this heading. This was not relevant here, as both participant and teacher worked in the same office.
Total	05:19	

T 5.2
Time spent by Participant PN46

These five-and-a-half hours of training are offset by benefits that the participant can expect in the future. It was estimated that this participant will save 41 hours of professional reading time per year. This estimate was based—in addition to the speed increase achieved—on several parameters, including the proportion of daily reading material that is easy enough for the participant to read at the increased reading rate, the daily professional reading time, the number of working days per year, etc.[5]

Results

After getting to know the example of a typical participant, we want to look at the results of all participants who were trained from May 2011 to September 2014. From 16 of these participants, we have the necessary data (such as start and final measurements). Only these participants were therefore included in the evaluation.

In publications, it is a well-known methodical inaccuracy for the participants who were excluded from the analysis to be concealed. This means that the results of a study often look better than they really are. We do not want such results, and will therefore later record the participants who could not be evaluated, and for which reasons.

Table T 5.3 shows the training results of the 16 evaluated participants.

	Reading rate	Comment
Start value	269 Wpm	Average (standard deviation 30 Wpm)
Minimum	232 Wpm	
Maximum	345 Wpm	This participant was already one of the fastest 20% of readers before the training (see page 12)
Final value	443 Wpm	Average (standard deviation 75 Wpm)
Minimum	300 Wpm resp. 356 Wpm	One participant stopped training prematurely, at 300 Wpm, because he noticed that he did not use the increased speed either in his professional or personal life. The lowest "real" final value of a participant was 356 Wpm.
Maximum	594 Wpm	
Increase	66 % (174 Wpm)	Average (standard deviation 34%) Increase from 269 to 443 Wpm
Minimum	24 %	Increase from 241 to 300 Wpm resp. from 345 to 427 Wpm
Maximum	156 %	Increase from 232 to 594 Wpm

Note: Pages 177 to 209 contain the complete data of all the participants.

T 5.3
Training results for 16 participants

5 *For more information, refer to the section "Benefits of basic speed reading" on page 157.*

The participants improved their reading rates from 269 to 443 Wpm on average. This is an increase of 174 Wpm[6], or 66%[7]. The participant with the strongest increase improved by 156%. The lowest percentage increase occurred for two participants, and was 24%.

The speed increases were achieved without sacrificing reading comprehension. At their start values, the participants estimated their average comprehension to be 96%, and 97% for their final values.

Total training time

Total training time

The total training time averaged about 7.5 hours, see Table T 5.4. One participant spent only about 4.5 hours, while another participant needed 15.5 hours for the training. Converted into seminar days, the training time thus extended from half a day to two full seminar days.

The effective part of the training consists almost exclusively of the exercises (the other activities within the training can be considered more or less unavoidable "overhead"). The participants practiced for an average of 3.5 hours. The spectrum ranged from just under two hours to just over seven.

	Mean value in hh:mm	Minimum in hh:mm	Maximum in hh:mm	Std. dev. in hh:mm
Total training time	07:27[1]	04:19[2]	15:24[2]	03:28
Measurements	01:26	00:10	03:14	00:57
Exercises	03:42	01:39	07:13	01:45
Phone calls	00:57	00:00	06:57	02:07
Meetings	01:19	00:00	02:20	00:36
Other	00:01	00:00	00:09	00:02

1 *Except for rounding errors, this is the sum of the times below it.*
2 *This is not the sum of the times below, because the respective extreme values come from different participants.*

T 5.4
Total training time of 16 participants

Course duration

The course duration averaged 5.7 months. The shortest duration was 2.8 months, and the longest took 10.9 months—in this case, the participant left breaks of up to three and a half months between exercises.

6 *Standard deviation 81 Wpm*
7 *Standard deviation 34% ("percentage points")*

On average, the actual increase in reading rate ("core duration") took place over 72 days.[8] The shortest core duration was 14 days, and this participant[9] ended his training somewhat arbitrarily with 416 Wpm. The participant had not tested whether he had already exhausted his limit.

Core duration

He should only have finished the training if, for a number of exercises, no increase was achieved. For the other participants, the shortest core durations were 18 and 21 days.

Gradient

Speed increase per hour of practice

An important key figure is the gradient with which the reading rate could be increased within the core duration. Taking the practice time[10] within the core duration results in a gradient of 64 Wpm/h on average.[11] Simply put, one hour of practice (of course spread over several days) results in an average speed increase of 64 Wpm.

Speed increase per day

A second key figure is obtained by dividing the increase in speed achieved by the core duration: On average, the reading rate could be increased by 4.4 Wpm per day within the core duration.[12]

A comparison of this value with the expectations of teachers and researchers shows a remarkable result. There are teachers who advertise that they can double reading rates in a 2-day course without losing comprehension. This would correspond to a speed increase of about 125 Wpm per day.[13] Researchers who consider speed reading courses to be completely ineffective think that the strongest speed increase in a person's reading life only occurs during school time. Carver (1992b, p. 93) states that the rauding rate increases fairly evenly from grade 2 to 12, by about 14 Wpm per year. This is only 0.038 Wpm per day. It is unsurprising that this book occupies a middle position, between skeptical researchers and optimistic teachers. The enormous difference between the figures is surprising. 0.038 Wpm per day is only about one hundredth of 4.4 Wpm per day, as the 16 participants achieved, and this 4.4 Wpm per day is only about a 30th of what an optimistic teacher would expect: 125 Wpm per

8 *The median value was 51 days (half of the participants were above, the other half below). Minimum 14 days, maximum 207 days, standard deviation 58 days.*

9 *PN26 on page 180*

10 *Mean value 02:56 h, minimum 01:25 h, maximum 05:34 h, standard deviation 01:12 h*

11 *Minimum 27 Wpm/h, maximum 153 Wpm/h, standard deviation 33 Wpm/h*

12 *The scattering was very high: minimum 0.7 Wpm/day, maximum 20.1 Wpm/day, and standard deviation 4.8 Wpm/day. The reason for this was certainly not only due to differences in learning performance, but above all that the participants let different number of days pass between two exercises.*

13 *Assumption: start value 250 Wpm, final value 500 Wpm*

day. The opinions of the achievable speed increases are thus extremely far apart, and show how controversial speed reading is.

Now, let's continue with the results of the 16 participants.

Observations

The data of one of the 16 participants was so unusual that we first suspected a formula error in the Excel file, but this was not the case.

Exercise 1 was completed by this participant[14] with 25% over the start value. This is a high score, but still within the normal range of the other participants. Exercise 2, taken a week later, was a surprising 67% above the start value. Such a big leap, of 42 percentage points from one exercise to the next, is very unusual. The ***average*** reading rate for exercise 2 was 448 Wpm, which is still in the range of normal reading. However, the reading rate of the 25 single passages varied widely, and there were passages that were read extremely quickly, for example at 681 Wpm and 716 Wpm.

A natural speed reader?

Because the participant had read with full comprehension (self-assessment was 95%), there was an initial suspicion that this participant was one of the rare natural speed readers and had read the fast passages with visual line reading.

The participant's observations supported this assumption: "It's certainly true that I don't always use an inner voice when reading. Maybe I am already a speed reader, because I can read newspaper articles relatively quickly. It has only now become clear to me from speaking to you. I can, for example, read texts written by myself at a similar rate."

It would have been possible to interrupt the training of the basic speed reading with this participant and instead test whether the participant, besides visual line reading, could also master the two-dimensional speed reading (recognizable at speeds above 1,000 Wpm).

However, we were more interested in gaining new insights into the basic speed reading phenomenon. So the participant tried to take care to always use the inner voice during the next exercises. The final measurements resulted in a typical final value for the training of basic speed reading: reading rate 434 Wpm (62% over start value).

14 PN49 on page 204

Further participants

In addition to the 16 participants whose results we analyzed above, there were seven other participants who were not included in the evaluation due to missing final measurements.

A note on the notation: When "PN01" is used in the following, it means "participant with number 01," etc.[15]

First we see five participants whose data is inconspicuous and whose training, if it had been continued, would probably have taken a normal course:

- PN38: Start value 363 Wpm, training aborted after exercise 3 (414 Wpm), time spent for exercises: 00:41 h.
- PN36: Start value 270 Wpm, training aborted after exercise 2 (320 Wpm), time spent for exercises: 00:46 h.
- PN29: Start value 239 Wpm, training aborted after exercise 3 (261 Wpm), time spent for exercises: 00:49 h.
- PN43: Start value 270 Wpm, training aborted after exercise 7 (359 Wpm), time spent for exercises: 02:28 h.
- PN37: Start value 207 Wpm, training aborted after exercise 7 (300 Wpm), time spent for exercises: 02:33 h.

We will take a closer look at the data for two other participants, because they show interesting details:

- PN47: Start value 271 Wpm, training aborted after exercise 6 (311 Wpm), time spent for exercises: 02:29 h.

  The special thing about this training progress is that exercises 1 to 5 did not result in any notable increases. The values fluctuated between -2% (!) and 6% over the start value. Only with exercise 6 could 15% be reached over the start value. It is not known whether further exercises would have raised this rate to areas that we know of from the 16 evaluated participants (who achieved a 24% increase or more).
- PN32: Start value 231 Wpm, training aborted before the first exercise, time spent for exercises: 00:00 h.

  It is noticeable in this training progress that the participant achieved a certain speed increase without performing a single exercise. The participant only took measurements, 61 in total. Measurements 1 to 18 were the planned starting measurements and showed an average

15 *The participant numbers listed in this book have been chronologically assigned since 2008 for different purposes. Therefore, the participant numbers of each "experiment" contain gaps.*

comprehension level of 95%. Measurements 19 to 61 took place within 49 days, after which the participant stopped training. The last 19 of these measurements were retrospectively defined as final measurements. This resulted in a final value of 276 Wpm (20% over the start value) at 99.7% comprehension.

One of several possible explanations for this result is that the participant may not have carried out the measurements as measurements, but rather as exercises (i.e. trying hard to read the passage as quickly as possible).

Based on this experience, the Excel file for the basic speed reading training was extended in such a way that, after each measurement, it had to be stated whether and to what extent the participant had tried hard while reading. The choice was between "no," "yes" and "somewhat" (where "no" is the desired value for the measurements).

Variation possibilities

Here, we have presented a training format for basic speed reading based on the principle of "comprehension-maintaining speed training." While many speed reading seminars use a mix of different exercises (including many ineffective ones, see the chapter "Myths and Half-Truths"), we only used one type of exercise: trying hard to read as fast as possible (but maintaining full comprehension).[16]

The possible variations within this training format consist of changing the length of the various exercises and changing the distance between the sessions. In principle, as in many similar cases, there is likely to be a conflict of objectives or "trade-off" between the duration of the training (in days or weeks) and the time spent on training (in practice hours).[17]

For example, if a participant achieves a 10% increase in a 10-minute practice session, it is not certain that this participant would have achieved a 20% increase in 20 minutes. Perhaps, in 20 minutes, only a 15% increase would have been possible. A trade-off would have already taken place. The most extreme form of trade-off is also to be expected: There is probably an upper limit to the increase for each participant, such as 20%, which cannot be exceeded on a certain day, no matter how many hours the session is extended to.

16 As simple as these instructions are, they have not yet been included in a speed reading guidebook (for a list of the books examined, see page 287 ff.).

17 Ultimately, the question is which gradient is more important to you. Do you want to optimize the speed increase per hour of practice, or the speed increase per day?

The same applies to the time between practice sessions. Too few days in between will have to be "paid" for by the fact that a session brings, on average, less of a speed increase than would have been possible with sufficient time distance.

Concerning the conflict of objectives, the training of our 16 participants was designed in such a way that the training time was kept to a minimum. Therefore, the sessions were rather short and the time distance between the sessions was rather large. A longer total course duration was therefore taken into account.

You can probably make an exercise (approximately 3,200 words) a little longer and reduce the time between the exercises (usually three to six days) without increasing the total time spent. How far this reduction of course duration can be taken without negative effects is still unknown.

As we all know, the brain needs sleep phases to strengthen what it has learnt. This may be a limiting factor for the desired reduction in course duration. For this reason, there will be a lower limit for the number of days into which the training can be compressed (even if you are willing to invest an unlimited amount of time). Given all we currently know about learning, reading and speed reading, I would be surprised if the training could be compressed into less than a week.[18]

In the next chapters, we will deal with advanced speed reading and some unanswered questions.

18 *In terms of "speed increase per day," I think it is unlikely that the average participant will reach more than 25 Wpm per day (174 Wpm / 7 days = 25 Wpm/day). The best of the 16 participants (PN24 on page 178) reached 20 Wpm/day.*

Advanced Speed Reading

Achievable Reading Rates

IN THIS CHAPTER, WE WILL EXPLORE the reading rates attainable with speed reading in more detail.

Accurate vs. skimming speed reading

If we want to make statements about the reading rate with advanced speed reading, we have to deal with two main problems. The first (quite fundamental) problem is that there does not seem to be a clear boundary between accurate and skimming speed reading.

The situation is different for normal reading, and also therefore for basic speed reading. As explained on page 13, the rauding rate is a limiting factor. If you read faster, your comprehension breaks down linearly with the increase in speed. Therefore, the effective reading rate (reading rate * comprehension level) remains unchanged, even if you increase the speed beyond the rauding rate. You can't read more efficiently than with your rauding rate. The rauding rate is thus the clear "preferred rate" of normal readers, and it is not surprising that normal readers spend roughly 90% of their reading time at their rauding rate, according to Carver (1990). The rauding rate clearly marks the boundary between normal and skimming reading.

In our experience, there is no clear "preferred rate" for advanced speed reading. In advanced speed reading, the viewing circles partially overlap. The words in the overlapping regions are looked at more than once by consecutive fixations. This provides some level of redundancy, i.e. the potential for even more efficient reading. If a speed reader now increases their speed (sets the viewing circles at a slightly larger distance), the overlapping regions become smaller (without any damage to comprehension). Of course, "blind spots" on the page also arise, which are no longer covered by viewing circles. The comprehension indeed decreases, but the decisive factor is that comprehension does not decrease linearly with the increase in speed.

Conjecture: The faster you read, the higher the effective reading rate

This basically means that the faster you read with advanced speed reading, the higher the effective reading rate raises, and approaches, presumably asymptotically, a maximum value. This maximum value is reached when so few viewing circles are set per page that they no longer overlap.

To cut a long story short, there is no clear “preferred rate” for advanced speed reading. Speed varies from page to page depending on the importance of the content, say from 1,000 to 10,000 wpm. Reading comprehension thus fluctuates too (though not with the same “amplitude”). To where the boundary for skimming speed reading is set is quite arbitrary.

Lack of publications

The second difficulty with statements about the reading rate is that there are still too few scientific publications in which visual speed readers are studied. At the moment (in 2016), we only have test results from a handful of subjects. Depending on the extent to which the methodological quality of a study is taken as a criterion, useful data is only available for five to (at the most) ten visual speed readers.

We will, therefore, also use the information provided by speed reading teachers, knowing that a completely neutral view of the results of their own speed reading students is not necessarily to be expected.

Figure F 6.1 on page 55 summarizes the information provided by the teachers and studies that we believe to be relevant. The “black spot” between 100 and 500 wpm is the downsized illustration of page 2, and shows the reading rates of normal readers.

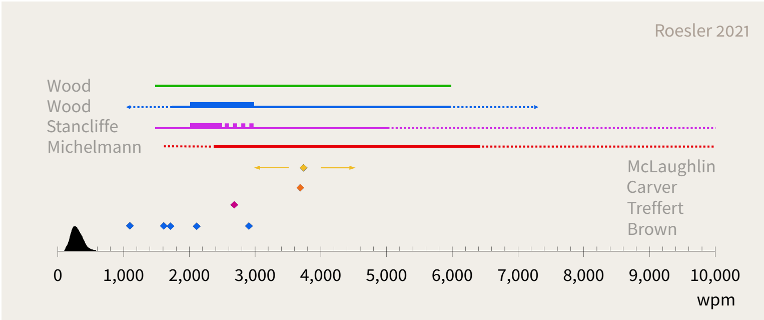
Wood

From Evelyn Wood, we have data on both natural speed readers and trained speed readers (which is unusual in this combination, and makes Evelyn Wood one of our most important sources). Both groups of speed readers are listed as separate bars in the figure.

In Wood (1960), she reports how she examined over 50 natural speed readers, who could read between 1,500 and 6,000 wpm. For each of these readers, she noted the characteristics of the reading process, the reading rate and her evaluation of the comprehension on a file card. Evelyn Wood has probably studied more natural speed readers than anyone else.

She gives the following information about her results as a speed reading teacher:[1] “A 12-week study session with two hours of class work weekly and another hour a day in practice can bring average reading speeds between 2,000 and 3,000 words a minute with full comprehension. Out of a class of 25 or so, several will get no better than 1,800 words a minute and several more will push beyond 6,000 words a minute.”

1 *Tampa Tribune, Mar 26th 1961, “Ten Times Present Speeds—Specialist at University South Florida Teases Professors with Promise of High Speed Reading” (quoted from Spache, 1962, p. 258)*



F 6.1
Reading rates for two-dimensional speed reading (various sources)

Stancliffe

Before George Stancliffe specialized in speed reading training for children, he taught speed reading to adults. We can read about this in Stancliffe (2003, pp. ii, 1, 83):

"Using the Dynamic Reading method[2], the practical limit to reading speed is over 10,000 words per minute. However, it is far more common to have students achieve reading rates of between 1,500 and 5,000 words per minute."

"In my experience, it is not uncommon for 10 year olds to attain reading speeds of 5,000 to 20,000 words per minute. But adults seldom do well at speeds of over 2,000 wpm."

"… I've only had three adult speed readers that got better than 10,000 wpm. Most adults aren't much good over 2,000 or 3,000 wpm."

The bar in Figure F 6.1 is intended to illustrate these statements (where only the data on adults is included).

Michelmann

According to R. and W. U. Michelmann (1995, p. 195), the range of accurate speed reading is between 2,400 and 10,000 wpm. However, this range has already been put into perspective and clarified by the two teachers themselves. In 2004, the two told me about the upper limit: Up to 6,400 wpm would be read with slalom finger sweep, and from 7,000 wpm, the loop finger sweep would be necessary. Only the slalom finger sweep guarantees complete coverage of the texts.

For the lower limit, in 2006 Rotraut Michelmann expressed her opinion that 2,400 wpm should not be called the lower limit of accurate speed reading, but rather a benchmark for the beginning of the training, because difficult technical texts would sometimes be read with 1,800 or 1,600 wpm.

2 *What is meant is two-dimensional speed reading.*

This completes the information reported to us by speed reading teachers. Now, let's take a look at some of the few scientific publications in which visual speed readers have been studied.[3]

McLaughlin

McLaughlin (1969a) examined a natural speed reader ("Miss L") and handed her a book that had not yet appeared on the market. Miss L read the book at an average rate of 3,750 wpm. Her reading speed varied between 1,200 and 9,000 wpm, depending on the page. For some text excerpts, McLaughlin reproduced the original text of the book and Miss L's retelling. From this, it is indeed evident that she had understood particular parts of the text (however, it was not possible to derive a rough percentage comprehension level from this).

In Figure F 6.1, the arrows near the data point "3.750 wpm" indicate that the reading rate varied considerably.

Carver

Carver (1985a) carried out a very elaborate search for superior readers, and finally chose 16 people. Among the tests used were two carried out with books. These books contained human interest stories. Among the 16 people, there was a subject ("SPEED-3,700") who showed particularly remarkable results. Particularly noteworthy were the achievements in writing summaries of the books. Carver was a critic of speed reading all his life, and didn't believe that one could read more quickly than 600 Wpm with good comprehension, that is, be a "super reader," as he called it. With this subject, however, he was almost doubtful: According to Carver, this subject would have constituted striking evidence of the existence of a truly "super reader" if there had been evidence that they could also recall a great many of details of the book, which was not the case.

Carver called this subject "SPEED-3,700" because they had completed the final test of the course in which they had learned to speed read with 3,700 wpm (with, supposedly, 80% comprehension). Figure F 6.1 therefore shows the data point at 3,700 wpm. Unfortunately, we can't really show the rate with which Carver examined the subject, because he didn't let them read the books with a free choice of speed, instead setting a fixed tempo grid (e.g. there were test runs with 1,500, 6,000 and 24,000 Wpm).

3 *The following sections are partly taken from Musch and Roesler (2011, pp. 100–104).*

Treffert

Treffert and Christensen (2006) investigated the "savant" Kim Peek and reported that he had read through thick books at barely ten seconds per page, and even years later knew everything in them: the names of the characters, the texts in their wording, even the page numbers of the text passages.

Let's try to estimate the reading rate of Kim Peek. From a TV documentary[4] and through other (somewhat anecdotal) sources from the internet, we learn that Kim Peek read eight pages in 53 seconds. Assuming that there are roughly 300 words on one page, his reading rate would have been about 2,700 wpm.[5]

However, one has to say that Kim Peek doubled his reading speed with a "trick." While reading, he brought the book very close to his face and read the left-hand pages of the book with his left eye and the right-hand pages with his right eye. He called this kind of reading "scanning."

Brown

We now come to the five data points in Figure F 6.1 which we can trust the most. Brown et al. (1981) provides the strongest scientific evidence so far for the existence of extraordinary speed readers. Brown carried out one of the very few studies on speed reading which even skeptics have to describe as methodically sound.[6]

Five "skilled rapid readers" were selected for the experimental group, who had not only attended a speed reading course but were also identified as particularly qualified by the teachers of these courses. All five stated that they had successfully used the speed reading technique learned in the courses for at least one year.

Their average speed was 1,891 wpm, several times faster than that of a control group reading at 345 wpm. Despite their much higher reading speeds, the speed readers achieved a comprehension level of 65%, just as much as the clearly slower reading control group. The comprehension level was determined by a time-consuming procedure, in which several independent judges evaluated the records of the subjects.

What is striking is this: The slowest speed reader (1,050 wpm) had understood the most (79%), but had the lowest effective reading rate (830 wpm). The fastest speed reader (2,960 wpm) had understood the

4 *Höfer and Röckenhaus (2006)*
5 *8 * 300 * 60 / 53 = 2,717*
6 *If you want to read Brown et al. (1981) in the original, you should also read Cranney et al. (1982), because both papers describe the same empirical experiments and the same subjects (but each with additional information).*

least (54%), but had the highest effective reading rate (1,600 wpm).[7] The other three speed readers were almost perfectly lined up in between. This data supports our preliminary considerations on page 53: Firstly, it is hardly possible to draw a clear boundary between accurate and skimming speed reading. Secondly, the faster you speed read, the higher the effective reading rate should be.

Further sources

Some other sources were not included in the diagram, for various reasons.

Stevens and Orem (1963) reported that they were able to teach two-dimensional speed reading to about 200 of a total of 2,000 course participants. At the end of the course, they could read more quickly than 1,500 wpm, with good comprehension. All of the readers felt that they were reading and not skimming. Because Stevens and Orem didn't specify the range of the reading speeds above 1,500 wpm, we haven't included the data in the figure (but retain in mind the 1,500 wpm as a possible lower limit of two-dimensional speed reading).

Schale (1969, 1970) reported that, in her speed reading courses, about one percent of the participants could read more than 20,000 wpm and comprehend 70% or more. Over the course of four years, she identified 15 such "gifted rapid readers" from over 4,000 students, three of whom she studied in more detail. This included the subject "M.T.C.," a 15-year-old girl. M.T.C. was tested immediately after a speed reading course using the Nelson–Denny Reading Test. She read at a speed of 8,520 wpm, and with a comprehension level that only 19% of the subjects had achieved. In a follow-up study one year later, she was tested with the Diagnostic Reading Test. She read at a speed of 41,000 wpm, and understood 85% of the text.

This all sounds very impressive at first, but one can question the methodological quality of the study. Musch and Roesler (2011) criticized the missing control group, and were not convinced of the validity of the test methods used, so we have to doubt the comprehension data. M.T.C. certainly mastered two-dimensional speed reading, possibly as well as "Miss L" from McLaughlin (1969a), but there is a well-founded suspicion that M.T.C. has already gotten into skimming speed reading at the speeds reported above.

7 *The numbers were measured from Brown et al. (1981, p. 38, Figure 2) and are accurate to approx. 1%.*

We do not need to look at any other sources for the time being. There are some other studies that may include purely visual speed readers, such as Taylor (1962) and Nell (1988). However, these studies are too poorly documented for making a reliable statement.

Assessment of sources

With the help of the various sources summarized in Figure F 6.1 on page 55, we will now try to form our own opinion about the reading rates for two-dimensional speed reading. That not all sources refer to English-speaking readers (R. and W. U. Michelmann refer to German-speaking readers) should be no problem. The reading rate is likely to differ very little in both languages. Also, the fact that most of the sources refer to wpm instead of Wpm (standard length words per minute) can be neglected in light of the existing inaccuracies.

It is clear that the teachers quoted here are quite unanimous. The data given by Wood and Stancliffe is almost identical, and the values given by R. and W. U. Michelmann are only slightly different. The data provided by the researchers, especially from the particularly revealing publication by Brown et al. (1981), tends to be lower. At least, however, it overlaps with data provided by the teachers. This is good news, and a sign that researchers and teachers are probably referring to the same, genuine phenomenon, which in this case is two-dimensional speed reading. It has already been pointed out that the teachers may rate the results of their own speed reading students too positively. This may explain the differences between data provided by researchers and teachers.

But what can we now promise in concrete terms, for if someone wants to learn advanced speed reading? 1,500 wpm is a reading rate that Wood (1960), Stancliffe (2003) and Stevens and Orem (1963) put as a lower limit. 1,500 wpm reached four out of five speed readers from Brown et al. (1981). The fifth speed reader from Brown (with 1,050 wpm) seems to have operated a kind of "learning-oriented speed reading" due to a much higher comprehension level when compared to the control group, and cannot necessarily serve as a counter-example against the previously-mentioned 1,500 wpm. All the sources taken together, in my opinion, allow for the following assurance:

> Those who have learned two-dimensional speed reading successfully will most likely be able to read accurately at 1,500 wpm (or faster).

For any attainable speed with the (accurate) two-dimensional speed reading

Some speed readers can even go into the 2,000 to 3,000 wpm range, though there is some disagreement about the exact figures. According to Wood, training can lead to an average reading rate between 2,000 and 3,000 wpm with full comprehension. According to Stancliffe, adults seldom do well at speeds of over 2,000 wpm, and most adults aren't much good over 2,000 or 3,000 wpm. In Brown et al. (1981), the two fastest of the five speed readers were in this range, namely 2,120 wpm (with 59% comprehension) and 2,960 wpm (with 54% comprehension). Because the control group understood 64% on average, it is questionable whether it is still possible to speak of accurate speed reading for both subjects. Nevertheless, from an overall view of all the sources, it seems to me that the following statement about the achievable speed of the two-dimensional speed reading is possible:

> A certain percentage of speed readers can read accurately at 2,000 to 3,000 wpm.

For some attainable speed with (accurate) two-dimensional speed reading

We would now like to make a statement about the upper limit for (accurate) speed reading. We have already discussed the difficulty, perhaps even the impossibility, of drawing a clear boundary between accurate and skimming speed reading. However, we can at least speculate as to what value this upper limit cannot exceed (we are talking about the "upper limit of the upper limit").

The best indication of this is provided by the more than 50 natural speed readers examined by Wood (1960) who were able to read between 1,500 and 6,000 wpm. Unfortunately, we don't know from Wood (1960) how many of the speed readers were 6,000 wpm or slightly below, and how much they comprehended. As for the worst case, there was only one person with 6,000 wpm and such a low comprehension level that we couldn't accept it as accurate speed reading. The second fastest person, for example, could have been 1,000 or 2,000 wpm below this figure.[8]

We can at least state the following: None of the over 50 speed readers read at over 6,000 wpm. As we are talking about natural speed readers, some of whom have been practicing purely visual reading for decades, this limit will certainly apply even more to the trained speed readers. This allows us to make the following statement about the upper limit of speed reading:

8 *It would certainly be a rewarding task to analyze the Evelyn Wood file cards (probably archived by the "Utah State Historical Society" as part of the "Evelyn Nielsen Wood Papers, ca. 1925–1979").*

> The upper limit for accurate two-dimensional speed reading is presumably a maximum of 6,000 wpm.

Upper limit for (accurate) two-dimensional speed reading

That this assumption can be refuted is something that cannot be ruled out. A single subject with special performance is sufficient if the performance has been confirmed in a methodical, well-conducted study. What is certain is that the subject must have extremely sharp eyes, because visual acuity is the decisive limiting factor in purely visual speed reading. Because eyes often become worse with age, young speed readers are good candidates for this, similar to 15-year-old "M.T.C." from Schale (1969, 1970) and "Miss L" from McLaughlin (1969a).

Training Format for Advanced Speed Reading

THE MOST SUITABLE TRAINING FORMAT for advanced speed reading known to us is one we owe to R. and W. U. Michelmann (2005). Of course, this training format has historical predecessors. Ultimately, it is based on Evelyn Wood and the finger sweeps she made known. However, it was R. and W. U. Michelmann who gained a decisive insight: Right at the very beginning, it must be trained with 10 times the normal speed(!).

Because the average reading rate according to R. and W. U. Michelmann was 240 wpm, the first exercises for the training are held at 2,400 wpm. During the training, this increases to 4,800 wpm and finally to 10,000 wpm (or even above). Only when (after a few weeks) a "reading feeling" arises at 10,000 wpm can you go down again to 2,400 wpm, and can then read in principle with full comprehension.

Michelmann training format: high-speed training right from the start

We will call this training format "high-speed training right from the start," but we could also have simply called it the "Michelmann training format." In 2008, some test subjects began to be trained by me using this format. We came up with some improvements which were immediately applied. This book describes this modified training format. Notable differences to the original Michelmann training format are summarized on page 217.

In contrast to the training format for basic speed reading, the training does not take place onscreen but with real books. We will discuss later which books are suited to learning advanced speed reading. The exercises are performed with finger sweeps, to guide the eyes over the page to the correct fixation sequence. The "slalom finger sweep," which we have already mentioned in Figure F 3.1 on page 22, is mainly used for exercises with 2,400 and 4,800 wpm. A second finger sweep, referred to by R. and W. U. Michelmann as the "loop finger sweep," is used for exercises from 7,000 wpm upwards. One of R. and W. U. Michelmann's experiences is that, of the many finger sweep variants suggested by Wood, only the slalom and loop finger sweeps are necessary for advanced speed reading.

The rough training scheme consists of the following activities, and is adapted to the individual needs of each participant.

- A weekly meeting with the teacher (mainly to practice and correct the finger sweep)
- Daily practice, about 30 minutes (approximately 7 to 15 minutes net with finger sweep)
- In the first week, the slalom finger sweep is practiced with 2,400 wpm. (You understand virtually nothing, maybe 0 to 5%.)
- In the second week, the slalom finger sweep is practiced with 4,800 wpm. (You still understand almost nothing.)
- From the third week, the loop finger sweep is practiced with 10,000 wpm. (Comprehension level is still minimal, but this changes after a few weeks and a "reading feeling" develops.)[1]
- If at some point (hopefully) a "reading feeling" has developed, it is permitted to practice again with 2,400 wpm, which is supposed to have good comprehension. We then say: "A breakthrough has been achieved," or even "***the*** breakthrough has been achieved," because there is only one such breakthrough necessary for mastering advanced speed reading. This is the first time that the "elementary skills" mentioned on page 21 work simultaneously (A: omit subvocalization, B: grasp meaning purely visually, C: see with two-dimensional vision, D: set fixations precisely).

The activities in the following weeks are then less schematic, and usually run in parallel:

- Exercises will continue to be carried out at 2,400 to 10,000 wpm, so that the effect experienced for the first time can be reliably repeated and the advanced speed reading becomes a reading technique that can be applied at any time.
- Visual line reading, as a special form of advanced speed reading, is practiced.
- In due course, the speed reading student is allowed to use speed reading freely, i.e. to speed read their own reading material.

1 *Unfortunately, not for every participant. With our current methods, the success rate is approximately 50%, see page 90, and you can read at www.speed-reading-teacher.com whether this has improved since the publication of this book.*

Exercises

During the training, two types of exercises are used. There are exercises that do one-to-one what a visual speed reader normally does: reading with slalom or loop finger sweep, but also so-called "rapid page turning."

Warm-up exercises

In addition, exercises are used which are intended to support individual learning goals A to D, such as "seeing with two-dimensional vision." These exercises are called "warm-up exercises." The warm-up exercises are chosen individually for each speed reading student, and depend on which of the learning goals is currently causing the most problems for the student.

Books and templates

In their first meeting with the teacher, the participant is given several books to practice with daily. For each book there are templates (transparent overhead foils with imprints), that they place on the pages to indicate the exact path of the finger sweep. There are templates for the slalom finger sweep, with 2,400 and 4,800 wpm, and for loop finger sweep, with 10,000 wpm. Each template also specifies how many seconds per page are appropriate, for example 5.0 seconds (for the template 2,400 wpm, for a book with about 200 words per page).

Exercise procedure

After the finger sweep was practiced several times with a template on a book page and the tempo was adjusted with a stopwatch, an exercise begins with a duration of about 2.5 minutes. For a book with 200 words per page, about 30 pages are now read with the slalom finger sweep. The speed reading student estimates their comprehension level, and calculates the real reading rate with the help of the stopped time.

Page turning

The finger sweep is performed with the right hand for right-handed people and with the left hand for left-handed people. For right-handers, the result is that the left hand responsible for turning the page and the left arm appear to lie somewhat strangely. The left forearm presses down the side just above the first line of the left side (so that it cannot flutter and thus distract) and the left hand, especially the thumb, lies on the upper edge of the right page (and thus presses it down and prevents the right page from fluttering). The thumb and the index finger grip the top right corner of the right page, and turn it over.

Alternating exercises and warm-up exercises

After such an exercise, there is a one-to-three minute warm-up exercise, followed by another exercise, another warm-up exercise, and a third exercise. This concludes the exercise program of a training day.

The exercises take approximately 7.5 minutes all together. With other activities (warm-up exercises, organizational and documentation), it takes about 30 minutes. During the course of the training, after a little routine, the duration of an exercise is increased to 5 minutes, so that 15 minutes of net practice time can be reached within a 30-minute session.

2nd week

Starting from the second week, the exercises will be done with 4,800 wpm. In an exercise lasting 2.5 minutes, roughly 60 pages are then read with a slalom finger sweep. Roughly every second day, one of the exercises will be carried out "merely" with 2,400 wpm, in order to stay practiced at this pace. In preparation for the third week, during the warm-up exercises every now and then the so-called "horizontal 8" is practiced, which can be regarded as the core movement of the loop finger sweep. In the third week the loop finger sweep, which takes a lot of getting used to, should work right away.

3rd week onwards

From the third week on, the loop finger sweep is practiced with 10,000 wpm. The suitable books are different to the first two training weeks, and have on average more words per page (closer to 300 than 200 words). At least every second day, there will also be an exercise with 2,400 or 4,800 wpm for staying practiced at these paces (and for another reason, which we will explain later). The time period from the third week is the decisive phase of the training. In this phase, the brain must gradually succeed in achieving the first three of the four learning goals.

Learning goal A (omit subvocalization)

Subvocalization must disappear more and more. In order to support this, one can internally count the back and forth movements of the index finger during the finger sweep ("1—2—3—4 . . ."). This is intended to make it more difficult for the brain to simultaneously articulate the words seen internally. This is just one of many ideas that we would like to present in more detail later on (from page 265 in the appendix).

Learning goal C (see with two-dimensional vision)

The "tunnel vision" that is part of normal reading has to be broken up more and more. The view must become more and more "wide" and "two-dimensional." In order to support this, before the main exercise, a certain warm-up exercise can be carried out which we have given number C500 on page 269. The text is turned upside down. Most people will then be unable to read the text. You let your gaze wander over the text and try to experience what "seeing with two-dimensional vision" feels like. You should not focus on single words, but look at the page as you would a tree or painting. Because the text is upside down, it is much easier to avoid "tunnel vision," at least in our experience. The two learning goals A (omit subvocalization) and C (see with two-dimensional vision) are probably not completely independent of each other for many participants. If you are still reading with "tunnel vision" and concentrating on the word exactly at the fixation point, then the reflex to articulate this word internally is especially difficult to suppress, and vice versa: If one can already see with two-dimensional vision and subvocalization begins, the view often narrows again and tends towards "tunnel vision."

Learning goal B (grasp meaning purely visually)

The third learning goal in this training phase is the ability to grasp the sense in a purely visual way (i.e. without the help of the inner voice). Here, we are still facing the greatest mystery as to what exactly has to happen in the brain in order for this learning goal to be achieved. At the moment, we can only say that after a while it works for some participants and not for others. For a long time, we did not have any warm-up exercises to support this learning goal. It was only when we first got to know the oldest German-language speed reading guidebook (Aghte, 1965) that we found appropriate warm-up exercises.

These "imagination drills," as we call them, are listed in the appendix on page 268, starting with point B500. In Aghte (1965), nothing is said about how effective these imagination drills are and the percentage of participants who benefit from them. So far, five of my participants who had problems with learning goal B have tested these imagination drills (two of the participants very thoroughly). With no one did the imagination drills bring the desired result.

Learning goal D (set fixations precisely)

Unlike the three learning goals that must be achieved in 10,000 wpm loop exercises, the fourth learning goal of visual speed reading ("set fixations precisely") is not yet really relevant at this speed. This would be different at a speed of 1,500 or 2,400 wpm, i.e. in the range of accurate speed reading. In this case, the page must be covered completely with viewing circles so that there are no "blind spots" on the page and the text can be completely captured. At 10,000 wpm, one lies well within the range of skimming speed reading and the viewing circles hardly overlap, or not at all (perhaps this is the reason advanced speed reading has to be practiced at this speed).

"Reading feeling"

The observation made by R. and W. U. Michelmann is (at least as I understood it) that at 10,000 wpm, a "reading feeling" must have developed before you can practice again at 2,400 wpm.

My interpretation of "reading feeling" is the following: "Reading feeling" is a weaker term than "I have understood the text." However, the latter is not to be expected at 10,000 wpm, because we are no longer in the range of accurate speed reading. Even many experienced visual speed readers will, at 10,000 wpm, only reach 20% comprehension level, although they have mastered the above-mentioned learning goals perfectly. For comparison, normal readers with a rauding rate of 300 wpm can, at 10,000 words per minute, only articulate 300 of them internally, so 3% of all the words. Their comprehension level is 3% or less. In my opinion, "reading feeling" at 10,000 wpm expresses that one has clearly grown beyond the normal comprehension level of up to 3%. Whether this is 7, 10 or 20%, can be left open at the moment.

One of the dangers in this training phase is to overlook the point at which "reading feeling" arises. The term "reading feeling" initially doesn't mean anything to a speed reading student. Naturally, the speed reading students do not know how this reading feeling, which they should pay attention to, feels. Whether it's 3% comprehension with skimming in normal reading or 7 to 20% comprehension with skimming speed reading, both are very far from the 80 to 100% comprehension we are used to with normal reading. Therefore, it is not certain that a speed reading student would automatically say to the teacher: "I think the reading feeling is there and we can now practice at 2,400 wpm."

How do you recognize "reading feeling"?

This is the main reason that, from the third week onwards, exercises with 2,400 or 4,800 wpm are interspersed again and again. If the learning goals work, then at 2,400 wpm it is much more noticeable that a new type of reading is now possible. We have decided (somewhat arbitrarily) that at a speed of 2,400 wpm and 30% comprehension, it can be assumed that the breakthrough has been achieved. Converted to an "effective reading rate," this is 720 wpm and can no longer be explained by normal reading. This is a first indication that the breakthrough has been achieved.

Indicator "effective reading rate"

In order to be sure that the learning goals have been achieved, we also query the participants' self-assessment of the various learning goals. In the case of learning goal A (omit subvocalization), most participants are able to recognize whether and to what extent subvocalization is still taking place. Most participants can also recognize whether and how well the seeing with two-dimensional vision works (learning goal C). A typical question the teacher asks after an exercise with, for example, 2,400 wpm, is: "Which percentage of the words on the page have you seen clearly enough?" An answer of 80 to 100% indicates that seeing with two-dimensional vision works well enough (and the fixations are set precisely, learning goal D).

Introspection as a further diagnostic tool

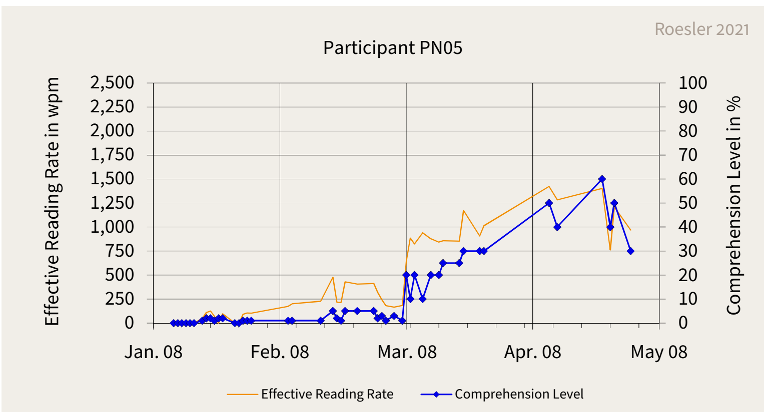
The strongest risk with learning speed reading is that reading and speech disorders may occur. This effect was first mentioned by R. and W. U. Michelmann (1995). We are now of the opinion that, as teachers, we are able to cope with this problem. However, we can understand very well the warnings from R. and W. U. Michelmann against self-taught learning of visual speed reading. Reading and speech disorders are discussed in detail from page 163 onwards, in the chapter "Benefits and side effects."

Risk of reading and speech disorders

Example

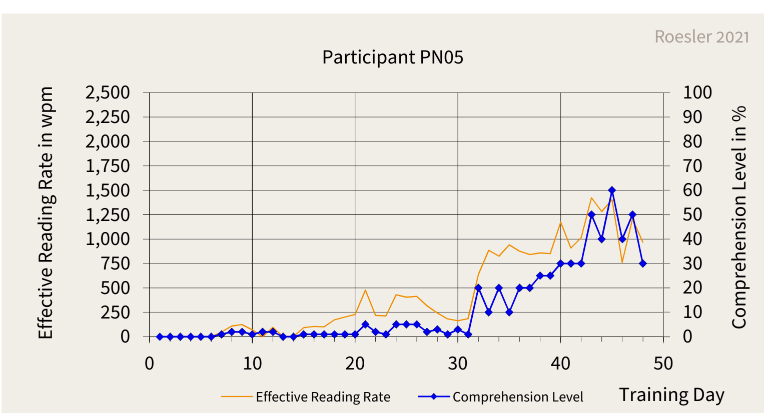
Figure F 7.1 shows the training progress of a successful participant. The blue curve shows the comprehension level in the finger sweep exercises (the best of the three or four exercises of the training day was always scored). The orange curve shows the best effective reading rate for the training day.

Participant PN05 completed his first training day on Jan 6th 2008. Two months later, on March 4th 2008, the effective reading rate skyrocketed to 885 wpm, a sign that the participant had probably made the breakthrough. Incidentally, the participant commented on his exercises on Mar 4th with the remark: "View is widening."



F 7.1
Training progress of a successful participant (date view)

Figure F 7.2 shows the same data broken down by training days. Training day 32, with an effective reading rate of 640 wpm, was much better than the previous training days. Training day 33 with 885 wpm and the following training days strengthened confidence that the training would be successful.



F 7.2
Training progress of a successful participant (by training days)

The participant needed until the 48th training day until he was able to master the visual speed reading so well that, in his opinion, he could do without any further help from the teacher. His last comment on training day 47 was: “At 2,400 wpm, I make less fixations than calculated, 20 instead of 27, but I have the impression of being able to perceive the complete content.”

Incidentally, with advanced speed reading, the sudden increase in the effective reading rate within a few training days is the rule rather than the exception. It is to be assumed that throughout the entire training period, learning processes take place in the brain and progress (in favor of individual learning goals) occurs. Only when the last required learning goal has been achieved satisfactorily does advanced speed reading work, and can be detected via the effective reading rate.

This chapter does not yet tell the whole story of the training of advanced speed reading. We will deal with it in a few more chapters. First of all, let’s try to understand finger sweeps and their role more closely.

Finger Sweeps

We consider Evelyn Wood to be the "inventor" of finger sweeps. Franklin J. Agardy describes this in his book[1], along with many other biographical details of the life of Evelyn Wood, based on investigations by Verla Nielsen.

One such detail is that Evelyn Wood was sent to Nazi Germany with her husband, a Mormon bishop, to support several hundred young church members in their missionary work there. When the situation worsened in 1939, the Woods had to help to withdraw all missionary groups from Germany and were literally unable to leave the country until the day before the outbreak of World War II.[2]

The invention of the first hand movement (as a preform of the finger sweeps) took place in the Indian summer of 1958, by which time Evelyn Wood had already examined 53 natural speed readers, but had no idea how she could teach this skill to herself. Angry with herself, she hurled the book she was reading (W. H. Hudson's "Green Mansions") across the stream. Back in her cabin, she opened the book again and was able to read it with "total comprehension" and "at incredibly high speed." She reported that she was able to do it because she brushed her hand down on the page in a rapid motion and her eyes followed her hand. In her opinion, she may have initially attempted to clean the soiled pages, and this was the day she discovered the use of the hand as a pacer.

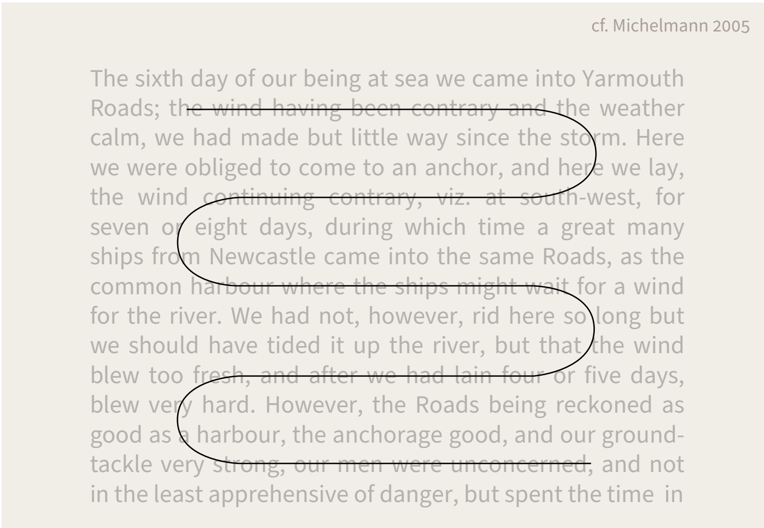
Evelyn Wood had apparently derived several different finger sweeps from this discovery, and taught them in her courses. Let us now take a closer look at two of these finger sweeps, the slalom and the loop finger sweep, although it is admittedly true that a book like this is not an ideal medium for explaining such a dynamic movement as a finger sweep.

The slalom finger sweep

According to R. and W. U. Michelmann, it is always the index finger of the hand you write with that carries out the finger sweep. In the following, we will describe everything as done by right-handed people.[3] Figure F 8.1

1 *Agardy (1981, p. 5, 26 ff.)*
2 *Agardy (1981, p. 34)*
3 *I'd like to apologize to the left-handed readers for having to do the opposite in the following section. By the way, I myself am a "re-educated" left-hander. That could be a reason for why advanced speed reading worked badly with my finger sweep, and why I set fixations without finger sweep, like natural speed readers.*

shows how the tip of the index finger moves over the page. “Slalom” is the name of this finger sweep, because the line is a little reminiscent of the route of skiing when you descend a mountain in slalom.



F 8.1
Slalom finger sweep

Hand position

We are going to talk about the correct tempo of the finger sweep in a moment. First, we need some tips on hand position and mechanics. The hand is held similarly to the well-known “I want you” gesture of “Uncle Sam.” The middle finger, ring finger and small finger are slightly angled or sometimes touch the palm of the hand. The hand is not flat on the book page (as for playing the piano), but turned 90°, more like a karate chop. The hand, and in its extension the forearm, lie mostly parallel to the right or left margin of the book page. You can’t quite get this right, but in order to achieve this, you should at least try to bring the elbow as close as possible to the side of the chest, much closer to it than, for example, if writing on a piece of paper.

Hand movement

Now on to the movement of the hand and index finger. The slalom line can be thought of as being composed of two components: a purely horizontal oscillating movement from left to right and back again, and a purely vertical movement component from the upper margin of the page to the lower margin of the page. It is important that the horizontal oscillating movement is performed almost exclusively by the index finger. The hand and forearm almost exclusively perform the vertical movement. The hand and forearm also form a rigid line which is almost unchanged, so the wrist remains quite motionless.

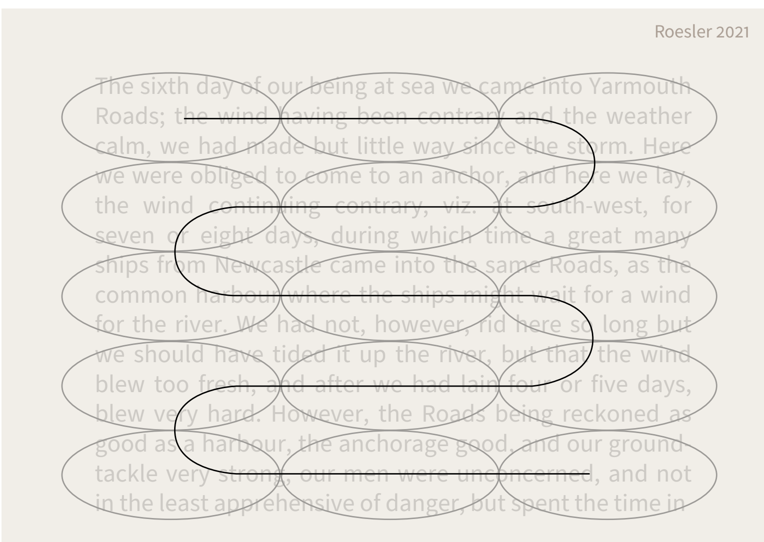
Finger movement

For the index finger, this means “a lot of work.” The finger joints perform almost the complete oscillating movement. With the oscillating movement to the left, the index finger bends to the left, with all finger joints contributing to this. With the oscillating movement to the right, the index finger stretches straight again, comes into the “I want you” position, or is even a little further deflected to the right.

We are still not saying anything about the pace of the finger sweep. Before, we must think about where the eyes look when the finger is sweeping, because that’s what it is all about (learning goal D: set fixations precisely). The finger sweep is only the tool for achieving this.

Viewing circle model

Figure F 8.2 shows in an idealized illustration, where the fixations come to lie. In the middle of each viewing circle (which can also be ovals), you have to imagine the fixation point. Each fixation takes about 250 ms, just like normal reading. The fixation duration seems to be the parameter for normal reading and speed reading, which is least variable and therefore can hardly be optimized.



F 8.2
Viewing circle model for slalom finger sweep (approx. 2,310 Wpm)

Tempo of the finger sweep

Now, we can finally indicate the tempo of the finger sweep. With three viewing circles next to each other as shown in Figure F 8.2, the oscillation from left to right takes about 750 ms, i.e. three quarters of a second. A full oscillation (from left to right and back) takes 1.5 seconds here. In a book with a narrower type area, i.e. shorter lines, perhaps two fixations next to each other are sufficient, and a full oscillation takes only 1.0 seconds. With some texts, it is also the case that four fixations are necessary next to each other. A full oscillation then takes 2.0 seconds.

For graphical representation in Figure F 8.2: To keep the diagram clear, the viewing circles are not displayed in an overlapping manner. Unfortunately, it now looks as if there were "blind spots" between the viewing circles. In fact, it can be assumed that, at this speed (approx. 2,310 Wpm)[4], the visual acuity of many speed readers is still sufficient to completely or almost completely cover the type area. Figure F 3.1 on page 22 shows a more realistic illustration with overlapping viewing circles, and the viewing circle models in the training materials of R. and W. U. Michelmann (2005) always show circular (not oval) viewing circles, which partly overlap.

Training experiences

The teacher can first of all only judge the participant's finger sweep. If the finger sweep looks correct, and is performed at the correct oscillating rate, then one can only hope that the eyes will look at the desired spots. That this does not necessarily have to be the case is an experience taken from the test training at the beginning of 2008, with several participants who met once a week in my living room. In the fourth meeting, one of the participants expressed doubts that his eyes were following his finger.

Mirror as diagnostic tool

It was only then that we came up with the idea of placing a mirror next to the book and observing the movements of the eyes while the finger was sweeping. The participant was right in his assumption, and since then we have always used a mirror as a further diagnostic tool.

Video recordings as diagnostic tools

We had already used video recordings from the first meeting as diagnostic tools for finger sweeps. The participants could also record their daily exercises and send them to the teacher for evaluation. This should prevent a possible false finger sweep from being practiced for a full week before it can be corrected.

Typical finger sweep analysis

Here is an example of a typical analysis of a finger sweep by the teacher:

- The finger sweep appears smooth, and the finger keeps the correct distance to the beginning and end of the line in the upper half of the page. However, the sweeps seem to become narrower over the course of the page, and leaves too much space at the beginning and end of the line in the lower third of the page. Page turning works well, and the position of the left hand is just right. The tempo of 5,270 wpm is very close to the target of 4,800 wpm.

4 *Calculated from the following data: text length 130 standard words, 15 fixations, fixation duration 225 ms.*

- Improvement possibility 1: The hand still carries out a slight left-right movement, and the upper finger joint does not bend enough during sweeps to the left. It would be better if the finger joints produced the left-right movement alone.
- Improvement possibility 2: The right page flutters a little on the lower right-hand side. The position of the left hand is just right, but the left hand could push down the right page immediately after turning it over, so that the page cannot flutter.

From the fourth meeting on, we started to film eye movements. The advantage of video recordings is that they can also be viewed and analyzed in slow motion. In addition, the progress made over several meetings can be documented and tracked. A low video quality is sufficient for the finger sweep to be judged. For eye movements, you have to pay more attention to good lighting, a correct zoom size and the position of the tripod, so that the recordings can be evaluated. Aside from this, 30 frames per second and a resolution of 480 x 640 pixels is sufficient for assessing eye movements.[5]

It is obvious that such recordings cannot provide nearly as much data as so-called "eye trackers," which are used in reading research. From the video recordings, a teacher can only see how many fixations are placed next to each other and at what tempo. In our experience, however, nothing more is necessary.

Terms

In order to facilitate communication between the participant and the teacher, we suggest terms in Table T 8.1, some of which have already proved their usefulness, and some of which are to be introduced here:

5 *For example, the following camera phones and digital cameras provided sufficient quality: Samsung SGH-U700, Ricoh Caplio G4, HP Photosmart R507, Canon Digital Ixus 55.*

Term	Description
half-sweep	Outward or backward sweep of the index finger
full sweep	Outward and backward sweep taken together
oscillating movement	Horizontal movement component of the finger sweep
oscillation duration	Duration of a full sweep (reciprocal value: oscillation frequency)
top, bottom, vertical etc.	Mostly meant in a metaphorical sense (i.e. relative to the upper or lower margin of the page, not relative to the center of the earth).
downward movement	Vertical movement component of the finger sweep
offset (downwards)	Vertical distance between two half-sweeps, usually calculated in lines (line spaces)
number of viewing circles next to each other	Number of viewing circles covered by a half-sweep
type area	Rectangular area of the page covered by ordinary text
tessellation	The way in which the page (or more precisely, the type area) is covered by viewing circles. (Figure F 8.2 on page 73 shows, for example, three viewing circles next to each other and an offset of three lines).

T 8.1
Terms

Possible variations

The slalom finger sweep is used for a wide range of reading rates. According to R. and W. U. Michelmann, the range reaches up to 7,000 wpm (then the loop finger sweep is necessary). For the reasonable lower limit of the range, we can only make a theoretical consideration (because we have not yet thoroughly tested and measured the lower limit). Since a visual speed reader can reach about 700 to 900 wpm with visual line reading, and therefore without swinging finger, only then is a two-dimensional component necessary for speed reading, and only then does the slalom finger sweep need to be used.

The different reading rates are achieved through different tessellation schemes. For example, a half-sweep can cover two, three or four viewing circles (more than four viewing circles are probably only necessary for a few books with particularly long lines).

The downward offset may vary, and may be more or less than the three lines of Figure F 8.2 on page 73. In general, the offset will not be a whole number line spacing. For example, if a page with 31 lines is covered by ten half-sweeps, the average offset is 3.1 lines.

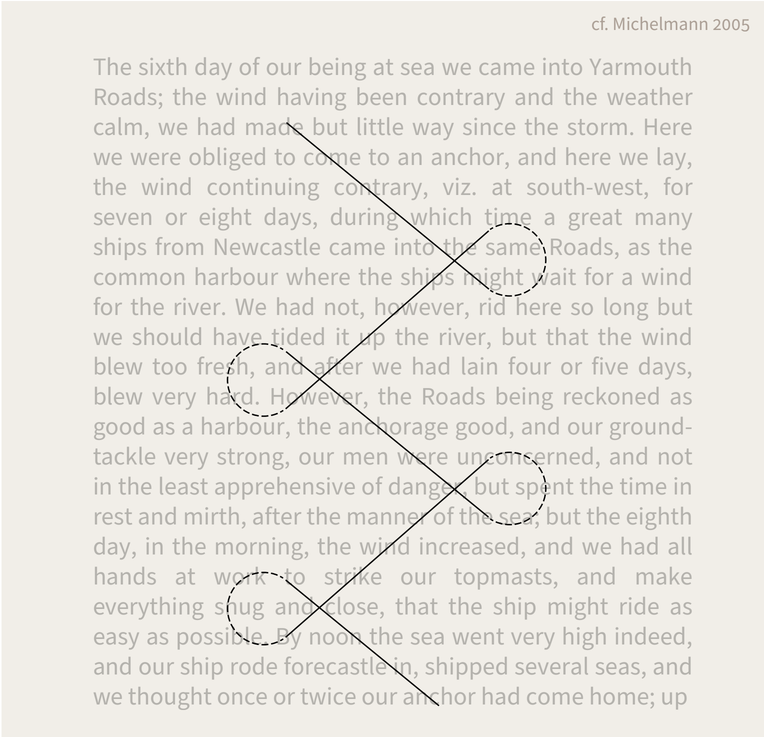
The offset is the parameter of the tessellation which is most finely adjustable. However, the number of viewing circles next to each other can only be a whole number, so this parameter is "quantized." We observed, in the video recordings of the eye movements, that sometimes one fixation less is set in the backward sweep than in the outward sweep. The corresponding tessellation can be assumed to be honeycomb-shaped instead of tile-shaped, as shown in Figure F 8.2. Thus, the number of viewing circles would be half-numbered, or at least averaged over outward and backward sweeps. Ultimately, however, this does not change the fact that this parameter cannot be fine-tuned in any way.

The variations of the slalom finger sweep have been presented here primarily as theoretical considerations. It would not be surprising if the real fixations of speed readers deviated widely from this ideal scenario. Even for normal reading, we discussed the effect that fixation durations and saccade lengths for one and the same reader and within a single passage of text can vary widely (see pages 9 and 10).

The loop finger sweep

Let's now come to the loop finger sweep, which, according to R. and W. U. Michelmann, is used from speeds of 7,000 wpm upwards, and plays a decisive role in learning advanced speed reading from the third training week on. The tip of the index finger moves over the page, as shown in Figure F 8.3 on page 78. The dotted circles are meant to indicate that the finger at these points is likely to hover at a greater distance above the leaf than at the diagonal straight lines between the circles.

By the way, it is mnemonically difficult for many participants to associate the term "loop" with this form of finger sweep. Maybe it's useful to imagine tying shoelaces. The loops and the loose ends of a tied shoelace show a certain similarity to the shape of the loop finger sweep.



F 8.3
Loop finger sweep

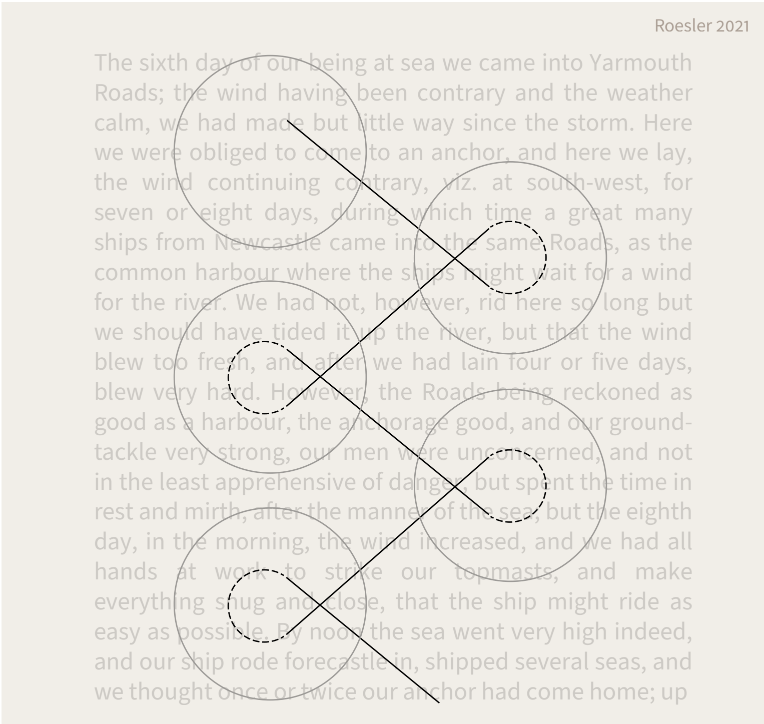
Caution is required in this illustration of the loop line[6]: It has to be regarded as a purely schematic representation much more than the corresponding illustration of the slalom finger sweep. Firstly, the loop finger sweep is individually very different, as R. and W. U. Michelmann have emphasized to their participants, and secondly, it is not implied that the diagonal connecting lines are really straight (perhaps they are curved), or that the dotted circles are really as they are shown (perhaps they are only pointed, or not circular at all).

Viewing circle model

Before we talk about the hand position and finger movement, let's first take a look at the viewing circle model for the loop finger sweep. In the training materials of R. and W. U. Michelmann (2005) it is left open where the fixations lie on the loop line. According to our observations, the fixations are only set at the start, reversal and end points of the loop line, see Figure F 8.4 (approx. 10,170 Wpm)[7].

6 The "loop line" refers to the entire line, not just to the dotted sections.

7 Calculated from the following data: text length 191 standard words, 5 fixations, fixation duration 225 ms.



F 8.4
Viewing circle model for loop finger sweep (approx. 10,170 Wpm)

It is plausible that, for the loop finger sweep, it is easy for the eyes to fixate exactly at the reversal points. The greatest acceleration (in the physical sense, this includes a change of direction) is experienced by the fingertip at the reversal points. For (most likely) evolutionary reasons, this movement stimulus is particularly interesting for the eyes. The eyes, therefore, fixate on these points.

Tempo of the finger sweep

With the viewing circle model, the tempo of the finger sweep is determined. Here too, a fixation takes an average of 250 ms, so that a half-sweep takes 250 ms and a full sweep (or "full zigzag") 500 ms.

Possible variations

The possible variations are dealt with briefly here. It is basically only possible to vary the offset downward. In the example in Figure F 8.4, the offset is approximately 3.75 lines. You can't vary the horizontal part of the movement, because with the loop finger sweep, only one viewing circle comes to lie next to each other, if one can express it in such a way. One can only discuss how closely the viewing circle should be placed to the beginning or end of the line. Eye tracking measurements of real speed readers are not yet available. It would be plausible if, with a small offset, the fixations were set at slightly more than 25% and slightly less than 75% of the line length. With a large offset, the ideal positions should be closer to the center of the line, i.e. closer to perhaps 33 and 66% of the line length.

Hand position

The position of the hand is basically the same as for the loop finger sweep and the slalom finger sweep, i.e. turned by 90°. With the loop finger sweep, however, it is mechanically and ergonomically possible to put the finger sweep "on leaf," even if the hand is turned less than 90°. One of the successful participants, for example, held his hand only turned by 20° over the sheet.

Hand movement

While the hand and forearm are not supposed to contribute to the horizontal oscillating movement of the slalom finger sweep, this is unlikely to be avoided with the loop finger sweep. The hand and forearm "wiggle" a little bit. Similarly, the hand and forearm do not necessarily form a rigid line during the loop finger sweep, but the wrists of some participants bend a little in the oscillation frequency.

Finger movement

The necessary movement of the index finger can be best made clear if one executes everything in slow motion and carries out the finger sweep without an offset downwards, thus "stepping on the spot." The tip of the index finger then constantly follows a curve that looks like a "horizontal 8." In the left sweep, the left half of horizontal 8 is followed in a clockwise direction. In the right sweep, the right half of horizontal 8 is followed counter-clockwise.

Detailed description

If one imagines both halves of horizontal 8 as two separate clock faces, then one can describe the path of the index finger as follows: The left half of horizontal 8 is entered at 3 h, and the finger is already quite bent here. At 6 h, the finger is most bent, and stretches again from here. At 11 or 12 h, it is completely stretched and bends again from then on. At 3 h, it is again quite bent, and the right half of the horizontal 8 is entered (at 9 h).

It continues counterclockwise, followed by the most unpleasant part of the finger sweep. At 6 or 5 h, the finger is bent as far as it will be in the horizontal 8, and stretches again from there. At 1 or 12 h, it is completely stretched and bends again from then on. At 9 h it is quite bent again. Here, horizontal 8 is completely followed once.

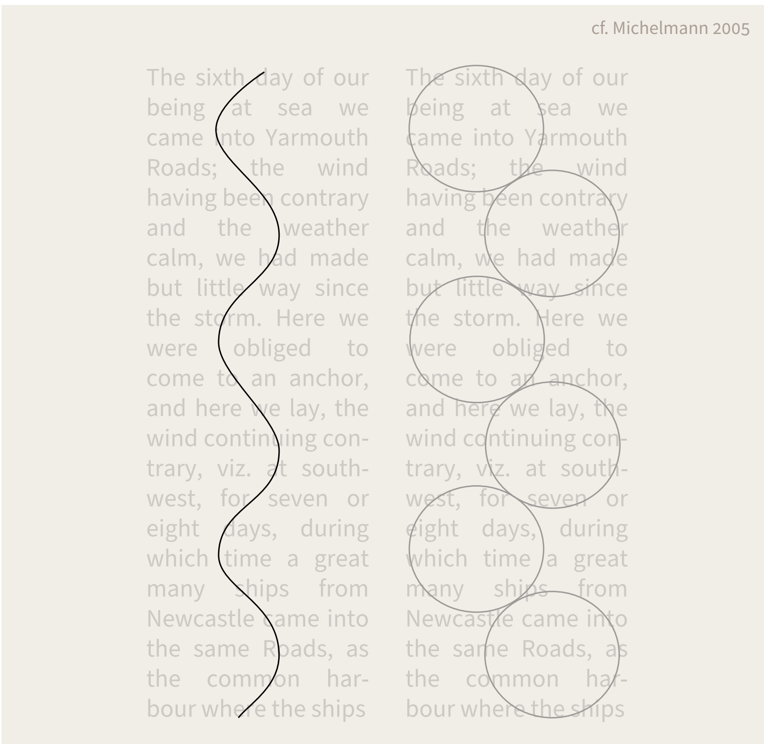
To make this clear: Although we did not carry out an offset downwards with our hand and forearm, the finger movement does not only include horizontal but also vertical movement components (which, together, make up the two-dimensional shape of the horizontal 8).

Unfortunately, this makes the finger sweep complicated enough, even if it is only performed in slow motion and without offset. It is easy to imagine how difficult it will be in real-world use, when the loop finger sweep gets the necessary offset and there is only 500 ms time left for a full zigzag movement.

Further finger sweeps

Wedel finger sweep

In the training materials provided by R. and W. U. Michelmann (2005), another finger sweep is mentioned (see Figure F 8.5), which can be regarded as a special case of the slalom finger sweep. The name of this "wedel finger sweep" is derived (similarly to "slalom") from a turning technique for skiing. According to R. and W. U. Michelmann (2005), the wedel finger sweep is suitable for narrow texts with a column width of up to one viewing circle or a little more. The "wedel" is a typical finger sweep for newspaper columns.



F 8.5
Wedel finger sweep incl. viewing circle model (approx. 2,930 Wpm)

From the perspective of the viewing circle model, the "wedel" seems to have a greater similarity to the loop (page 78) than the slalom (page 72). Nevertheless, it is justified to consider the wedel a special case of the slalom, as first of all, the wedel strives for a complete coverage of the text (without "blind spots"), and secondly, from the mechanics of the finger movement, the wedel is clearly "slalom-like" and feels completely different for the speed reader than the loop finger sweep, which takes a lot of getting used to.

In the English-language guidebook literature[8], there is a whole assortment of finger sweeps, most of which possibly come from the "school" of Evelyn Wood. We read there about finger sweeps like "L hand motion," "the loop," "open X," "closed X"[9], "straight down hand movement," "curved S" or "S hand motion"[10], "hand dusting"[11], "circling hand movement," "paragraphing hand movement," "underlining with two fingers," "slashing hand movement," "criss-crossing hand movement," "question mark hand motion," "the horseshoe," "U hand motion," "the half-moon," "double line sweep," "variable sweep," "reverse sweep" and "double guide."

The guidebooks contain imprecise or no statements about the tempo of the respective finger sweeps, and almost no information about the tessellation scheme intended with them. Some of these finger sweeps must be attributed to skimming speed reading, because under no circumstances they can achieve complete coverage of the type area. One example is the "question mark hand motion." For complete coverage, I see only two reasonable possibilities: tile-shaped or honeycomb-shaped tessellation. The slalom finger sweep provides both with a comparatively harmonious finger movement, and so we already have everything we need. In my opinion, there is currently no reason to challenge R. and W. U. Michelmann's limitation to just a few finger sweeps.

Remarks

Function of the finger sweep

Up to now, we have only looked at finger sweeps from a tessellation perspective: The finger sweeps should help to guide the fixations systematically over the type area. It was therefore about learning goal D, "set fixations precisely."

On/off switch

If I have understood R. and W. U. Michelmann correctly, they also see the benefit of finger sweeps from a second point of view. The finger sweep also has the function of an "on/off switch." When the swinging finger is used, the brain can more easily enter the "visual speed reading" mode. Without a swinging finger, however, the brain remains in "normal reading" mode. Correspondingly, R. and W. U. Michelmann also use the term "conditioning" (which has to be achieved from training week 3 onwards with the loop finger sweep at rates of 10,000 wpm or above).

8 Wenick (1990, p. 13 ff., 54–55, 64 ff.), Kump (1998, p. 66, 89, 97, 106, 156 ff.), Frank (1992, p. 89 ff.), Moidel (1998, p. 35 ff., 55 ff.), Buzan (2003, p. 92 ff.)

9 "Closed X" corresponds to the loop finger sweep of page 78, rather than "the loop."

10 Corresponds to slalom finger sweep from page 72.

11 Probably the first finger sweep invented by Evelyn Wood.

I don't know how strong the effect of the "on/off switch" is. The natural speed readers, who, as already mentioned, read without finger sweeps, obviously achieve this effect in a different way. For me personally, switching without any finger sweep is no problem. The mental effort for this is no more than when I try to put my hearing to the mode of attentive listening, for example. After 10 years of experience with visual speed reading, it is now the case that, when looking at text, I usually enter the "visual speed reading" mode from the beginning. To switch to normal reading mode, I have to "do something" mentally. It feels like I have to actively "control" the tongue, and possibly the larynx.

Does the finger hide the text?

An unresolved question on the use of finger sweeps must still be discussed. The index finger obviously hides part of the viewing circle. These hidden words cannot actually be recognized. On the other hand, the speed readers say that at "slow" speeds of 1,500 to perhaps 2,000 or even 3,000 wpm, they have the impression that they have seen all the words on the page sharply enough.

R. and W. U. Michelmann (2005) write in their training materials that the eyes fixate where the finger no longer is. The finger therefore runs ahead of the eye—but how far? Only if it runs ahead of a full viewing circle (i.e. 250 ms) would we not have to wonder any longer. According to our observations, however, it does not go that far ahead. Still, the index finger hides part of the viewing circle, and our question has not yet been answered.

An explanation might be the fact that the finger moves during the 250 ms fixation. The finger probably moves so far away that the hidden words will become visible again within 250 ms. If not a single word of the viewing circle is hidden for the full 250 ms, we wouldn't have a problem, because a mere display time or "exposure time" of 50 ms is sufficient for the eye.[12] Be that as it may, in order to finally clarify this issue, we will probably have to wait for research results from universities.

Rapid page turning

Let's now come to a reading process that is only indirectly related to finger sweeps, but fits well in the chapter with slalom and loop finger sweeps. While the slalom can, in principle, still be carried out with full comprehension, the loop is already in the range of skimming speed reading. Rapid page turning can now be seen as the fastest form of skimming speed reading, with a correspondingly low comprehension level.

12 *Rayner et al. (1981)*

The book is leafed through at a rate of approximately one page per second, as R. and W. U. Michelmann propose[13], meaning there is only one second to capture the content of a double page. In one second, only about four fixations can be placed: for example, one each in the upper and lower half of the left book page and in the upper and lower half of the right book page. These fixations are set without the help of a finger sweep.

Page turning every 1.5 seconds

Our experience is that most participants take longer than one second for a double page. Often, it takes 1.5 seconds, so we sometimes refer to this as "page turning every 1.5 seconds." Converted into wpm, "page turning every 1.5 seconds" corresponds to a speed of about 20,000 wpm.[14]

There are at least three plausible reasons for one second not being sufficient for four fixations. Firstly, turning a page takes a certain amount of time. Secondly, the saccades between two fixations take longer than with normal reading. The saccade duration depends on by how many degrees the two fixations are separated.[15] When rapid page turning, the fixations are much further apart than with normal reading. Thirdly, there are indications that the fixations take longer if one tries to maintain a very "large" two-dimensional view. The two subjects in Schale (1970) obviously had such large viewing circles that they could see two columns of a book page with one fixation sharply enough, but needed an average of 0.8 and 0.75 seconds per fixation.

Variation

The rapid page turning described here deviates from the rapid page turning described by R. and W. U. Michelmann (2001, p. 39). According to this, the right hand starts at the top right of the right double page, and sweeps across the entire text of the two pages diagonally down to the bottom left of the double page. The left hand, while holding the left margin of the book, catches and holds the book's page. The right hand moves back diagonally. The head is directed towards the middle of the book: Only the eyes automatically follow the movement of the right hand. This type of rapid page turning has many more of the characteristics of a finger sweep, or at least a hand movement led by the eye.

Reason for rapid page turning

Even if the comprehension level is low when rapid page turning, it is by no means pointless. It constitutes an important step of "reading management," one of the three main types of speed reading. In a very short time, it is possible to gain an initial overview of a book. The rough

13 R. and W. U. Michelmann (1995, p. 112, 2001, p. 39)
14 For a book with 250 words per page.
15 Saccade duration = 21 ms + 2.2 ms per angular degree of saccade length (Carpenter, 1988, p. 72)

structure of the book is recognized, along with the illustrations the book contains. A reader who masters two-dimensional speed reading will, at this rate, be able to capture roughly 10 to 20% of the words on the page. This is often enough to be able to assess whether this page is interesting or not.

Rapid page turning is also useful for normal readers who have not mastered speed reading. Although normal readers may only be able to capture one to two percent of the page's words at this rate, the structure of the book and the illustrations are still recognized. For reading management, this is a useful work step. While rapid page turning is useful for normal readers, this is not the case for finger sweeps. In my opinion, a normal reader cannot benefit from going over the page with a slalom or loop finger sweep.[16]

16 *One possible exception is the "search term technique," which uses the slalom finger sweep (see page 123).*

Effort and Success Rate

LEARNING ADVANCED SPEED READING is several times more laborious than learning basic speed reading. By now, we have the exact records of the training progress of 21 participants (see appendix, starting on page 211). This allows us to see how many of the 21 participants have learned the advanced speed reading and how many have not, and how much time was required for the training.

Training time

Training days, duration, time spent until breakthrough

First of all, we will look at the seven participants who have mastered advanced speed reading. Table T 9.1 on page 88 shows the data of the individual participants. An average of 34 training days were needed until the breakthrough was achieved. The training had lasted an average of 2.6 months up to this point in time. The total time required for a participant averaged 40 working hours (whereby all the time spent was included here, such as telephone calls and travel time).

Net practice time until breakthrough

The net practice time is particularly interesting, which averaged 7.1 hours. This is the time it takes for the brain to be able to produce the effect of the advanced speed reading for the first time. Included in the net practice times were all the exercises we assume are particularly effective for learning advanced speed reading: slalom and loop finger sweeps, and rapid page turning. The warm-up exercises interspersed between the finger sweep exercises were not included, because we suspect that their benefit is not as important for learning advanced speed reading.

Low scattering

The relatively low scattering of the results is striking, as can be seen from the low standard deviations. The “slowest” participant (PN19), with 45 training days, took only around twice as many days as the fastest participant (PN06), with 21 training days. For such a complicated skill as visual speed reading, a much wider range of results could have been expected.

Participant PN06 did not only take on a special role regarding training days. With a net practice time of only 3.2 hours and an extraordinarily short course duration of only 0.8 months, she found it easier to learn advanced speed reading than all the other participants. She even beat the shortest Michelmann course duration of 5½ weeks, as reported by Wozniak (2002). One reason may be that PN06 plays a musical instrument, and when reading notes (several voices in a score) always has to use “two-dimensional vision.”

Participant	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
PN06	21	0.8	3.2	32.6
PN01	26	1.8	4.1	28.7
PN25	34	2.7	6.7	29.6
PN54	36	1.8	10.0	56.0
PN51	37	2.9	7.3	17.9
PN05	40	2.4	6.3	46.6
PN19[1]	45	5.6	11.8	68.3
Mean value	34.1	2.6	7.1	40.0
Standard deviation (in %)	8.2 (24%)	1.5 (58%)	3.0 (43%)	17.7 (44%)

1 The breakthrough for visual line reading was achieved by PN19 much earlier: day 17, duration 0.7 months, net practice time 3.0 h, total time spent 23.9 h.

T 9.1
Total time required until “breakthrough” for the 7 successful participants

Now, we will look at the upper limits of the time required. This gives us an indication of how hardworking or persistent speed reading students should be (before they give up training because they think they will never learn advanced speed reading).

Recommended minimum training times

As there were participants who needed 40 or 45 training days, one should practice for at least this amount of time. I would add a “safety buffer,” and recommend at least 70 training days (because the data base of seven successful participants is still a little small). The course duration should be at least three months, or including a safety buffer, maybe six months. (We are only talking here about the time taken for the “breakthrough,” after which follows an “application phase,” which is also accompanied by the teacher). The net practice time should be at least 10 hours, or including a safety buffer, at least 20 hours.

Let’s compare the recommended minimum training times with the data of the 14 participants who have not (or not yet) learned advanced speed reading. Table T 9.2 shows that three participants had clearly not practiced enough. Participant PN12, with 44 training days and 7.5 hours of net practice time, should also probably have practiced more.

Participant	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
PN10 (not practiced enough)	15	0.8	2.9	21.7
PN09 (not practiced enough)	17	0.8	3.0	19.7
PN11 (not practiced enough)	21	1.0	3.3	28.1
PN23 (trial 2)	40	5.8	21.1	41.6
PN12 (not practiced enough?)	44	50.1	7.5	67.3
PN03	48	4.6	12.0	50.5
PN20 (trial 2)	51	15.6	12.0	41.5
PN24 (trial 2)	52	2.3	4.7	25.4
PN07	62	8.0	15.7	78.7
PN02	70	11.5	16.6	73.2
PN14	75	6.1	19.7	66.3
PN16 (trial 2)	99	37.1	32.3	75.3
PN21	115	21.1	36.4	105.7
PN08	159	52.4	25.2	125.3
Mean value	62.0	15.5	15.2	58.6
Standard deviation (in %)	40.2 (65%)	18.1 (117%)	10.9 (72%)	31.9 (54%)

T 9.2
Total time spent by the 14 unsuccessful participants

The expression "trial 2" is given in the table for those participants who had previously participated in vain in Michelmann format training. The values for these four participants must be thought of as correspondingly higher, i.e. about their (unfortunately unknown) time spent on the first trial.

Success rate

This is an issue that is not as easy as we might first think. We need to clarify which participants should be included in the calculation of the success rate. However, what must be discussed beforehand is what is understood by "success," and whether it is possible to determine success clearly.

The guidebook literature helps us little here. With very few exceptions, the authors make no distinction between basic and advanced speed reading. For these authors, there is a continuum from slow reading rates (as with normal reading) through to 1,000 or many thousands of wpm, along which the participants should increase their reading rate with a variety of exercises. The fact that there is a clear boundary between fast normal reading and purely visual reading is usually not seen.

Definition of success

Of course, we are only interested in success regarding advanced speed reading. All four learning goals A to D (see page 21) must be achieved, and only then can we speak of "success." Our diagnostic possibilities (see page 68) should now be sufficient for deciding this for all the participants (at least for the 21 participants so far, it has been possible and is documented in the appendix starting on page 211). With four of the seven successful participants, it was even possible to determine the exact day of the "breakthrough."

To calculate the success rate, we now have to divide the number of successful participants by the total number of participants. The number of successful participants was seven, with the reservation that Participant PN19 had learned advanced speed reading, but was not able to reproduce the effect permanently and integrate it into everyday life (see page 238 ff.). One could therefore argue that the number of successful participants is only six.

For the total number of participants, it is certainly sensible to consider only those participants who practiced long enough. This means that three to four participants have to be dropped from the calculation. Likewise, we cannot include the four participants who had previously tried in vain to complete Michelmann format training. This is because participants who had previously ***successfully*** participated in such training do not take part in a second attempt, and thus falsify the sample. Therefore, we have to exclude a total of seven to eight participants from the calculation.

From a total group of 13 to 14 participants, seven (possibly six) successful participants remain. This is about 50%, and this allows us to make the following statement:

Success rate

> The success rate for learning advanced speed reading (with the methods available in 2016) is approximately 50%.

Now, one could argue that there would certainly also be training with a better success rate elsewhere. At least for the English and German-speaking areas surveyed by us, it is unlikely that a training format is practiced somewhere that is more than 50% successful. It is clear that training courses which last only one or two days cannot achieve this. This leaves almost no training providers left to be considered, perhaps only a little more than those listed as important sources on page 20.

Founded in 2010, the German Society for Speed Reading has accumulated a great deal of know-how from people who have taken part in the most varied and long-lasting training courses. Some participants could not tell if they had learned advanced speed reading.[1] Their teachers either didn't know it themselves, or were apparently happy when the contact with the participant gradually came to an end. When we examined the participants more closely, it turned out that those who hadn't learned it were in the majority. A training format with a success rate of more than 50% does not seem to exist at present.

Evelyn Wood and Reading Dynamics

As early as 1967 (still in midst of the "Wood era"), there were critical reports that the majority of course participants had not learnt speed reading, and that this unpleasant fact had been concealed. The best inventory of the early years of commercial speed reading courses that we found in literature comes from Alexander (1967a, 1967b, 1967c). From these three articles, which Alexander had written for the Harvard University student newspaper, the information from the following two pages is taken (enriched with some personal judgments).

As already mentioned, Evelyn Wood discovered the finger sweep in 1958, and thus learned advanced speed reading. Afterwards, according to Alexander (1967a), she experimented with high school students in Utah. In spring 1959, she gave a "Reading Dynamics" course in Wilmington, Delaware. Russel G. Stauffer, the director of the university's Reading-Study Center, attended her course and was apparently successful: He learned to read fiction at more than 2,000 wpm. Stauffer organized a course for about 20 faculty members, including the university's president. The success rate seems to have been high enough, because during the fall semester of 1959 Evelyn Wood was appointed assistant professor in the local "School of Education."

In the fall of 1960, Evelyn Wood opened about 25 training centers in the USA, but went bankrupt in September 1961. John Kilgo, director and owner of the Boston franchise, described the situation: "We opened all 25 centers within one month with no preparation and no advertising. There was just nobody with any practical business experience involved. Soon five centers in the South went bankrupt—sold out is a nicer way to put it".

Loss of know-how

A closed corporation was then created, and a graduate of the Harvard Business School, George Webster, was hired as a business consultant. The first thing Webster did was to fire most of the old guard. These were the people who had been working with Evelyn Wood from the very

1 *How difficult this assessment is from a participant's point of view, if the breakthrough has not yet been achieved, has already been discussed on page 68.*

start, and we can assume that they had really mastered the advanced speed reading. The Reading Dynamics training centers were sold to hard-headed businessmen, most of whom could not speed read. (I personally see this as the time at which the rot began to set in. Not only did this deprive the training centers of important know-how, but there were also other decisions that must have had a very negative impact on the success rate.)

Reduction of course duration

Originally, the course had lasted 12 weeks. John Kilgo reported that the participants had attended only eight[2] of these 12 weekly sessions. As a result, only eight-week training programs were offered from a certain point in time, with the unusual situation that participants only attended an average of five of the eight sessions.

Let's compare these twelve, eight and five weeks with Table T 9.1 on page 88, column "course duration (months)." In the first 12 weeks (2.8 months), no less than ***five*** of the seven successful participants achieved their breakthrough. With eight weeks (1.9 months) only ***three***, with five weeks (1.2 months) only ***one*** participant would have succeeded. Thus, the reduction of the course duration to less than 12 weeks led to a dramatic drop in the success rate. (This trend towards shorter course durations did not end in 1967. The course duration for many providers was further reduced in the following years. Courses lasting one to two days became the rule.)

Avoiding the term "breakthrough"

The reduction of the course duration was accompanied by another development. Evelyn Wood and her old guard used the term "breakthrough" to denote the sudden attainment of "dynamic reading." The term "breakthrough" was dropped, in favor of a more gradual description of success. Kilgo reported that they were instructed not to talk much more about the "breakthrough." Too often it would not come, and the students would return to their old speeds. Also, it would make the course too much of a hit-and-miss proposition.

"96% successful participants"

Another measure taken by George Webster was the introduction of a guarantee. Those who could not at least triple their effective reading rate despite thorough practice had the right to demand a full refund of their tuition fees. More than 96% of the participants apparently did not take this step. The Reading Dynamics official pamphlet made the following statement: "The success of Reading Dynamics lies on its ability to teach over 96% of its pupils successfully." Concluding that "if 96% of participants do not claim their money back, the success rate is 96%" may be obvious, but if you look closely, it is completely untenable.

2 *Presumably an average value*

Let's get to the final point, which Alexander (1967c) calls "the basic deception of the Reading Dynamics course." The final test at the eighth session was much easier than the first one at the beginning of the course. Even participants who had little understanding of the text achieved high scores in the final test. In addition, the participants were instructed before the final test to "go full out" (regardless of whether they had mastered the technique or not). Together with the easy final questions, it was then hardly possible to miss the goal of tripling the effective reading rate.

A too-easy final test

All three points (avoiding the term "breakthrough," advertising with "96% successful participants," a too-easy final test) combined made it almost impossible to realize the true success rate of the courses. In my judgment, due to the reduced duration of the course, the success rate had already fallen to a very low level in 1967, most likely below 10%.

The reaction of university science was divided. Evelyn Wood could mainly convince the researchers of the University of Delaware. Apart from this, the vast majority of researchers continued to insist that accurate reading with more than 900 or 1,000 wpm was impossible. It is a testimony to the power of observation and judgment that Jeffrey C. Alexander, then a young Harvard student, had taken a middle position between the strong advocates and the radical opponents of dynamic reading. He admitted the existence of the phenomenon and that there were people who learned it, but pointed to the low success rate of the courses (Alexander, 1967c, "Evelyn Wood: Most just waste the money").

This, then, was the situation in 1967. At that time, there were more than 50 Reading Dynamics institutes in the USA, and 300,000 people allegedly participated in Reading Dynamics courses in total.

Who can easily learn to speed read?

The still-unsatisfactory success rate in 2016 (approximately 50%, according to our argumentation) calls for improvements in two respects. We need better training methods in order to increase the success rate (which we only want to name and not discuss here). A success forecast would also be a great help, i.e. a kind of "aptitude test," which could tell us, before training, which participants should only start their advanced speed reading training. We don't have this test yet, but we will start to think about which individuals will find it easy to learn advanced speed reading, and which ones won't.

Success forecast or "aptitude test"

So far, we have only noticed one source that seriously addresses this issue: Stevens and Orem (1963). The fact that sources on this issue are rare is not surprising when we think about it. We can only expect information on this from the few teachers whose training format is suitable for producing a sufficiently large number of visual speed readers. In addition, such teachers have to admit to themselves and to the public that a significant proportion of the participants do not master advanced speed reading. We have already learned in the "Evelyn Wood and Reading Dynamics" section that a certain (economic) pressure stands in the way of this.

In 1963, George L. Stevens and Reginald C. Orem wrote that more than 2,000 adults had taken part in their reading courses. Approximately 200 of them acquired special skills: They could read various kinds of material with good comprehension, faster than 1,500 wpm. These participants had thus learned two-dimensional speed reading.

The success rate of their training format was thus just under 10% (200 successful participants out of a total of over 2,000). From today's perspective, this is not a particularly high success rate. Because no details of the training format have been given, we can only speculate about the reasons for this low success rate. Stevens and Orem report about five years of course experience: Their first course therefore took place in 1958 or 1959. Since Evelyn Wood only invented the finger sweep in 1958, it is easily possible that Stevens and Orem didn't know anything about it and that their participants had trained without finger sweeps. There may also be other reasons for the low success rate, such as the course duration being too short.

Common characteristics of successful participants

Stevens and Orem name the following common characteristics of successful participants:

- At the beginning of the course, their reading rate was already over 300 wpm (with good comprehension).
- Reading was a common form of recreation.
- None remembered any difficulty in learning to read.
- All reported that they were above average in academic achievement.
- All showed good visual memory, a dependence on visual imagery, and a general preference for visual symbolic experience over aural.
- Though all experienced inner speech to some extent in their reading, none thought it to be an essential part of comprehension.

"Eye-minded" versus "ear-minded" people

Stevens and Orem seemed to think the two latter points were the most important, and wrote the following about them:

Fast readers showed "strong preference for a visual presentation of symbolic information over an aural-oral situation." The fast readers "reported that meetings, lectures, and group discussions were not usually as meaningful as a personal review of written material. By and large, they felt that they did their best studying alone. These points contrasted markedly with many of the slower readers who, in some cases, expressed precisely the opposite experience." Additionally, the fast readers "indicated excellent recall of visual detail." Stevens and Orem had questioned several hundred very fast and very slow readers informally. It seemed to them that one group could be called "eye-minded" and the other "ear-minded."[3] "The faster readers preferred visual experience and the slow readers aural."

According to Stevens and Orem, inner speech is the quality which most clearly distinguishes the fast from the slow readers. The degree of dependence of the reader on subvocalization in the reading process, if determined at the beginning of training, was found to be most indicative of the reading rate that could be achieved by the end of the training.

One can recognize from this publication that Stevens and Orem are good observers and scientifically-minded teachers, whose statements we can take seriously. Nevertheless, it is unclear the extent to which we can use their results for our intended success forecast. We are looking for a success forecast for 50% of the participants, who can learn advanced speed reading with current training methods. Stevens and Orem describe the similarities of just under 10% of the participants (those who were successful). Perhaps these 10% were especially "easy learners" or "naturals," who in their childhood might even have become natural speed readers if their learning circumstances had been different. I also heard a statement of R. and W. U. Michelmann that 10% of their participants learn the visual speed reading easily.

In summary, I think 10% would find it easy to learn advanced speed reading. Another 40% would also learn advanced speed reading with the current methods. It is still unclear how this 40% could be identified before training. The similarities described by Stevens and Orem would likely play a certain role, albeit not as clear as in the case of the "easy learners."

Favorable age

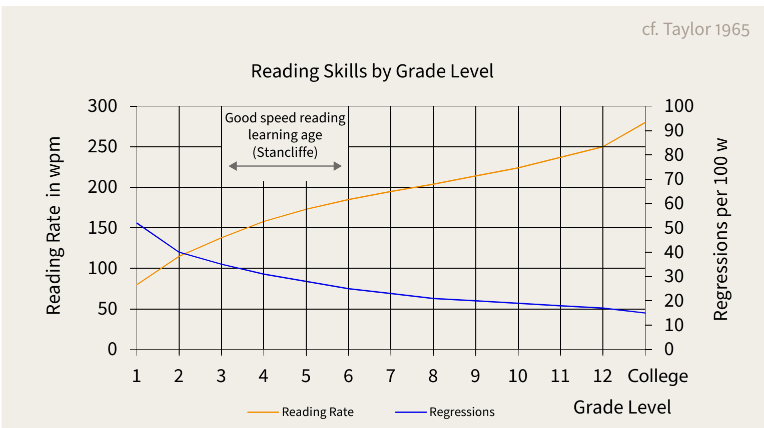
8- to 12-year-olds (3rd to 6th grade)

How easily one can learn advanced speed reading does not only depend on whether one is, in simple terms, "eye-minded" or "ear-minded." It also depends on age. According to Stancliffe (2003, p. ii), children aged 8 to 12 (approximately 3rd to 6th grade) find it easier to learn advanced speed reading.

3 *Aghte (1965) used the terms "visual type" and "aural type."*

Admittedly, for most readers this advice will come quite late. Fortunately, you can still learn to speed read at a later age, though with more effort. For example, I myself was 45 years old when, after months of training, advanced speed reading worked for me.

Which reading skill is achieved at which grade is shown in Figure F 9.1 (data from Taylor, 1965, p. 193). The reading rate increases from 80 wpm in 1st grade to 280 wpm in college.[4] At the same time, the number of regressions decreases from 52 regressions per 100 words in the 1st grade to 15 regressions per 100 words in college. Other parameters, such as the average fixation duration, also improve (not shown in the figure).



F 9.1
Reading skills by grade level

In the diagram, you can see in which grades advanced speed reading, according to Stancliffe, is easiest to learn. At this time, pupils are not yet able to read very well. Their reading speed of 138 to 185 wpm is quite low compared to adults, roughly corresponding to the slowest 2 to 10% of adult readers.[5]

However, there must be a reason why age 8 to 12 is particularly appropriate for learning speed reading. Possibly "tunnel vision" has not yet hardened enough, which is characteristic for normal reading.[6] Learning goal C (see with two-dimensional vision) could thus be much easier for children than adults.

4 *The wpm curve is distorted, in that the average word length of texts increases as the class level increases. Carver compensated for this effect by converting wpm to Wpm and thus detecting that the speed increases fairly evenly from grade 2 to 12, by about 14 Wpm per year (Carver, 1992b, p. 93).*
5 *See page 12*
6 *See page 33*

Whatever the exact cause is, it is clear that children achieve their breakthrough very quickly. To state this in days is not simple, because Stancliffe (2003, p. 38) talks about three stages of comprehension increase, and we can only assume that the breakthrough happens during stage 2 (“growth stage”). If this is the case, most children achieve their breakthrough after roughly one to three weeks.[7] For adults it is a multiple, on average 2.6 months or 34 training days.[8]

7 *“no-warranty statement”*

8 *See Table T 9.1 on page 88*

Experiences

In this chapter, we want to discuss how advanced speed reading "feels," and which texts are suitable for speed reading. We will discuss the phenomenon of "cinematic reading," and discuss the effects that reduce comprehension levels when speed reading.

What does advanced speed reading feel like?

We will try to answer this frequently-asked question. It is probably not something that speed readers would agree on. I would say that in comparison to normal reading, advanced speed reading feels very "quiet." The content is also less "penetrating" than with normal reading.

Surprisingly, the reading speed (e.g. 1,000 wpm) does not feel very fast. I certainly realize it's much faster than normal reading, but it doesn't feel as exhausting as I would expect at such a high speed. I notice this especially when I change from normal reading, at about 400 wpm, to two-dimensional speed reading, at about 1,000 wpm. The 400 wpm feels more exhausting, and the 1,000 wpm feels like a real rest! Perhaps this effect is because speed reading requires less fixations, and the eyes can be more "lazy."

Does it endanger reading pleasure?

It is often said that reading pleasure is lost when you speed read. I rarely have this feeling anymore. It may be more true just after learning to speed read, when you still feel insecure and are a speed reading beginner. However, the question is of secondary importance, because a speed reader does not unlearn normal reading. If necessary, for example with poems and other "beautiful literature," one simply uses normal reading.

Confusion of words

Even during normal reading, it is possible to confuse one word with another when the word shapes are overly similar. A colleague once told me that, on a train ride, he constantly interpreted the German word "Bahnknoten" (rail hub) as "Banknoten" (banknotes) in a brochure, because he was working on a project which dealt with the quality of banknotes.

When speed reading, where you are constantly on the verge of visual acuity, this danger is even greater. I don't experience such word confusion daily or weekly, but certainly more often than when I read normally. I have already confused the following words, for example: "Biohöfe" (organic farms) with "Bischöfe" (bishops), "fragile" (fragile) with "fragliche" (questionable), "kontaktlos" (contactless) with "kostenlos" (free of cost), “Kostprobe” (taster) with “Katastrophe” (catastrophe), “enteilen” (hurry away) with “einteilen” (classify), “Autokäufer” (car buyer) with “Amokläufer” (person running amok). It is (understandably) not known how many unreported cases there are. Of course, I only noticed the cases in which the problem caused misunderstandings.

Foreign languages

Speed reading does not only work with texts in your own native language, but also with foreign languages. Depending on how well you know the language, speed reading works more or less smoothly. Words whose translation you don’t know will naturally reduce the comprehension level (as with normal reading in the given language). Such words likely reduce the comprehension as much as if you hadn’t seen them at all (like words lying in the gaps of the viewing circles, which occurs at high rates).

Words that are known but not “automated” are also problematic. For example, with the English word “actually,” I always have to think about briefly whether it means in German “aktuell” (current) or “tatsächlich” (actually). This fraction of a second of thinking hardly plays a role in normal reading. When I speed read, however, I don’t have this time and completely skip the word. That’s why I lose more comprehension when I switch from normal reading to speed reading in English than I do with texts in my mother tongue, German. This is perhaps one of the reasons I can’t currently speed read English texts for pleasure.

Suitable text

Newspaper columns

The layout and font of a text influences how well you can speed read it. Many speed readers say that newspaper columns are particularly difficult to speed read.

There are at least two possible explanations for this. To the left or right of the column to be read, there are usually other columns. The visual acuity of the eyes is often sufficient to recognize not only the words in the column to be read, but also some words from the neighboring columns. These words, however, must be mentally masked. Perhaps this effect is the cause of the difficulties.

A second explanation concerns word separation in columns. The percentage of separated words in short lines tends to be higher than in long lines. For the brain, a fraction of a word is certainly a more unusual word shape than the complete word. A word part at the end of the line and a word part at the beginning of the next line must be put together in the brain to form a word. It is possible that putting words together visually is more difficult than putting them together while subvocalizing.

Not only are lines that are too short difficult to speed read: Lines that are too long have a similar effect. Lines which are too long are rare in books. In most books, the lines contain a maximum of 12 (standard length) words. To cover the type area, it is usually sufficient for a speed reader to place four viewing circles (i.e. fixations) next to each other.

Very long lines

On the screen, however, you often see lines that are 20 or 30 words long. It may take up to ten viewing circles to cover the width of the line. Now, the problem a speed reader is faced with is obvious:

With four fixations (250 ms each), it only takes one second for the speed reader to have all the information from the viewing circles in their head. They can "generate sense" out of it (and perhaps understand the two or three sentences that were in the viewing circles). With ten fixations, a much greater integration effort is required: Perhaps there are five to eight sentences which have to be visually captured "at once," and only then can their content be understood.

Increased time delay could also play a role. With four fixations, understanding is roughly one second behind seeing. With ten fixations, it is already two and a half seconds before comprehension can "get to work."

These problems do not mean that very long lines can only be read normally. If the lines are too long for two-dimensional speed reading, a speed reader can fall back into visual line reading. This means that reading rates of 700 to 900 wpm are still possible.

Different fonts, mix of normal and italic fonts

Speed readers also report that texts are difficult to read if they contain different fonts or use a mix of normal and italics, as is often the case with interviews (as in this book from page 1 onwards). As I was told by experienced teachers, some speed readers read first all the interview questions and then all the answers.

Suitable Books

Let's now move on to the characteristics that distinguish books that are easy to speed read, and are therefore particularly suitable for speed reading training.

Text-overladen pages . . .

Books which do not contain any pictures or diagrams[1] are well-suited, preferably those which only use one font and one font size. Bold or italic fonts should not be present. The typeface should not be disruptive, as is the case with lines of unequal length (as in novels with a lot of direct speech). I also find blank lines slightly disruptive. A page full of words and nothing else is well-suited.

. . . with some paragraphs

However, the page should not be completely unstructured. A page without paragraphs is not necessarily ideal. It helps with speed reading if there are paragraphs which consist of, for example, five to eight lines.

1 *R. and W. U. Michelmann, for example, pasted over distracting pictures in their training books from 2005.*

I personally find paragraphs with indentations at the beginning of the first line a little more readable than paragraphs without indentations.

With these factors in mind, we searched a number of "book bazaars" and bookstores for suitable antique and modern books for the test training in 2008. Approximately 50 books seemed to be suitable to us.[2] The participants used the books over the course of the training and rated them. About 30 books were considered good, and have since been used in speed reading training.

"Book 5b"

Usually, each participant selects a handful of training books from this pool that suit them. However, two of the books have proved so successful that they are generally given to every participant. One of them is "Herbstmilch" (Autumn Milk) by Anna Wimschneider, in the Piper Publishing House paperback edition of 2007.[3] In detailed records from the participants starting on page 211, this book is called "Book 5b." A page consists of 30 lines of about 8.3 standard length words each (type area 9 x 15.5 cm, font Garamond, font size 12 points, line spacing 15 points). The participants consider this very easy to speed read. There are no pictures or diagrams, not even chapter headings, which always have a slightly distracting effect.

The only thing that could be criticized in this book are the asterisks that appear approximately every three pages, and are used to separate two sections. The disruption is so minor that it is not worthwhile for the teacher to compensate for it in this training book (which could be achieved by pasting or painting over in the color of the paper, for example).

"Book 22a"

The other book that is always given to each participant is the popular science book "Book 22a," which is only available second hand.[4] A page consists of 35 lines of about 9.3 standard length words each (type area 10 x 16.5 cm, font Times, font size 11 points, line spacing 13.5 points). Distracting chapter headings are very rare, about every 20 pages. The book is also quite voluminous, and not finished as quickly as "Herbstmilch."

Different exercise speeds

The various training books are suitable for different speeds used in training (2,400 and 4,800 wpm with slalom finger sweep, 10,000 wpm with loop finger sweep). For example, the books judged by the participants to be suitable for 2,400 wpm have an average of only seven words per line and 200 words per page. Books suitable for 10,000 wpm have an average of little under nine words per line and 300 words per page.

2 *The selection was made intuitively and not according to the valuation methods described in Smeik (2004), such as syllable analysis, etc.*

3 *ISBN 9-783492-207409*

4 *As I want to continue to buy this second-hand book for my participants cheaply, the ISBN is deliberately kept secret.*

Large print

We have yet to discuss a recommendation by George Stancliffe, who we mentioned on page 20 as an important and serious source for this book. Stancliffe specializes in speed reading for children, but has also taught adults how to speed read.

Stancliffe (2003, p. 11) recommends that you should start training with material that uses large print. Once the participants mastered speed reading in large-sized print, they could work themselves down to the smaller-sized stuff. He has found that many adults and some teenagers need very large-sized print material to achieve their breakthrough, children less so. 20 to 30% of the participants found large print helpful. Incidentally, George Stancliffe belongs to this group of people himself. When he learned to speed read, he only achieved his breakthrough with books which had very large type ("jumbo-sized").

During test training in 2008, we also tested several large print books based on Stancliffe's recommendation. For some reason, however, books with extremely large print were not preferred. When writing this book, I had the feeling that we should have taken the issue more seriously and that the success rate might have been a little higher. The breakthrough in speed reading could be characterized in such a way that it has to "click" in the brain: There has to be an "aha! effect." It could be that, for the 20 to 30% of participants mentioned (and perhaps even more), there is a difference between the "book is easy to speed read" and the "book is good at creating the aha! effect."

There are now (at least) two ways to deal with this problem. One option is to do a part of the exercises with large-print books, even if the participants do not like these books. The other is to switch to large-format printing if a participant has not achieved the breakthrough after a certain amount of time, for example after ten hours of net practice time.[5]

Cinematic reading

We now come to a phenomenon that only few speed readers experience, what R. and W. U. Michelmann call "cinematic reading," in which some speed readers feel they experience the storyline themselves "inside the book." The effect appears to occur only at very high speeds, mostly over 10,000 wpm.

I am aware of four people who have described this effect. One is a speed reading teacher who learned to speed read on a Wood course, one is a natural speed reader, and two have learned to speed read from R. and W. U. Michelmann.

5 See Table T 9.1 on page 88

I was able to talk to one of the two Michelmann students. He reported that he could easily get into cinematic reading (and remember what happened on which page). He doesn't think he reads books any slower than 20,000 wpm. Cinematic reading never sets in below 10,000 wpm.

The speed reading teacher David Harwick describes the following experience in Frank (1994, p. 165): "Once, in practicing the preview technique, I began to read at an extremely high rate—a rate that was later clocked at about eleven thousand words per minute. Going that fast, I lost my sense of self. There was no more 'Here's David practicing the preview technique.' Instead, I became totally immersed in the material. Pages later, I suddenly came to myself and realized that I had been involved in some sort of meditative experience."

The natural speed reader (who is a member of the German Society for Speed Reading) reported that he sees a film sequence. Towards the end of a book he read really quickly, because the setting and the characters were now familiar to him. It was "like cinema." However, the effect does not always occur (and if it doesn't happen, then reading makes him very tired). This participant experiences cinematic reading below 10,000 wpm. After reading six pages of the thriller "Touchdown" at 2,300 wpm, he said, "I captured the content in a movie-like way: as a flood of images."

Discussion

These are somewhat anecdotal reports. Because they come from different and credible sources, they probably describe a genuine effect. What remains to be discussed is how we should classify it. The effect certainly lies within "two-dimensional speed reading." On page 61, we argued that the upper limit of accurate two-dimensional speed reading is probably no more than 6,000 wpm. It is therefore likely that, with cinematic reading at 10,000 wpm, not all the words on the page can be recognized sharply enough, and the effect lies within "skimming speed reading."

To further assess the effect, we would need to know how high the comprehension level in cinematic reading is. Is the transition to cinematic reading accompanied by a higher comprehension (because the brain has put itself in a particularly receptive state)? Or, is comprehension as high or low as it always is with skimming speed reading at 10,000 wpm? Unfortunately, we don't know. On the one hand, we would be facing the "fine art" of speed reading, where the information can be captured at an extremely highly effective reading rate, while on the other hand it would only be an interesting psychological phenomenon of the "inner view of a brain," without any practical relevance.

Comprehension-reducing effects

We now want to discuss something that is not particularly obvious at first. Why do readers not comprehend a text 100%, even though they have recognized 100% of the words? We have noticed this with normal reading and, to a greater extent, with speed reading.

In normal reading, the "curve with the bend" (page 14) shows us that this very fast but still normal reader only understands 79% at their rauding rate of 492 Wpm. At about 240 Wpm, they understand more, about 90%. According to Carver, reading with rauding rate means all the words are internally articulated. We can conclude from this that the meaning-generating areas of the brain therefore have all the information necessary for full comprehension. The meaning-generating areas of the brain, presumably mainly located in the neocortex, will be labelled here "comprehension areas." At 492 and 240 Wpm, the comprehension areas of this reader are equally well-supplied.

Why, then, is comprehension not equally good? Obviously, the time available for reflection is different. The comprehension areas do not have an infinitely high processing speed, but need time to form associations and to process and understand what has been read. In other words, a higher reading rate alone is detrimental to comprehension.

The same is observed with advanced speed reading. With visual line reading at 800 wpm, the speed reader sees the words sharply enough and understands about 80 to 95%. When speed reading at 1,500 wpm, the viewing circles overlap the text completely, so that it can be called accurate speed reading.[6] However, speed readers tend to estimate their comprehension at around 70%. Whether 1,500 or 800 wpm, the comprehension areas "know" all the words of the text. Here, there is also a different amount of time available for reflection, and it is the higher speed alone that reduces the comprehension level.

Missing time for reflection

This means that there are (at least) two effects that reduce comprehension. One is the lack of time for reflection that we have just discussed.

Unrecognized words

The second effect is more obvious and is less debatable: If words are not recognized and therefore cannot be transmitted to the comprehension areas, comprehension decreases. This happens with advanced speed reading, when the viewing circles no longer completely cover the type area, and this happens during normal reading, when the rauding rate is exceeded. Then, not all the words (even if they were recognized visually) can be internally articulated and passed on to the

6 *See page 59, "For any attainable speed with the (accurate) two-dimensional speed reading"*

comprehension areas. From the point of view of the comprehension areas, such words “have not been recognized.”

“Accurate speed reading”

We want to deduce from this a clarification and a conclusion for the training of advanced speed reading. We want to clarify that the term “accurate speed reading,” as we defined it on page 28, only means that practically all the words are recognized sharply enough and passed on to the comprehension areas. Accurate speed reading does not necessarily mean that a reader understands 100% of the text.

Portion of words seen sharply enough

For the practice of speed reading courses, the advice that follows is this: In order to obtain a precise overview of the current reading performance of the participants, more than just the two most important key figures (“reading rate” and “comprehension level”) should be recorded. The percentage of words on the page that were seen sharply enough should also be asked.

How precisely a participant can estimate this percentage has certainly not yet been scientifically investigated. For the comprehension level, however, we can rely on the participants’ self-assessment, as Carver has found (see page 129). With the proportion of words seen sharply enough, we can only assume that the estimate is fairly reliable.

Natural Speed Readers

We owe a great deal to natural speed readers, because without them as role models, hardly anyone would have come up with the idea that a second way of reading is possible: purely visual (speed) reading. There would presumably only be training formats for basic speed reading, if at all. Perhaps no one would even consider reading rates to be modifiable, and therefore trainable.

We will look at some reports on historical speed readers and estimate how many (or rather, how few) natural speed readers there are. First, we would like to find out a little about six natural speed readers who have been examined or interviewed by the German Society for Speed Reading.[1]

A. E.

The reading rate of the 40-year-old banker A. E. was measured by Thiele (2010), using three texts. Her reading rate was between 2,200 and 2,800 wpm. A. E. estimated the level of comprehension to be between 60 and 85%. Her effective reading rate varied between 1,690 and 2,240 wpm.

A. E.'s eye movements differed greatly from those of trained speed readers, who normally cover the type area with a slalom movement. A. E., on the other hand, notionally split a page into three sections of about 10 lines each. While she was reading a section, she seemed to fixate all over the place. However, these fixations were probably not completely random: "I don't read any of the text twice when I set my fixations."

Talking about her reading accuracy, she reported that she recognizes spelling mistakes immediately and becomes irritated and slows down.

A. E. learned to read from her father before she went to school. She seems to have a kind of photographic memory, because she is very good at memorizing names, sequences of digits and pictures.

O. D.

The second speed reader examined by Thiele (2010) was O. D., a 45-year-old sales manager. The reading rate was measured over five texts, and varied between 880 and 2,300 wpm. While 880 wpm can still be explained

1 *Two of the six natural speed readers were first described in Thiele (2010).*

by visual line reading, 2,300 wpm is already clearly in the range of two-dimensional speed reading.

The eye movements seemed more systematic with O. D. than with A. E., and were more similar to the eye movements of trained speed readers. On the outward sweep, three fixations were mostly placed next to each other, and on the backward sweep mostly two fixations. The outward and backward sweeps together covered about five lines.

O. D. only learned to read in school, and started reading a lot from the 2nd or 3rd grade onwards. He was not easily distracted, as a statement from his mother illustrated: "A bomb could explode next to you and you wouldn't hear it!"

O. D. can remember combinations of numbers and letters well, but names very badly. He can speed read texts that are rotated 90° or are upside down. He told an anecdote about sitting in front of his manager's desk for his annual evaluation, which his manager covered up by hand (so that he couldn't read anything) and only revealed it for a short time. These brief moments were sufficient for O. D. to read each paragraph, because he could read both quickly and upside down.

N. H.

Among his colleagues, the 48-year-old physicist N. H. is known as a fast reader. He became aware of his talent relatively late in life. Only shortly after his studies did he realize that he read texts much more quickly than other people. We have no film of his eye movements, but we do have many measurements of his reading rate. In 2013, he read 51 passages from an easily readable novel[2] over a period of about three weeks, and estimated his comprehension level each time. The reading rate, with an average of 868 Wpm, was in the range of visual line reading, and his comprehension level was 85%, on average. It was noticeable that the reading rate increased during the course of the novel. The first measurements were around 650 Wpm, and later measurements around 1,000 Wpm. An explanation for this could be that a speed reader must first get to know the characters and the plot at the beginning of a novel, and once the reader becomes more familiar with the characters, the text becomes more comfortable for them.

When N. H. was asked to read three passages with his inner voice, the reading rate was 390 Wpm (with 100% comprehension). This also means that his rauding rate is relatively high. N. H. is thereby faster than almost 90% of the readers.

2 Text example see page 195

N. H. began to learn to read at the age of about 4 ½ years, probably from older children in his neighborhood. Reading aloud is difficult for him because he feels the urge to read with his eyes faster than he can speak. He can read texts that are upside down in a purely visual way, though more slowly than with a correctly positioned text, and errs on some words. However, he can only remember telephone numbers and names at an average level. N. H. has a very good memory for location, and often knows where a certain statement is after reading a book (for example, at the top right-hand side of a page). He may not be able to "mentally photograph" a page, but his memory tends to go in this direction, at least if the page is suitably structured.

D. J.

The 24-year-old student D. J. was examined at a conference of the German Society for Speed Reading in 2013. The eye movements were not analyzed, but many measurements of his reading rate were taken. He read 100 passages from an easily-readable novel and assessed his comprehension level each time. His reading rate, with an average of 1,253 Wpm, indicates that he has used the two-dimensional speed reading. The average comprehension level was 89%.

When D. J. was asked to read five passages with his inner voice, the reading rate was 501 Wpm (with 100% comprehension). His rauding rate is thus very high, and is better than 98% of the other readers.

D. J. was asked to try reading a text upside down (which he had never tried before). He found that he could only read the text normally, not with speed reading. The speed was somewhat slower than if he had read the correctly-positioned text by subvocalizing.

D. J. remembers phone numbers terribly. His memory for appointments, names and pictures, on the other hand, is good, and extremely good for faces. He can remember the contents of a book very well after a quarter of a year. However, he ruled out the possibility of having a photographic memory.

D. J. only learned to read at school. From 3rd to 7th grades he borrowed books, newspapers, magazines and comics from the library almost weekly. He could not say exactly when his transition to visual speed reading took place. As far as he can remember, he did not realize that he read much more quickly than the other pupils until the 5th grade, after his transfer to secondary school.

R. C.

At a German Society for Speed Reading conference in 2010, the 63-year-old IT consultant R. C. was interviewed. R. C. lives in London, and his native language is English. R. C. gave information about his reading rates, which he had measured from various texts for many years. He described paperbacks with 8 to 10 words per line and 4 to 6 lines per paragraph as the ideal text format for speed reading.

As a student, he would typically read for pleasure at 1,500 to 2,000 wpm. He could "scan" a text with 5,000 wpm when he wanted to know only whether the text was worth reading. Since his eyesight is not as good as it was, he now reads for pleasure at 1,000 to 1,200 wpm, and on a Kindle at 700 to 1,000 wpm. If he wants to "taste the language," then he reads at about 500 to 600 wpm. (Most likely, R. C. has thus estimated his rauding rate). R. C. speaks French well, but reads French only at 200 to 300 wpm.

R. C. described how speed reading feels to him: He becomes aware of new relationships and facts. In a very pictorially-written novel he sees pictures, but only after he had created the relationships between the actors and the sequence of events in his mind. The images are not primary. Speed reading feels neither visual nor verbal, but rather like he recalls something. Important words he subvocalizes, but a better description would be: "Instead of hearing the sound, I know what the sound would be like."

R. C. can remember faces, diagrams and spatial relationships well, but texts, names and phone numbers much worse. He cannot read upside-down texts at all.

At 4 or 5 years R. C. learned to read, which he did very willingly and extensively. At 5 or 6 years, he discovered reading without subvocalization. He refers to this as one of his strongest childhood memories. When he was 8 or 9 years old, his mother did not want to believe that he really could read so quickly. She tested him, and was then convinced.

M. M.

The 67-year-old retired commercial employee M. M. was examined and interviewed at a conference of the German Society for Speed Reading in 2010. When asked about her reading style, she said: "I look at parts of sentences. At a single glance, I grasp words from several lines."

The measurements of 488, 680, 857 and 2,520 wpm did not give a clear picture (and suffer from the fact that the comprehension level was not recorded). The slowest value, 488 wpm, is still attainable by fast, normal reading. Her self-observation, however, indicated an extremely slow two-dimensional "speed" reading: "I have often read two lines at once and left no gaps." The rates 680 and 857 wpm are in the range of visual line reading. Reading at 2,520 wpm characterized M. M. as "diagonal reading for searching for passages." M. M. has problems speed reading newspaper columns, because the "eyes cannot spread."

Although she can read aloud, she has to "force" herself to do so. Her visual memory is good, and obviously much better than her "acoustic memory": To remember names, she writes them down first.

At the age of 4 ½, M. M. had started to learn to read. She asked her grandmother what the words on billboards meant. The first word she learned was "Kolonialwarenhandlung" (colonial goods store). At the age of 5, she borrowed "shopping bags full of books" from the America House in her home town, Hof (Bavaria). Later, in school, she tried to stop speed reading because the teachers couldn't handle it.

Remarks

The reports on the six natural speed readers have parts which are, admittedly, anecdotal, and arise from investigations and interviews that were not conducted uniformly. The main purpose of these reports is to give an impression of how similar or how different natural speed readers are.

What is striking is the high proportion of natural speed readers who learned to read before school: in this sample, four out of six. Good memory performance, albeit not very uniform, can also be assumed with some caution as a common feature of many natural speed readers.

A very clear common feature that is not specifically mentioned in the above reports is the fact that natural speed readers do not use a finger sweep or similar hand movements when reading.

Whitaker (2005)

The eye movements of A. E., a natural speed reader, made an unsystematic impression from the outside (but not according to her own observations). There is a readable description of Whitaker (2005) about how the reading process of natural speed readers works in detail:[3]

Building up the inner image

Natural speed readers claim to "see" an entire paragraph in their mind's eye. The first fixations search somewhat randomly for keywords in the paragraph. This fills the image of the paragraph that is to be built up in the mind's eye partially with viewing circles, each about 3 to 5 words wide and 3 to 5 words high. With each fixation, the brain begins a partial decoding process of the words in the viewing circle. This process helps to imprint the "image" of the text in the mind's eye. Once the paragraph is

3 *The following sections are partly taken from Whitaker (2005).*

sufficiently searched for clues as to its meaning, the eyes are directed to all the spaces in between the previous eye fixations in order to generate a complete "image" of the paragraph.

Linearization process

When at least one sentence or paragraph is complete in the mind's eye, a lightning-fast mechanism begins that "linearizes" the already partially decoded text. This linearization process is about 10 to 20 times faster than the usual finger pacing technique, but creates the illusion that the text is read in a linear fashion by a "super super fast" finger pacing.

Since Jim Whitaker, a natural speed reader, likely describes his own reading process, it remains unclear to what extent this can be transferred to all natural speed readers. The second part of his description (linearization process) has to take place in some form with every two-dimensional speed reader, no matter whether a "natural" or a trained speed reader, or whether the process is consciously perceived or not. I myself have consciously perceived the linearization process only once (on a training day in 2005, when I learned speed reading). Whitaker (2005) is one of the few meaningful sources on natural speed readers. Two further reports of his will be shown here.

Fiction

According to Whitaker (2005), speed reading fiction at high speeds does not work very well, because fiction focuses upon emotional experiences. The human brain simply can't process emotions quickly enough. At best, the speed reader remembers an account of events, but does not have the experience the author had in mind for the reader.

Long-term memory

According to Whitaker (2005), speed reading is essentially incompatible with long-term memory. You cannot speed read textbooks and expect the information to stick, no matter how well you understood the content in your short-term memory. Speed reading enables "short-term comprehension." It is necessary to repeatedly use the information in short-term memory within about 20 minutes of reading it, or the information does not make it into long-term memory. Speed reading can be used to review chapters that do not require deep comprehension.

Historical Reports

Some well-known people could show an unusually high reading rate (according to speed reading literature) and were therefore, with a certain probability, natural speed readers. We won't try to get to the original sources to check the information here. Very old sources must be judged with great caution. Early historians had a different understanding of historiography than those from today. Reports from third parties were often adopted and deeds of rulers were embellished. Nevertheless, it can be assumed that most of the people named below were actually able to read very quickly, and were probably visual speed readers. In contrast to characteristics such as "wisdom," "courage," "generosity" etc., the ability to read quickly should not be a characteristic that a "creative" historian would undeservedly attribute to somebody. No historian comes up with such a thought, unless this person really stood out with this ability. The following are listed by order of birth.

Caesar (100–44 BC)

According to Wood (1960), historians reported that the Roman statesman, general and author Gaius Julius Caesar was a very "rapid reader."

Magliabechi (1633–1714)

The scholar and librarian Antonio Magliabechi seems to have had a photographic memory. He was obviously also a natural speed reader, as we can conclude from the text in Buzan (2002, p. 87 ff.).[4] As we do not have any further details about Caesar's way of reading, we consider Magliabechi to be the earliest identifiable natural speed reader.

Swift (1667–1745)

The writer and satirist Jonathan Swift was also described by historians as a very rapid reader (Wood, 1960).

Johnson (1709–1784)

The scholar and writer Samuel Johnson was another rapid reader, as his friend and biographer James Boswell reported (Wood, 1960).

Balzac (1799–1850)

Historians described the writer Honoré de Balzac as a very rapid reader (Wood, 1960).

Mill (1806–1873)

The philosopher and economist John Stuart Mill bemoaned the fact that it took him longer to turn the pages than to read them (Wood, 1960). Buzan (2003, p. 81) writes: ". . . [He] is said to have read books by taking in entire pages in 'one visual gulp.' His father, a college professor, would give the young boy a book, tell him to go into another room for a brief period of time, read the book and then come back and discuss what he had absorbed."

T. Roosevelt (1858–1919)

According to Wood (1960), the 26th President of the United States, Theodore Roosevelt, was perhaps the most famous historical personality who was able to read at exceptionally fast rates. According to Agardy (1981, p. 26), Theodore Roosevelt read an average of two to three books a day when he was president.

Lenin (1870–1924)

According to Loeser (1973, p. 40), the politician and revolutionary Vladimir Ilyich Lenin was also a speed reader. V. D. Bonch-Bruevich, one of Lenin's closest collaborators, reported: "Vladimir Ilyich read in a very special way. On seeing Lenin read, I had the impression that he didn't read line by line but page by page, and grasped what he had read deeply, quickly and precisely. After some time, he recited single sentences and paragraphs by heart, as if he had carefully studied what he had just read. This was also what gave him the opportunity to read such a large number of books and articles."[5]

4 *The self-test on page 274 of this book uses this text as an example.*
5 *Translation by the author*

About the 32nd President of the United States, Franklin D. Roosevelt, Buzan (2003, p. 81) writes: “It is reported that he could read an entire paragraph at a single glance, regularly completing a book at one sitting. He apparently started out with average reading speeds, which he decided to work at improving. His first steps included increasing his original fixation span to four words per stop, then to six and eight words in a single fixation. Roosevelt subsequently practiced reading two lines at a time and then began to zig-zag his way down the pages, reading small paragraphs with single eye movements.”

F. D. Roosevelt (1882–1945)

The last historical speed reader to be listed here is the “savant” Kim Peek, who had a number of extraordinary skills. In addition to speed reading, as already discussed on page 57, he mastered calendar calculation and had an outstanding memory for facts and details (Treffert & Christensen, 2006).

Peek (1951–2009)

Frequency

As we can conclude from these reports, there are not many natural speed readers known by name. The number of unreported cases is likely to be extremely high, as most natural speed readers are not aware that they have a special talent. They may have noticed in school that they were faster than their classmates. However, in every discipline someone is the best in the class, be it sports, mathematics, languages or reading. To be the best in a manageable group is not yet a sufficient reason to go to a reading researcher and have oneself examined, or to apply to a broadcasting corporation to display one’s extraordinary talents. Natural speed readers usually go unnoticed (even by themselves).

We will now try to estimate the frequency of natural speed readers. We will discuss several indications, starting with very anecdotal single reports, up to measurements of reading rates on standardized texts with hundreds of participants.

Evelyn Wood must have had the best “gut feeling” of how common natural speed readers are. The first natural speed reader she met was Professor C. Lowell Lees, who read her term paper before her eyes (apparently, as quickly as he could turn the eighty pages) and then was able to say what was in it and what was not.[6] She timed him on other material, and found he could read at a rate of 2,500 wpm. When she published the book “Reading Skills” in early 1958, her publisher sent her to reading workshops all over the USA as part of the promotion. She asked everyone there if they knew a fast reader. In this way, she got in contact with a total

6 Wood (1960)

of 53 natural speed readers and was able to examine them.[7] Regarding the frequency of natural speed readers, she is supposed to have said that one can be found in every community.[8]

This suggests that natural speed readers are not extremely rare, around one in a million citizens. Such a pessimistic attitude was left behind for the German Society for Speed Reading when the immediate neighbor of one of the five board members turned out to be a natural speed reader. Nobody believed in that kind of coincidence anymore.

Estimate "1 out of 200"

The next indicator is 200 engineers from a Munich research and development department. In this department, in addition to my main tasks, I trained about 13 employees in basic speed reading. In doing so, I heard about a "very fast reading colleague," who then turned out to be a natural speed reader upon closer examination. That was the only person known among the colleagues as a fast reader. This gives us a first and, admittedly, rather rough estimate: Among 200 people there is at least one (but probably not many more than one) natural speed reader.

It is unclear with this estimate how well the department's employees were networked. Did the 13 trained employees really have that much direct or indirect contact with the other 200 employees that other natural speed readers would have attracted attention? This is uncertain, and leads us to another fundamental difficulty in determining the frequency of natural speed readers. It turned out that one of these 13 participants was a natural speed reader himself, even though he only did it sometimes. He stated that he did not always articulate internally when reading, and that he could, for example, read newspaper articles and texts he had written relatively quickly. At the beginning of the training, with the first 16 rate measurements, this participant did not attract attention. Only a few days later, during the second exercise, did he partially use visual line reading: He read two of the 25 passages of the exercise at 681 and 716 Wpm.[9]

"Occasional" versus "permanent" natural speed readers

This suggests that one would actually have to classify natural speed readers on a scale, starting with "occasional" or "sporadic" speed readers, who still read large parts of their reading material normally, up to "permanent" or "regular" speed readers, who read all reading material purely visually.

Methodical problem

For a "mass screening" of hundreds or thousands of readers, the methodical problem arises of how to identify such occasional speed readers. Normally, only one text is submitted for each participant

7 *Last four sentences according to Agardy (1981, pp. 25–27)*
8 *Quoted from memory, from a written but anecdotal source.*
9 *More about this participant (PN49) on page 48 and page 204.*

examined. Those who do not automatically fall into visual speed reading but read normally will not be identified as speed readers. The frequency statement, which we will derive at the end from several estimates, will therefore only refer to "permanent" natural speed readers.

Estimate "3 out of 1,000"

R. and W. U. Michelmann have been using the same text for decades as an introductory test for their speed reading courses, and have thus determined the reading rate of 1,000 "experienced readers with, mostly, many years of practice." The most frequent values were measured between 320 and 480 wpm. Above this, there is a big gap, after which came three people with 720 wpm. That these three participants had still read accurately was checked by R. and W. U. Michelmann.[10]

As 600 Wpm (equaling about 530 wpm for German texts) is the upper limit of normal reading, the three participants were, in my opinion, most likely natural speed readers who used visual line reading. This gives the following estimate: Among 1,000 people, there are about three natural speed readers. Since they were participants in speed reading courses, the sample is a little bit distorted, because two-dimensional speed readers with more than 1,500 wpm may be so satisfied with their reading rate that they do not participate in speed reading courses.

The third data collection from which we want to deduce an estimate is the reading rates of 1,326 mostly graduated adults, as presented on page 2 (with wpm unit) and page 12 (with Wpm unit). Four of these readers read more quickly than 600 Wpm, and are therefore potential visual line reader candidates. Their reading rates were 615, 630, 659 and 711 Wpm. Because the rate measurement was not accompanied by a comprehension test, these four could have been fast normal readers who had gotten into skimming a little. This was probably the case with the fastest of the four. When asked, he said: "I probably skim reading material under normal circumstances. When a spot jumps into my eye, I read it again slowly." With the other three candidates, I am also inclined to consider them as normal readers who had gotten into skimming, because their reading rate was even closer to the 600 Wpm limit.

Estimate "1 out of 1,300"

In addition to the 1,326 German-speaking participants, the reading rate of 15 English-speaking participants who read the "Magliabechi text" on page 274 in the English version was measured. One of these participants reported a reading rate of "about 1,500 wpm." It was the natural speed reader from London discussed above. The sample of the 15 English-speaking participants was distorted, in that they were not

10 *Sources of information in this paragraph: R. and W. U. Michelmann (2001, pp. 81–82) and personal communication (Mar 3rd, 2003) that three participants read at 720 wpm.*

"average" participants in seminars on software quality assurance but participants of a symposium in which only hand-picked experts from all over the world could take part. This third data collection gives the following estimate: Among 1,300 people, there is about one natural speed reader.

All three estimates taken together (five natural speed readers in 2,500) give the following total estimate:

> Among 500 people, there is about one "permanent" natural speed reader.

Estimated frequency of "permanent" natural speed readers

The true frequency value will differ from this estimate. Considering all the indications, I think it is very likely that the true value will be somewhere between "1 out of 100" and "1 out of 1,000." No matter where the true value exactly lies, it is so low that a university study of reading rates (usually with a maximum of a few dozen students) typically does not include a permanent natural speed reader. The fact that most reading researchers doubt the existence of speed readers may be partly due to this.

If one wants to estimate the total number of natural speed readers, i.e. permanent and occasional natural speed readers taken together, then estimation becomes even more difficult. There should be transitional forms between occasional natural speed readers and people who are in the process of developing into natural speed readers, and who are probably from the 10% of the population that we have described as "easy learners" (page 95).

The above frequency estimation must be further relativized. It probably applies (only) to the USA, Germany and other countries with a similar literacy level and a similar writing system (namely an "alphabetical writing system"). With logographic writing systems (such as the Chinese one), it is quite conceivable that many more people will be reading purely visually than is the case with alphabetical writing systems.

Natural speed readers, get in touch!

It would be useful for exploring the speed reading effect if researchers could access more natural speed readers than they are currently able to. There should be enough potential test subjects in every university town. In Munich, for example, with 1.5 million inhabitants, at least 3,000 natural speed readers are expected, according to the above estimate. However, they are not known. Therefore, anyone who can read faster than 600 Wpm with good comprehension should get in touch, no matter which city or country they live in. Some good starting points are either speed reading associations or researchers who have recently written about speed reading.

Additional Material

Reading Management

We have called reading management the "third pillar of speed reading." In contrast to basic and advanced speed reading, reading management is not about increasing the reading rate itself (calculated in wpm), but about the smart selection of the text passages that one wants to read. The best way to do this is described in this chapter. Afterwards, we will discuss graphic methods with which the material read can be presented in a structured way, and we will get to know the "search term technique," the "little sister" of speed reading.

Glasses and contact lenses

First of all, anyone who needs glasses or contact lenses to read should wear them. For advanced speed reading, it is clear that bad eyes have an immediate effect on the reading rate. As a man of over 50 suffering from the loss of the eye's ability to adapt ("presbyopia"), I now need different types of glasses to speed read optimally: a pair of glasses for computer work (distance between eye and text approx. 60 cm), reading glasses for books (distance approx. 40 cm) and glasses when I read in bed (distance approx. 25 cm). I have not used varifocals so far because I'm afraid that the "viewing circles" may be reduced in height during two-dimensional speed reading.

Of course, it is also useful for normal reading to wear a vision aid (if necessary). However, in contrast to advanced speed reading, there is a little bit of "buffer" before suboptimal eyes have a negative effect on the reading rate (because the "inner voice speed limit" of 600 Wpm is below the "visual speed limit" of 700 to 900 wpm).

Working environment

A good working environment, including adequate lighting, also has an effect on reading performance (but is not the subject of this book). For example, R. and W. U. Michelmann (2001, p. 76, 78) state that a standing desk is excellently suited as a lectern, and describe "glare-free" 1,000 lux as optimal reading light.

A reading management example

In order to illustrate which techniques can be used in reading management, we would like to introduce the following example. Before us, there is a bookshelf with many books on the same subject. Our task is to familiarize ourselves with the subject area. We do not want to read through all the books from beginning to end, but only the important passages in the most suitable books. (The following scenario is based on the description of the "orientation phase" in Sikora, 1972, p. 66)

Book title

At the beginning, it is worthwhile thinking briefly about the title of the book, because the author usually gives the shortest and most concise summary of their work with the title. If the book does not pass this test, the next book on the shelf is immediately tackled. (The same applies to the following steps.)

Author and publisher information

Many books contain a brief description of the author, their most important publications so far, the "school of thought" of the author, and other details that give the reader a first impression of the author's level of ambition. The year of publication, the edition of the book and the name of the publisher allow further conclusions to be drawn. For "connoisseurs," the publishing house is something of a trademark.

Characterization

On one of the first few pages, for example under the heading "about this book" or on the book cover, one often finds a characterization of the work. Thus, the work can be sorted into the thematic context of the subject area.

Table of contents

The table of contents indicates the "architecture" of the work. It not only provides insights into the author's thoughts, but also shows what is not dealt with in the book.

Register

According to Sikora (1972), the register is a real treasure trove. By means of the register, a book is "taken apart" and broken down into its components. It is obvious which trains of thought, events or people are dealt with in the book.

Bibliography

The bibliography reveals the author's sources. If the reader already has an insight into the subject area, they can easily determine where the work is to be classified, in the context of the subject area.

Preface, foreword and introduction

We now come to the "inner core" of the book: In the foreword, the authors usually explain why they wrote the book, what the prehistory and background of the book are. A foreword, which is usually written by recognized authorities, is a kind of "letter of recommendation." The introduction introduces the subject area and provides information about the author's level of ambition, writing style and perspective.

According to Sikora (1972), it should then be clear to a reader whether the reading intent is in line with the "author's offer." If not, the only option is to put the book aside.

Rapid page turning

Let's assume the book is still "in the game." It makes sense to use rapid page turning (as described from page 83 onwards). At this rate of about 20,000 wpm, a normal reader may only be able to understand one to two percent of the words, but can at least recognize the structure of the book and the illustrations.

Creating illustrations is usually more arduous for an author than writing text. Illustrations are only worthwhile for facts that are important and easier to explain visually than verbally. It is usually a very efficient way for a reader to "read" the illustrations first.

Illustrations

If the book still seems to be useful, it is "really read." (That this step is unavoidable despite all reading management is obvious.) In this phase, however, readers still have the option of performing "small-scale reading management." Not all the chapters of the book must be equally important for the reader. In many books, there is a summary at the beginning or end of the chapter. Based on this summary, a reader may decide not to read the chapter. The same can also be done at paragraph level. Sometimes it is clear from the first sentence that a paragraph can be skipped without major risk.

Reading

Discussion

The example scenario shown above should clarify what reading management means. In the guidebooks different variants for how one can carry out reading management are shown. What many of these variants have in common is that a book is not read through slowly from beginning to end, but that several review cycles are suggested, which become more and more thorough, and that each review cycle can result in the reading process being aborted.

In our opinion, most of these variants are useful and we don't want to highlight any of them as "better." However, an assessment from R. and W. U. Michelmann (1995, pp. 108–109) of the well-known SQ3R method by Francis P. Robinson shall be presented.

SQ3R method

SQ3R stands for the steps "Survey," "Question," "Read," "Recite" and "Review." The example scenario shown above roughly corresponds to the steps "Survey" and "Read." According to R. and W. U. Michelmann, the SQ3R learning method is often offered as a method for efficient reading, but in their opinion it is not. It can be useful as a learning and working method for school students, but it steals time in the workplace. The SQ3R method is not suitable for an experienced reader, because it is not efficient for them.

Let's talk about the nature of "reading management." Reading management requires a mindset when reading texts that is difficult for perfectionists. This is what I learned on my first speed reading course. Only in the course did I realize that it makes little sense to read old newspapers just as thoroughly as today's newspaper. One of the results of this course was to discard this kind of perfectionism, or to recognize such behaviors as unnecessary perfectionism at all.

Mindset

Reading management not only requires a different way of thinking: It is also a very difficult task to carry out. When it comes to reading management, there is always the danger of overlooking something important. The reader's full concentration is required, because decisions have to be made all the time ("can I really skip this paragraph without risk?"). In the end, typical management skills are required: determination, setting the right priorities, sensible risk assessment, etc.

Metacognitive strategy

This distinguishes reading management from basic and advanced speed reading. While reading management is a so-called "metacognitive strategy," basic and advanced speed reading are in principle very simple and narrowly defined skills. To put it bluntly: "Savants" such as Kim Peek, who often have difficulties mastering everyday life, are hard to imagine as managers or perfect users of reading management. However, they can learn the basic and advanced speed reading perfectly.

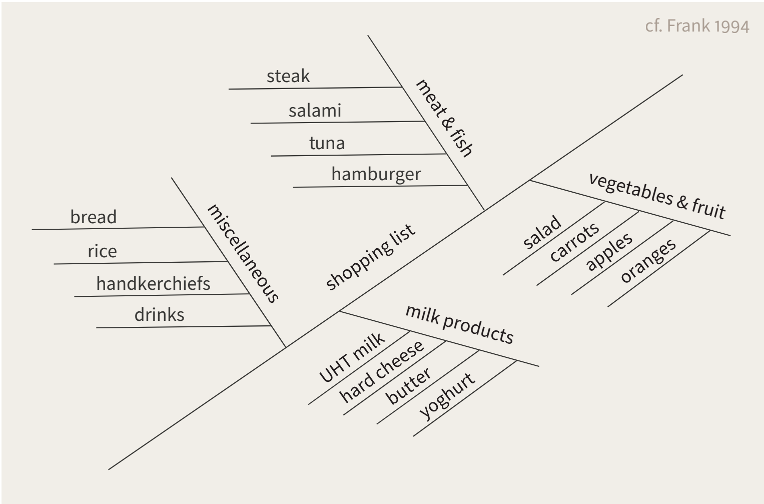
Immediately applicable

There is another fundamental difference between reading management and basic and advanced speed reading: The duration of the training is shorter. While learning basic and advanced speed reading takes days to months, reading management can be used immediately. Reading management does not have to be practiced, reading management has to be done.

Recall patterns, mind maps and text images

Unfortunately, reading and remembering what you have read is not the same thing. For this reason, methods were developed at an early stage to record the readings in a structured way, for example in tree diagrams. In Frank (1994, p. 110) and in Kump (1998, p. 52), these diagrams are called "recall patterns," a term that I assume had already been used by Evelyn Wood. There are several types of recall patterns. Figure F 12.1 shows the most common one, the "diagonal recall pattern." Further developed variants of the recall patterns are the "text images" by R. and W. U. Michelmann (1995, p. 81 ff.) and the well-known "mind maps" by Buzan (2002, p. 157 ff.).

During the creation of a recall pattern, the reader is forced to categorize the information and deal with it actively. This alone increases the likelihood of remembering what you have read. Kump (1998, p. 54) recommends that you do not look in the read text when creating the recall pattern. Otherwise, one would only practice copying text instead of memorizing content.



F 12.1
Diagonal recall pattern

The recall pattern is not necessarily completed at once, but is extended after each review cycle of the text. For example, a first version can be created after a book has been leafed through at a rate of one page per second.

There is nothing more to be said about recall patterns here, though you could write a whole book about it. Since recall patterns in our opinion have only marginally to do with speed reading, we refer to the corresponding original literature.

The recall patterns are most important in school and university. Here, there is the need to have a lot of material recallable by heart for examinations. This situation is rare in everyday working life. At an office workstation with a screen, you open a file to work on. The information on this comes from other files that are also opened on the screen. Long-term memory is not so important here, what is important is that one must be able to speed read.

Search term technique

At the end of this chapter, we will deal with a working technique that could be called the "little sister" of speed reading. The search term technique was introduced in R. and W. U. Michelmann (1995, pp. 137 ff.)[1] and

1 *I have not yet seen any other authors mention the search term technique. At the beginning of my work with speed reading, this was an indicator that R. and W. U. Michelmann probably have the most speed reading know-how. (I still refer to myself as a "Michelmann disciple," although I have since taken quite different views on many aspects of speed reading to R. and W. U. Michelmann. From a research genealogy point of view, I am more of a "Carver disciple," after Ronald P. Carver from the University of Missouri in Kansas City.)*

is an aid to finding a certain word in a large amount of text very quickly. "Very quickly" means that the search term can be found with the rate of the accurate speed reading, i.e. with about 1,500 to perhaps 2,000 or 3,000 wpm. This speed is surprising, in that the search term technique is used by normal readers who don't know how to speed read.

To find a word, the reader performs the slalom finger sweep (as described on page 71) and constantly speaks the searched word silently. The finger will then automatically stop in the right place as if by magic. R. and W. U. Michelmann give the following recommendations:

- You should try to lead the eyes with your finger rather than your will.
- With each half sweep, cover three to four lines. The distance between finger and text must be only a few millimeters.
- The search term should be short. A compound term such as "reading strategies" can be found more easily if you are looking for "reading" or "strategies."
- You shouldn't try to read at the same time, because you won't find the word you're looking for.

The search term technique must be practiced until it works well. For the success rate, there are the following experiences: On first attempt, about 50% (14 out of 29 German-speaking participants) found the word "bugs" on one page of an English-language textbook.[2] On the following page, the word "people," which appears twice, was searched for. Here, the success rate was about one third right away: Of the six participants, three did not find anything, two found a single occurrence and one found both occurrences. Another teacher reported the following success rates: The search term technique works immediately for about one third of the participants, after 20 minutes of training about 60 to 70% manage it.[3]

No one knows at present how high the success rate can be raised if you practice the search term technique for a long time and use it often. We are not aware of any experienced users who could be asked. This is also probably due to the fact that the practical relevance of this technique is not particularly high. From the point of view of research, however, the search term technique is an extremely interesting phenomenon that is worth investigating and, above all, understanding.

2 *Software Inspection (Gilb & Graham, 1993, p. 271)*
3 *Personal communication with Helgo Bretschneider (Aug 29th, 2007)*

Comprehension Measurement

The reading rate and the comprehension level are the two measurements that interest us most in speed reading. The reading rate can be measured easily and very accurately. The only subtlety to be observed is the difference between "words per minute" and "standard length words per minute" (see page 11).

Measuring the comprehension level is much more complicated. It is anything but easy to develop comprehension tests which are methodically sound. Not only speed reading teachers generally fail because of this, but many researchers of speed reading too.[1]

"75% correct" means next to nothing

Answering 75% of the test questions correctly does not necessarily mean that 75% of the text has been understood. It may mean that many of the test questions were very easy, such as questions that could be answered without ever having read the passage. It may also mean that some of the questions were extremely difficult and that no one could get a 100% score, even if they understood the passage 100%.[2]

We will first look at some typical problems in measuring comprehension, which were described by Carver (1990, p. 371–380). Then we will discuss the four measurement methods dealt with by Carver (1985c). We will find that a reader's subjective assessment of comprehension is, surprisingly, at least as good as the other objective measurement methods.

First of all, we will look at typical problems with measuring comprehension.[3]

Comprehension not measured

Every reading rate measurement, however sophisticated, is useless if the comprehension level is not measured in parallel. If the participants read at higher rates after a speed reading course, this alone does not prove the effectiveness of the training conducted.

It is possible that the participants have only got into skimming, with a significant correspondingly loss of comprehension. To explain this using Figure F 3.3 on page 25: Maybe the participants just slipped along the solid line towards "skimming" and there was no increase in the rauding

1 *Carver (1990, p. 371), Musch and Roesler (2011, p. 95)*
2 *Carver (1985c, p. 30)*
3 *The following sections are partly taken from Musch and Roesler (2011, p. 94–99).*

rate, as demanded by the dotted line. Without measuring reading comprehension, this alternative explanation cannot be ruled out.

Guessing probability not considered

Comprehension tests often consist of multiple choice questions with, for example, four answer alternatives (one correct answer and three false answers, so-called “distractors”). By simply guessing, an average of a quarter of the questions can be answered correctly. For example, if a participant answered 75% of the questions incorrectly and 25% of the questions correctly, the participant did not understand about 25%, but probably nothing at all. The following “naive” formula must not be used in the comprehension calculation:

Comprehension level = R / T
R = number of questions answered correctly
T = total number of questions

“Naive” comprehension calculation (returns overly optimistic values)

For multiple choice questions, a “correction for guessing formula” should be used instead. Carver (1990, p. 374) proposes the following formula:

Comprehension level = R_{corr} / T
$R_{corr} = R - (F / (A - 1))$
F = number of wrongly answered questions
A = number of answer alternatives per question

Comprehension calculation with correction for guessing

The “correction for guessing formula” ensures that three wrong answers “equalize” a correct answer (with four answer alternatives per question).

Until now, we have not seen any guidebooks or training materials for speed reading that use a “correction for guessing formula.” It can therefore be assumed that most speed reading teachers overestimate the comprehension level of their participants (especially in the final test of a course).

Simple comprehension questions

The comprehension level of the participants can also be overestimated if the questions being asked are too simple: i.e. they could also be answered by someone who had not read the text at all, or who had merely skimmed over it. Let’s take an example from a guidebook.[4]

4 *Schmitz (2008, p. 204, 207). Examples translated by the author.*

One of the questions about a three-page text on the subject of "short-sightedness" is:

General knowledge helps answering questions

> What is cited as a potential remedy for short-sightedness?
> a) Acupuncture
> b) Hard contact lenses
> c) Positive thinking or hypnosis
> d) Special spectacles

Even without having read the text, some participants will be able to exclude some of the distractors from general knowledge. Because normal spectacles do help against short-sightedness, answer D (special spectacles) is unlikely, and already recognized by some participants as a distractor. If "acupuncture" or "positive thinking or hypnosis" really helped against short-sightedness, this would certainly have been discussed in the media, but this is not the case. Some participants will also be able to recognize answers A and C as distractors. The correct answer (B, hard contact lenses) will therefore be marked as an answer beyond the 25% pure guessing probability.

Let us examine another question of this multiple choice test on short-sightedness:

Skimming helps with answering questions

> Which event has confirmed the hypothesis that stress can be a trigger for short-sightedness?
> a) An earthquake
> b) A wave of collective redundancies
> c) A malaria epidemic
> d) A train accident

This question is considerably better-suited. In order to answer it correctly without having read the text, one would need a lot of general knowledge.

However, the question could be answered if the reader had simply skimmed the text. "Earthquake," "collective redundancies," "malaria epidemic" and "train accident" would hardly be expected in a text on short-sightedness. If a participant only skims over the text and at least captures the keyword (in this case "earthquake"), the participant will be able to immediately find the correct answer without necessarily having comprehended the whole sentence. This multiple choice question is therefore not sensitive enough to measure the gradual deterioration in reading comprehension associated with the transition from normal reading to skimming.

When I read new guidebooks or training material on speed reading, I usually try to answer the test questions without having read the texts beforehand. A typical test consists of ten multiple-choice questions, each with four possible answers. I almost always get beyond the pure guessing probability of 25%, sometimes even to 50 or 70% “comprehension.” In real terms, of course, my comprehension was 0%.

Missing control groups

Without a control group, it is impossible to determine whether the participants have only learned to do the accompanying tests (“test wiseness”) without actually improving their reading performance. It is possible that the participants will only learn to recognize distractors in the comprehension test based on certain formulations. Often, the correct answer is longer in the comprehension tests than the distractor answers, or can be identified as the correct answer with sufficient experience on the basis of other such “surface characteristics.” It is also conceivable that, during training, the student learns to deduce the correct answer to a question using answers from earlier questions.

All of these are threats to the so-called “internal validity” of studies on the effectiveness of speed reading training. With a control group that does not receive appropriate training, such threats can be excluded.

Insufficient documentation of the experiment

Even if the study of a speed reading course is carried out methodically, the study would be of little value to other scientists if the publication does not adequately document the experiment.

Many publications do not report the raw values and variances for the measurement of the reading rate and comprehension level, only the variables derived, such as percentage gain and p-values (probability values). This makes it considerably more difficult to assess the strength of the effects achieved, or the practical significance of the findings.

Likewise, because the comprehension measurement is not trivial, the measurement methods used must be described so precisely that it is possible to replicate the investigation. A precise description, or better still, the reproduction of the texts and questions used, is necessary for this. If such information is missing in the publication, it is also impossible to rule out the above-mentioned misinterpretations of the comprehension level achieved.

Conclusions

The list of problems presented here concerning the comprehension measurement is by no means complete. For example, the problem "final test is easier than initial test" would have to be discussed, along with which countermeasures are possible (such as "balancing").

Such research methodology questions are part of the field of "experimental design." This is a serious and complex university discipline, mostly located in the faculty of psychology, which deals with the planning, execution and evaluation of empirical investigations. Therefore, one should not expect speed reading teachers to have the research methodological expertise and time resources to independently create a suitable comprehension test. Here, the teachers are dependent on the work done by the universities.

Objective and reliable tests are to be developed for this purpose, with which the ability to speed read can be validly determined, even at very high reading rates. However, especially in the German-speaking world, there is currently a severe lack of such tests (Musch & Roesler, 2011).

Four measuring methods in comparison

Let us now take a closer look at the comprehension measurement methods compared by Carver (1985c). Carver had 102 subjects read 10 passages of text consisting of 100 words each. The test setup was varied. Ten different reading rates were applied (from 62.5 to 100,000 Wpm) and the following four comprehension measurement methods were used:

Comprehension self-assessments

- Comprehension self-assessments (called "understanding judgments" by Carver, 1982): The comprehension self-assessment measure was simply the subject's opinion on the percentage of the passage they had understood.[5]

Missing verbs

- Missing Verbs: For the missing verbs measure, a verb was deleted in certain sentences. In five of the ten passages one verb was missing, the other five passages remained intact. After reading a passage, the subjects indicated whether or not they thought a verb was missing.

Best titles

- Best titles: The subjects read all ten passages and then had to answer ten multiple choice questions. The questions consisted of five possible titles for one passage each, and the subjects' task was to select the best title.

5 *For an exact description of the method, see Carver (1982, pp. 65–66).*

- Sentence Halves: After reading all ten passages, the subjects were shown 40 sentence halves. 20 of them came from the passages they had just read, and 20 from other texts. The subjects had to indicate, for each sentence half, whether it had appeared in the passages they had read or not.

Sentence halves

Carver showed that all four methods were suitable for measuring the real comprehension level, that could be predicted by his "rauding theory."[6] However, in some of the methods, the raw values of the measurement did not match the real comprehension level, but first had to be converted into the real comprehension level (by applying his "rauding rescaling procedure"[7]).

Raw values must sometimes be converted

For comprehension self-assessments, it was particularly simple: The percentages that the subjects had given corresponded (with a low scattering) to their real comprehension values. For example, if a participant reported "80% comprehension," then one can assume that the real comprehension was also about 80%.

The "missing verbs" method also provided values which, after using the "correction for guessing formula," corresponded with the real comprehension values (although with greater scattering than in comprehension self-assessments).

In the "best titles" method and the "sentence halves" method, however, the measured values after correction for guessing were clearly below the real comprehension level. For instance, only about 40% comprehension was displayed, while real comprehension was about 80%. Here, Carver's "rauding rescaling procedure" was actually necessary to calculate the real 80% comprehension from the 40% displayed.

Where does this difference between the four methods come from? Why do the comprehension self-assessments and the "missing verbs" method show the real comprehension directly, while the "best titles" and the "sentence halves" methods require a conversion? Carver (1985c) does not speculate on the reasons, but we want to make an assumption here.

6 *According to Carver (1990, p. 15), reading is about "comprehend[ing] the complete thought contained in each sentence". This definition of comprehension is well in line with the intuitive definition, and ensures that all values from 0 to 100% can actually occur: reading nothing = 0%, reading and understanding everything = 100% comprehension level.*

7 *For an exact description of the procedure, see Carver (1985c).*

Forgetting curve influences measurement

It can be assumed that the so-called "forgetting curve" has a different importance for the four methods. The "forgetting curve" (or "Ebbinghaus forgetting curve") shows that with increasing time distance from the learning event, an ever greater proportion of what has been learned is no longer recallable. Some measurement methods are now better at measuring comprehension in its pure form than others that measure a combination of comprehension and memory.

In the "best titles" and "sentence halves" methods, the subjects first had to read all ten passages (about three to four pages all together) and were only then allowed to answer the questions. In addition, the questions could only be answered well if the contents of the ten passages were memorized. The subjects had to be able to remember a lot of details over a certain period of time. Therefore, a combination of comprehension and memory was measured.

In the comprehension self-assessments and the "missing verbs" method, the subjects only had to read one passage at a time, and were then allowed to answer. Moreover, they did not have to remember any contents of the passage, but only one single data point, for example "50% comprehended" or "there was a verb missing in a sentence." The subjects may not even have remembered an abstract data point but rather an emotion, such as the unpleasant feeling of having understood very little, or the unpleasant feeling that a sentence in the passage was already linguistically or grammatically incomplete. We can remember emotions particularly well, as we know from mnemonics.

In the comprehension self-assessments and the "missing verbs" method, it can be assumed that the "forgetting curve" does not yet play a role, and that comprehension is measured in its pure form.

Scattering of measurements

According to Carver (1974b, p. 263), it can be assumed that the values provided by comprehension self-assessment are less scattered than those of the other measurement methods.

The reason for this is easily comprehensible. Take, for example, a subject who reads a passage with 100 words thoroughly (with 100% comprehension felt) and who has only skimmed over the last 10 words (with 50% comprehension felt). Practically every subject will notice the drop in comprehension at the end of the text and will not answer the question as to how much percent they understood with "100%," but will be somewhat lower in the estimation and indicate a value of maybe 95% (which should be close to the truth).

Comprehension cannot be measured as finely using other methods. For example, the "missing verbs" method provides either 100 or 0% as a measurement value, depending on whether the subject has noticed the missing verb or not. Of course, averaged over many passages and/or subjects, about 95% comprehension also comes out in the above scenario. It is clear, however, that with other measurement methods one can trust a single measurement much less than with comprehension self-assessment.

In science, objective measurement methods are usually more respected than subjective ones. However, the subjective measurement method "comprehension self-assessment" has an unbeatable advantage over the objective measurement methods: The "measuring device" (the brain) is identical to the object on which the measurement is to be carried out: also the brain. Only the brain has the possibility for introspection, which is beneficial for comprehension self-assessment.

Comprehension self-assessment in training

According to what has been said so far, it is probably clear that I consider comprehension self-assessment to be by far the best comprehension measurement method available to speed reading teachers. There are several reasons for this:

Advantages of comprehension self-assessment

- Comprehension self-assessment is not only at least as accurate as the other methods, but according to Carver (1985, p. 51), it is the best empirical measurement method.
- The low scattering of the measured values already makes a single measurement meaningful.
- The measurement is carried out quickly, much faster than if four alternative answers to a multiple-choice question had to be read first.
- The raw value of the measurement immediately indicates the real comprehension value. No conversion is necessary, not even a "correction for guessing formula."
- The measurement can be performed with any text, without preparation. The teacher does not have to invest any effort, for example, in creating multiple-choice questions.
- Because no preparation is necessary and a measurement is carried out quickly, the teacher can accompany the training very closely with comprehension measurements, and is never unclear about the current reading performance of the participants.

- Because no preparation is necessary, the teacher can't do much wrong when it comes to the measurements. Most of the methodological pitfalls discussed at the beginning of this chapter, which make it difficult to create multiple-choice questions, are irrelevant.

In my opinion, there is no longer any need for a speed reading teacher to retreat to the statement that universities have not yet provided the public with an objective measurement method, and that it is therefore inevitable that teachers will continue to work with home-made multiple choice questions. The subjective method "comprehension self-assessment" does everything that is needed in a speed reading course.

If a teacher does not want to do without their usual tests, they should at least use comprehension self-assessment as an additional method. The additional effort is minimal. If it is shown that the two methods provide the same comprehension values, comprehension self-assessment can be omitted again.

As good a method as comprehension self-assessment is, we still have to discuss in which situations it can be used and in which it cannot.

Limitations of self-assessment

Self-disclosure always raises the question of quality and honesty: how well the person can judge themselves and how honestly the information is given.

Can it only be used from 2nd grade?

Carver's experiments show us that we have no problem with quality when it comes to comprehension self-assessments. However, a restriction must be made. The method can presumably only be applied to pupils from the second grade onwards, because first-year pupils seem still to have difficulties with the term "percent," and do not understand the instructions correctly.[8]

Let's get down to the subject of honesty. Comprehension self-assessment can only be used in situations where there is no incentive for the subjects to "lie," whether for exaggeration or understatement. With the other measurement methods, we are less dependent on the honesty of the subjects. In terms of research methodology, the "external validity" and in particular the "situation validity" of comprehension self-assessment is therefore lower than with the other measurement methods.

For the study participants in Carver (1985c) there were apparently no incentives to "lie," neither financial nor idealistic. This would have been different if Carver had, for example, paid the participants depending on

8 *Quoted from memory from one of Carver's publications.*

their comprehension level. Similarly, it would certainly not be a good idea to measure the comprehension level in speed reading championships using the comprehension self-assessment method.

Can be used almost without restriction in speed reading training

In speed reading training, there should be few situations in which the external validity of comprehension self-assessment is threatened. It is in the common interest of both the participant and the teacher that the teacher knows the current reading performance of the participant as precisely as possible.

So far, I have only noticed one contrary situation: During the training of advanced speed reading, one subject reported comprehension values of just under 30%, although in real terms 50% would have been more appropriate. As it turned out, the subject was mistakenly of the opinion that the teacher's support would end when the "breakthrough" had been achieved (for which a comprehension level of 30% or more is an indicator, see page 68). This kind of misunderstanding will not occur in a commercial setting where, for example, a teacher pledges to support an individual training for a period of two years. Even if it occurred, it would not be an argument against the comprehension self-assessment method. "Playing dumb" cannot be prevented with the other objective measuring methods either. These offer only a certain protection against pretending to have a too-high comprehension level.

Even more Science

We want to discuss further scientific publications and the opinion of the scientific community on speed reading in this chapter. In doing so, we will also do "archeology of science," in order to investigate why most reading researchers are critical of speed reading. But first let's look at the relationship between speaking, listening and reading.

Speaking, listening and reading

In a metastudy, Sticht et al. (1974) compared the results of over 30 studies. These studies focused on speech rates, reading rates and the ability of subjects to understand rapidly spoken speech. In the overall view of these research results, Sticht et al. came to the conclusion that for college students, the following rates are roughly the same:

- Maximum reading rate
- Maximum "auding" rate (listening rate)
- Maximum speech rate

According to Sticht et al., all three values are between 250 and 300 wpm. Sticht et al. concluded that speaking, listening and reading are based on the same cognitive abilities. Sticht et al. don't make any statements as to where these abilities are localized in the brain, and in this book, we only speak very generally about the "language areas," which allow "inner speech" with a limited maximum speed. Sticht et al. hypothesized, supported by several studies, that listening and speech training also improves reading performance.

Promising training formats

If we take these results seriously, we can see three different training formats as promising for basic speed reading. The first format was described on page 39 and consists of training the reading rate by "comprehension-maintaining speed training (by reading)." The other two consist of indirect training the reading rate by means of "speed-speaking training" or "speed-listening training."

Comprehension-maintaining speed training (by reading)

The 27 participants from Radach et al. (2010) and the 16 participants documented from page 177 onwards show that "comprehension-maintaining speed training (by reading)" works. Speed-speaking training or speed-listening training has likely not yet been tried in connection with speed reading. However, based on the results of Sticht et al., we can assume that these two training formats are also effective.

Speed-listening training

In principle, a "speed-listening training" would work as follows: using an mp3 player (or another medium), sentences are played at a high speed and the participant tries to understand everything. Here, it is important, similarly to "comprehension-maintaining speed training (by reading)," that the speed is only slightly above what the participant has mastered before. Therefore, there must be a "comprehension-maintaining speed training (by listening)." The technical prerequisite for this method is that the speed can be fine-tuned on the device.

Speed-speaking training and MORR

Speed-speaking training would work like this: The participant is played one or two sentences at a normal tempo. The participant will recite the sentences as quickly as possible. Alternatively, they read a text in a loud voice as quickly as possible, or the participant first reads the text normally (i.e. silently and "slowly") and then a second time as quickly as possible in loud voice. Carver (1990, p. 280) calls the speed measured in this way the "Maximum Oral Reading Rate" (MORR).

While a participant always has to be careful during "comprehension-maintaining speed training (by reading)" not to fall into skimming, and not set the playback speed too high during speed-listening training, there is no similar danger with the speed-speaking training. This is because you can't accidentally speak more quickly than you can. If you try to do so, you will stutter or splutter, and this "false measurement" will immediately be recognizable as such.

At first, we had only stated that the maximum rates of reading, listening and speaking are approximately the same. Carver (1990, p. 280) has attempted to specify the relationship between reading rate and speech rate more precisely. He used data from Taylor (1965) to estimate the rauding rate and data from Doehring (1976) to estimate MORR, and assumed the following relationship:

Assumed relationship between rauding rate and MORR

Rauding Rate = Maximum Oral Reading Rate + 25 Wpm

Carver only called this a hypothesis because the two data sets did not come from the same population of subjects. In addition, the above relationship applies to group averages. Therefore, we cannot say how widely the values for individual subjects vary.

The formula at least offers us a second approach to determining the rauding rate. The existing approach trusts that subjects will fall into their rauding rate if they receive a correctly formulated instruction such as "Read at the highest speed you can reach with minimal effort." However, because about 20% of readers usually read slower than their rauding rate allows,[1] they may not be following the above instruction correctly. With the second approach, the measurement of MORR, further independent measurements could be obtained in training.

Second measurement approach

Although Sticht et al. (1974) explicitly write that they did not find any evidence for speed reading, their publication was decisive for our understanding of speed reading. They showed that the rates of the three "disciplines" (speaking, listening and reading) are related, and that improvements in one discipline are also effective in the other disciplines, indirectly admitting that Carver's "rauding rate" can be trained, i.e. that there might be such a thing as basic speed reading.

The rauding rate is trainable

It was by no means clear that the rauding rate could be improved within a manageable period of a few days or weeks. If at all, according to the widespread view among researchers, the reading rate can only improve gradually over a long period of time through a lot of reading practice. Reading researchers like Carver and renowned teachers such as R. and W. U. Michelmann express surprisingly similar views. R. and W. U. Michelmann (1995, p. 177) think that the more you read, the faster you become. Carver (1990, p. 181) essentially says the same thing, but specifies that relatively easy material has to be read.

This "pessimistic viewpoint" of serious experts made me doubt my own experiences. After a 2-day speed reading course in June 2002, I was able to increase my original reading rate from 233 to about 450 wpm within a few weeks, without loss of comprehension. Walter Uwe Michelmann was not very impressed, and assumed that the increase in speed was not brought about by the course, but by the fact that I probably read more from June 2002 onwards. However, as I remembered, that was not the case. Only after getting to know the publications of Sticht et al. (1974) and Radach et al. (2010) was the effect understandable. With Sticht, it became clear that the rauding rate is trainable, and with Radach it became clear how it can be done ("comprehension-maintaining speed training").[2]

1 *Carver (1990, p. 173)*

2 *Because the Radach et al. (2010) paper showed the functioning of a new speed reading type that has nothing to do with the speed reading that Evelyn Wood wanted to teach, we had to split the decades-old term "speed reading" into the terms "basic" and "advanced speed reading."*

History of the science of speed reading

It is sometimes the case in the history of science that new insights take a long time before they become established. A well-known example is Alfred Wegener's theory of continental drift, which was only generally accepted about 50 years after its publication. It is obvious that speed reading has to overcome similar hurdles. With this in mind, let's try to trace the history of science of speed reading. It does not need to be emphasized that the phenomenon of "speed reading" existed well before the first scientific investigation into it. The earliest natural speed reader (based on reasonably solid historical evidence) is the librarian Antonio Magliabechi (1633–1714).[3]

Introduction of the term "rapid reading"

Adelaide M. Abell published the oldest article about speed reading known to us in 1894 ("Rapid reading: Advantages and methods"). Abell compared the reading rate and comprehension level of 41 participants[4] in a psychology class at Wellesley College near Boston. The fastest participant was over six times faster than the slowest. According to Abell, the comprehension level increased with slower reading rates for the majority of the participants, but this connection between reading rate and comprehension level did not always apply. Two participants were better than the others in terms of both rate and comprehension. Abell wrote: "In general the conclusion may be drawn that though every individual probably has his maximum rate of reading, determined by his natural quickness of apprehension and association, it is yet possible and desirable to some extent to increase the ordinary rate." In this publication, therefore, no increase in reading rate was achieved or investigated, but the possibility of rapid reading was postulated, and the term "rapid reading" introduced.

First known speed reading course

The first known speed reading course was offered in 1925 at Syracuse University, New York.[5]

"1,500 to 6,000 wpm is possible"

In 1958, Evelyn Wood invented the finger sweep.[6] In our opinion, only since then was it possible to teach advanced speed reading. Speed reading courses, which may have taken place up to then, were probably only effective in the range of basic speed reading. Evelyn Wood's first report on natural speed readers and their reading rates from 1,500 to 6,000 wpm appeared in 1960.[7]

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3 More about Magliabechi on page 274
4 Probably exclusively or predominantly women, because Wellesley College was founded as a college for women.
5 McNamara (2001, p. 14887)
6 For details, see page 71
7 "A breakthrough in reading" (Wood, 1960)

The best were not tested

At the 1961 National Reading Conference in Texas, Evelyn Wood had three of her finest speed readers demonstrate their ability before an audience of two hundred. Researcher George Spache had secretly set up scientific equipment in an adjoining room and asked the visibly surprised Evelyn Wood if he could test her demonstrators. Wood refused.[8] (Wood's refusal was not a principled one, because the five speed readers from the Brown et al., 1981, study were provided by Wood.[9])

"Maximum 900 wpm possible"

Science's response to Wood's reading rate claims was not a long time coming. Spache (1962) described it as physiologically impossible to read faster than 800 or 900 wpm. He argued "purely visually." With a fixation, a maximum of 3 words could be captured, with the shortest fixations lasting about 1/6 s and the shortest saccades 1/30 s.[10] (From today's perspective, we would say that Spache calculated the upper limit for visual line reading.)

First anti-speed reading book

In 1969, Carver attended an 8-week Reading Dynamics course and reported his observations in his book, "Sense and Nonsense in Speed Reading" (1971). This was the first and, until the Wood biography by Biederman (2019), only book to deal entirely with speed reading and to criticize speed reading. Carver did not learn advanced speed reading in the course, but neither did he seriously attempt it. Since he already "knew" from the scientific papers that reading rates above 1,000 wpm were impossible, he had no motivation to do the required exercises.[11]

"Maximum 600 wpm possible"

Following on from Spache's 1962 argument, the inner voice was discussed as a limiting factor by Sticht et al. (1974). The upper limit was quantified at 600 Wpm by Carver (1990). (From today's perspective, we would say that Carver specified the upper limit for basic speed reading.)

"Speed readers exist"

The year 1981 should have marked a turning point in the scientific evaluation of speed reading. As mentioned on page 57, Brown et al. (1981) showed in a methodologically sound study that five speed readers with an average reading rate of 1,891 wpm understood as much as a control group that read with an average of 345 wpm. Although the upper limits of the reading rate given by Spache (1962) and Carver (1990) were clearly refuted, the results of Brown et al. had no discernible influence on the opinion of the scientific majority. We will speculate on the reasons for this in the next section.

8 Biederman (2019, p. 87)
9 Personal communication with Bruce L. Brown (Jun 19th, 2010)
10 $900 = 3 * 60 / (1/6 + 1/30)$
11 Carver (1971, p. 7, 9, 15, 16)

Homa (1983) examined two speed readers (provided by a speed reading institute) who read at 15,000 and 30,000 wpm respectively. In the comprehension test, both scored as poorly as the worst 20% of a control group. Homa concluded that the only extraordinary talent exhibited by the two speed readers was their extraordinary rate of page-turning.

"Speed readers can only turn the pages"

As discussed on page 56, Carver (1985a) conducted an extensive search for outstanding readers, and one of the 16 people examined (participant "SPEED-3,700") showed remarkable achievements in writing summaries for the books read. According to Carver, this subject would have constituted striking evidence for the existence of a "truly super reader" if this subject could have also recalled a great many details of the book, which was not the case. (In my opinion, however, Carver is asking too much: He essentially asks for a speed reader with photographic memory.)

"Speed readers overlook details"

1985 could have been a turning point in the evaluation of speed reading if Carver had been convinced of the existence of the speed reading effect by "SPEED-3,700." Here, a unique opportunity was missed, because "SPEED-3,700" was, in my opinion, probably the only visual speed reader Carver ever had among his subjects. A change in Carver's opinion would have had a great influence on the scientific community. He founded the "Society for the Scientific Study of Reading" in 1993, and was known for having dealt critically with speed reading throughout his life as a researcher, for example in 1971 with his book "Sense and Nonsense in Speed Reading."

Carver (1992b) repeats his criticism of speed reading, and recommends not taking part in speed reading courses. There were many ways to slow the reading rate down, such as dim lighting, dot matrix printers, poor handwriting, or poor screen contrast, but no easy way to speed it up. Speed reading training is really skimming training in disguise. If you triple your reading rate, you probably reduce your comprehension level to a third.[12] This view of the "pure trade-off" in speed reading has become the default position of many researchers.

"Pure trade-off"

Radach et al. disputed this in 2010, when they showed that a doubling of the reading rate is possible without a significant loss of comprehension (see also page 39, training format "comprehension-maintaining speed training"). Incidentally, we don't know of any other methodologically sound study that is adequately documented and has shown the

"Barely a trade-off"

12 On the surface, my first experience with a two-day speed reading course was the same: At the end of the second day, I was almost three times faster and understood only one third. A few weeks later, however, I was able to read at twice my original speed and understand everything.

effectiveness of a speed reading training program. Brown et al. (1981), for example, have only shown that speed readers exist, but have not evaluated a training program.

It remains to be seen whether the publication by Radach et al. will contribute to a rethink in the scientific community. The following event shows that the majority of reading researchers are still critical of speed reading in 2010:

Negative opinion of the majority

Radach presented his research at the annual conference of the "Society for the Scientific Study of Reading" in July 2010. There were about 60 reading researchers in the lecture auditorium. Before he presented his results, Radach asked the colleagues assembled if any of them thought that doubling the reading speed without significant loss of comprehension was possible. "Almost no one has raised their hand, about 3 to 4 out of 60," Radach recalls.[13] (All he had asked about was what we would call "basic speed reading" today. The scientific community's attitude towards advanced speed reading is likely to be even more negative.)

Status in 2010

Now let's draw a summary up to and including 2010. For decades, it has not been possible to convince the majority of researchers of the existence of the speed reading effect. Sadly, speed reading in this regard has already surpassed the theory of continental drift. However, we hope that reading research will again take the topic of "speed reading" more seriously, and that more researchers will be encouraged to analyze the speed reading effect. A positive example in this respect is the study of two visual speed readers by Radach et al. (2015).

Now, let's speculate about why Brown et al. (1981) had no recognizable impact on the scientific majority opinion.

The underrated publication

A title that was not meaningful enough?

Although it would be appropriate in terms of content, Brown et al. (1981) could not, of course, title their publication "First methodologically-sound study proving the existence of speed readers." Instead, they named it "An analysis of the rapid reading controversy." Unfortunately, one can imagine anything by reading this title. It sounds more like a discourse analysis or, at best, a metastudy. The title does not make it at all clear that new experimental data is reported.

Thus, there is an initial suspicion that the publication was not correctly received, i.e. that it was read by the wrong people, if at all. This simple explanation for the lack of impact the study had seems to be untrue, however. The "Journal of Reading" recognized the importance of the

13 *Personal communication (Nov 11th, 2015)*

study and published the results again (Cranney et al., 1982). Well-known reading researchers like Just and Carpenter (1987, p. 428) and Carver (1990) also discussed the study in their books (but in a relative or negative way). We must therefore analyze the reasons for this criticism.

Comprehension measurement through "free recall"

Brown et al. had deliberately dispensed with multiple choice questions and used an elaborate method for measuring reading comprehension that was to come as close as possible to actual reading situations: free recall of everything that the subjects could remember from the book chapter they had read. After the subjects finished the chapter, they took notes, rapidly skimmed over the chapter again ("post-view"), then completed and arranged the notes. With this memory aid, they then gave an organized, detailed summary of the chapter, recorded on tape. The notes were typed by secretaries and handed over to four "judges." Each judge had prepared an outline of the chapter, and evaluated for each transcription the percentage of the information of the chapter that was captured.

In addition to the experimental group of five speed readers, there were also two control groups. One group knew their way around the subject area of the text to be read ("informed readers"), the other not ("uninformed readers"). In the following, we will only look at the control group that performed better ("informed readers"). In the test condition "preferred rate," the speed readers read at 1,891 wpm, as already mentioned, and thus several times more quickly than the control group at 345 wpm. If we include the time needed for the "post-view," the ratio was still 1,134 wpm to 304 wpm. Despite significantly higher rates, the speed readers understood as much as the control group: 65%.

Just and Carpenter put into perspective

Just and Carpenter regard the study by Brown et al. as an example of the fact that for some tasks it is sufficient to understand the gist, but details or subtleties are unimportant. For Just and Carpenter, it was apparently crucial that the participants gave a "summary" into a tape recorder (and not that the subjects wrote down everything they had remembered). Just and Carpenter therefore ultimately doubt that the comprehension level in the usual sense was measured by Brown et al.

Just and Carpenter admit, also on the basis of their own research, that speed reading can be seen as a useful, if limited tool that can permit skilled readers to respond flexibly to different texts and reading tasks. Speed readers would gain a comprehension advantage only with basic information from texts on familiar topics. Speed readers could easily put together the fortuitously sampled information. Just and Carpenter strongly suspect that the speed reading effect is based on better conceptual-level processes, and not on better perceptual processes. (In this book we take the very opposite view: In terms of perception speed readers are better than normal readers, because they can still capture all the information at about 1,500 wpm. Conceptually, however, they are no better: Speed readers are not speed thinkers. Speed readers have quite normal "comprehension areas," which do not always keep up with the content at high reading rates, which leads to a reduction in comprehension.)

Carver's criticism

Neither can Carver be accused of neglecting the study by Brown et al. He discussed it very thoroughly on about four pages in Carver (1990, pp. 407–410, 417). In addition to the test condition "preferred rate," at which the speed readers were much faster than the control group, Brown et al. (1981) also administered a test run in which all the subjects had to read at 260 wpm ("power condition"). Here, the comprehension level of the speed readers was 73%, while the control group understood only 54%. Carver concluded that the speed readers were either better readers in general than the control subjects, much better note takers, much better at organizing and verbalizing their recalls, or a combination of all the above.

In my opinion, Carver overlooks the fact that in the "power condition," the speed readers did not read normally at 260 wpm, but—as stated by Brown et al.—typically read the text five or six times at a very high rate. Strictly speaking, the speed readers did not perform a "power condition," but showed that cumulative multiple speed reading is more useful than reading the text slowly, once. In retrospect, it would have been better if Brown et al. had induced the speed readers in the "power condition" to read normally rather than visually, by means of a corresponding instruction. In that case, the speed readers might have also reached only 54% comprehension, like the control group, and researchers like Carver would have been more likely to draw the correct conclusions from the study. However, Carver said that the study only yielded a seemingly positive result for speed reading.

Myths and Half-Truths

In this chapter, we do not want to deal with the issues that are correctly presented in the guidebooks, but with issues which we believe are most likely to require correction or at least relativization. First, we will discuss some of the recommendations that are most frequently mentioned: "avoid regressions," "suppress subvocalization" and "read groups of words."

"Avoid regressions"

In normal reading, even for experienced readers, about 10 to 15% of the saccades do not go forward, but jump back to words or parts of words that have already been read, i.e. they are "regressions" (see page 10). If these regressions could be avoided, it would save up to 10 or 15% on reading time and increase the reading rate accordingly.

Advanced speed reading

The recommendation "avoid regressions" is certainly not relevant for advanced speed reading, because the eye movements which are guided by finger sweeps during advanced speed reading follow a completely different logic to those used during normal reading.

Basic speed reading

We therefore only have to discuss the recommendation for normal reading or basic speed reading respectively. The crucial question is whether regressions are something "bad" which must be prevented, or whether regressions are at least partially useful. Many of the regressions are undoubtedly necessary when a word or fact was not correctly understood when reading, and a high comprehension can be maintained by the regression. In this respect, the blanket recommendation "avoid regressions" is an invitation for allowing some loss of comprehension. This is not a problem at first, but one has to be aware of having left the area of basic speed reading (which wants to be "comprehension-maintaining") and has already gone into the area of the third speed reading type, "reading management." In some guidebooks, this is seen in a similar way.[1]

Another issue is the question of cause and effect. Are regressions the cause of slow reading, or just the result of deeper problems, such as a lack of concentration or "not being able to articulate internally quickly enough"? Does the recommendation only try to combat the symptoms, and is it therefore ineffective?

1 *For example in Schmitz (2008, p. 105)*

The ultimate test is a well conducted study with a control group, in which the experimental group are told to avoid regressions and the control group go through training without such instruction. It can then be determined which part of their speed increase is due to the "avoiding regressions" recommendation.

There is already a study of this type: the repeatedly mentioned study by Radach et al. (2010). The participants of the experimental group received acoustic feedback controlled by an "eye tracker" when a regression back to another group of words took place. This is a very strong intervention, presumably much more effective than a purely verbal instruction "avoid regressions". Indeed, the experimental group was able to reduce regressions back into another group of words by 50%, while the control group remained almost unchanged. However, the regressions within a word decreased equally for both groups (by about one third) and the decisive result for a speed reading training was: The control group were able to increase their reading rate ***as much as*** the experimental group, which was almost doubled. The part of the speed increase achieved in this case by "avoid regressions" was therefore zero.

This gives a mixed assessment for this recommendation. While it is true that faster readers perform fewer regressions when reading than slower readers, there are considerable doubts that the recommendation "avoid regressions" within a speed reading training could play the role of particularly useful exercise instruction.

"Suppress subvocalization"

Advanced speed reading

For advanced speed reading, it is indisputable that subvocalization has to be eliminated. In this book, we have described it as one of four learning goals to be achieved (learning goal A: omit subvocalization). As correct as the recommendation "suppress subvocalization" is, it is ineffective on its own. A speed reading student cannot intentionally suppress subvocalization. Only the right training format with the right exercises (e.g. finger sweep exercises) will lead to the elimination of subvocalization after many training days.

Basic speed reading

Subvocalization also plays a role in basic speed reading, but one that is fundamentally different to that of advanced speed reading. In this book we argue that with basic speed reading the speed of the inner voice is increased, but all the words are still articulated internally. "Accelerate subvocalization," not "suppress subvocalization," is the correct recommendation here.

In summary, our evaluation reads as follows: "Suppress subvocalization" applies only to advanced and not to basic speed reading.

"Only subvocalize the important words"

After this "moderate" recommendation, some words may still be articulated internally. This somewhat relativizes the strict recommendation "suppress subvocalization." While this strict recommendation dates from Evelyn Wood's time, the moderate recommendation seems to be much more recent.[2]

Advanced speed reading

It may come as a surprise, but the moderate recommendation may be less suitable than the strict recommendation. Though some purely visual speed readers report that they still articulate a few words per page internally, for example three to five words, this is not necessary for understanding and rather a reflex that cannot be completely stopped. For speed reading students who are just learning the advanced speed reading, it is extremely disturbing when some words are still subvocalized. Often a subvocalized word masks the other five to ten words captured in the same fixation. In our opinion, this moderate recommendation is unsuitable for advanced speed reading.

Basic speed reading

For basic speed reading, the moderate recommendation must be evaluated even more critically, because it may not only be unsuitable, but even unfeasible. We have a sequence problem here. Whether a word is important (and should only be subvocalized according to the moderate recommendation) is something a reader only knows if they understand the word. Because they are normal readers who have not mastered advanced speed reading and therefore cannot grasp meaning purely visually, they only understand the words they have subvocalized. If they understood such a word and recognized it as unimportant, it is too late to say: "Oh, I wish I hadn't subvocalized that word!"

A second argument speaks against this moderate recommendation. It insinuates that one could switch back and forth between subvocalization and grasping meaning purely visually, for example "three words don't subvocalize, one word does, three words don't." This switch would have to take place approximately every quarter or half second. On the other hand, for purely visual speed readers, it takes a few seconds (especially if they have only learned advanced speed reading shortly before) to mentally switch from the "subvocalizing reading" mode to "purely visual reading" mode.

Our assessment of the recommendation "only subvocalize the important words" is therefore clear: It is most likely that this recommendation is unsuitable for both advanced and basic speed reading.

2 *See, for example, Askeljung (2013, p. 96).*

"Read groups of words"

The recommendation "read groups of words" means that more than one word should be captured with a fixation, for example three or four adjacent words. It is also sometimes recommended not only to group any words, but to form "meaning groups,"[3] i.e. to group words with related content.

Advanced speed reading

The historical origin of this recommendation is certainly the observation by visual speed readers that they capture several words from several lines at once with one fixation. In the end, it concerns learning goal C (see with two-dimensional vision). Similarly to the recommendation "suppress subvocalization," the recommendation "read groups of words" is initially quite correct, but probably ineffective on its own. Advanced speed reading is learned by conducting the various exercises with finger sweeps. The effect of advanced speed reading (including learning goal C "see with two-dimensional vision" or "read groups of words") then occurs for the first time with the breakthrough after many training days, regardless of whether one has explicitly attempted to read in groups of words.

Basic speed reading

Basic speed reading can also be considered under the aspect "read groups of words." If the speed of the inner voice is increased, for example from 250 to 500 Wpm, then the saccade lengths necessarily also increase (because the fixation durations are little changeable).

While at 250 Wpm a saccade is on average only 5.5 letter spaces long, at 500 Wpm it is already 11 letter spaces on average.[4] In 11 letter spaces, three short words certainly fit in. The reader would therefore have already captured a small group of words with one fixation.

Here, too, cause and effect must be distinguished. Long saccades and thus "reading groups of words" are the consequence of the fact that a participant was able to successfully increase their tempo of inner speech. Long saccades and thus "reading groups of words" are only a symptom. There is therefore a suspicion that the recommendation "read groups of words" could be ineffective. The answer is most likely to come from a study, and just as with the recommendation "avoid regressions" discussed above, this study already exists.

In the study by Radach et al. (2010), the word groups in the text to be read were highlighted in color, so that a chessboard-like pattern was created. This made it easier for the participants of the experimental group to follow the recommendation "read groups of words." Nevertheless, the result was very sobering for the proponents of the recommendation: The control group were able to increase their reading rate as much as the

3 *Schmitz (2008, p. 30 ff.)*
4 *Calculation basis: fixation duration 220 ms, 1 W = 6 letter spaces*

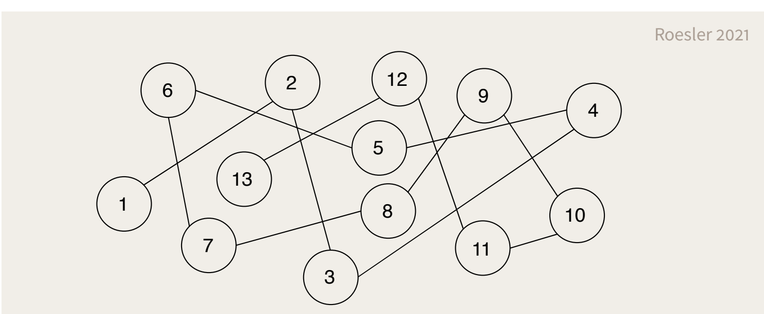
experimental group. The positive evidence that the recommendation "read groups of words" could contribute to a speed increase is still missing.

The recommendation to form "meaning groups," i.e. to group words with related contents, suffers from a second difficulty: The recommendation is probably unfeasible. Here, we have the same sequence problem that was already discussed with the recommendation "only subvocalize the important words." Which words form a meaning group is only clear after one has read (and understood) them. Before reading, one does not yet know which words form a meaningful group.

Our assessment of the recommendation "read groups of words" is therefore as follows: For advanced speed reading one can rightly say that "groups of words are read," and for basic speed reading this description is at least not seriously wrong. However, there are considerable doubts as to whether a recommendation to "read groups of words" given verbally (or otherwise) can contribute to an increase in speed in speed reading training.

Number-finding picture

Much rarer than the recommendations discussed so far is a certain exercise, which could be described as a "number-finding picture," which is used in speed reading courses. The aim of this exercise is to look at the numbers starting from 1 in ascending order as quickly as possible, see Figure F 15.1.



F 15.1
Number-finding picture

Advanced speed reading

This exercise is very old, and has changed over time. The original form might have been a number-finding picture without connecting lines and without circles around the numbers, as we can conclude from guidebooks that refer back to very old sources.[5] The number-finding picture without connecting lines could help to support learning goal C ("see with

5 *For example Loeser and Schnauss (1999, p. 143).*

two-dimensional vision") of advanced speed reading. The better you manage to break "tunnel vision," the faster you will be able to find the next number. A still-unanswered question is whether the benefit of this exercise (calculated per minute of exercise time) comes close to the benefit of the proven finger sweep exercises of the Michelmann training format, or whether the exercise is a useful "additive" to the proven exercises for other reasons.

The meaning behind these (and similar) exercises, training two-dimensional vision, has apparently been lost at some point. In Ott (1972), for example, such exercises were presented under the heading "eye gymnastics," which already points to a change in meaning. Another change went along with this: The number-finding picture was depicted with connecting lines between the numbers. It is very obvious that such a number-finding picture can train the learning goal "see with two-dimensional vision" much more poorly than the original form of the exercise (without connecting lines). There is rather the danger that tunnel vision is solidified when one tries to go along the lines with their eyes.

Basic speed reading

There is not much to say about basic speed reading. The two-dimensional aspect of the number-finding picture suggests that the exercise is irrelevant for basic speed reading. It is also not apparent how the tempo of inner speech could be influenced by this exercise.

Our assessment of the number-finding picture is that a number-finding picture with connecting lines should not be a meaningful exercise for speed reading, be it advanced or basic. However, it is conceivable that a number-finding picture without connecting lines can make a positive contribution to the training of advanced speed reading.

"Who reads faster understands more"

This statement, which has been written in guidebooks for decades, comes from Evelyn Wood herself. The problem with this statement is that it was meant about the long-term changes in the reading performance of schoolgirls, but can easily be misunderstood as a quick fix.

In about 1947, Wood took on the job of "girls' counselor" at Jordan High School in Salt Lake City. The schoolgirls seeking advice had one thing in common: They were all poor readers. Wood set up a remedial reading program that hundreds of schoolgirls have gone through over the years. Wood gained the following insight: The faster the girls read, the better they read.[6]

6 *Source of information in this paragraph: Agardy (1981, p. 23–24)*

This finding should not be doubted, but it must be made clear that Wood only noticed a correlation between reading rate and comprehension level. A correlation does not necessarily mean a cause-effect relationship. A correlation often results from the fact that both parameters are influenced by a third. In our case, the most probable assumption is that the parameter "remedial reading program" positively influenced the other two: "reading speed" and "comprehension level."

We now come to the danger of the statement "who reads faster understands more." If it is not interpreted as a long-term approach to improved reading (but as a quick fix), for example when a teacher just says, "read this exercise faster and then you will understand more," the statement is definitely wrong.

Basic speed reading

Reading rates and comprehension levels are "negatively correlated," as the "curve with the bend" on page 14 shows. This applies to both branches of the curve, both above and below a person's rauding rate. Who reads faster than with their own rauding rate will find that their comprehension breaks down strongly: linearly with the increase in speed. The transition from learning-oriented reading to reading with rauding rate comes also with the price of a certain decline in comprehension.

I can only imagine one situation in normal reading in which the statement could be true as a quick fix. Some authors do not formulate their texts with short and easily-understandable sentences, but construct complicated nested sentences, which can sometimes extend over ten lines. To understand such a sentence, it would be wrong to read slowly and thus fall into learning-oriented reading (which would normally be the appropriate strategy for increasing text comprehension). Reading more slowly in a nested sentence can be counterproductive, because at the end of the sentence you may have forgotten what was at the beginning of the sentence. Outside this special situation, there is nothing to suggest that the statement discussed could be true.

Advanced speed reading

Nor is it advisable in advanced speed reading to increase speed in order to (allegedly) understand more. According to the observations of visual speed readers, there is a continuous conflict of objectives between reading rate and comprehension level, and this is also the case with advanced speed reading. If they want to understand more of the text, they slow down, for example from two-dimensional speed reading with 1,500 wpm to visual line reading with 800 wpm. If the text is very difficult, they may slow down to normal reading.

Let's summarize our evaluation of the statement "who reads faster understands more": The statement is greatly misleading. It is right in the sense that Evelyn Wood meant it, and it is wrong in almost all other situations if it is interpreted as a quick fix.

Remarks

We cannot, at this point, deal with all topics from guidebooks for which a correction or relativization would be appropriate. The above list is far from complete, and would at least have to be supplemented by a detailed discussion of the topics "widening the vision span" and "pacer." We can only briefly discuss both topics.

Widening the vision span

The frequently-used exercises for widening the vision span, such as "word pyramids," are only useful (if at all) for advanced speed reading, because visual performance in basic speed reading is not a limiting factor. Moreover, the aim of advanced speed reading should not be to "widen the (horizontal) vision span," but to "widen the (two-dimensional) viewing area."[7]

Pacer

The use of a pencil or finger as a pacer is not appropriate for basic speed reading, and constitutes an unsuitable transfer of the concept of "finger sweep" (which is useful for advanced speed reading) to basic speed reading. The finger sweep is an aid for the exact guidance of eye movements (and not primarily a means of increasing speed). With basic speed reading, a guidance of the eye movements is not necessary (and probably even hinders), because eye movements occur automatically during normal reading.

Incidental effect

According to what has been said so far, the impression could have been created that we have described all the exercises used in seminars as ineffective, especially for basic speed reading. This impression is not so wrong, but also not the whole truth. In every speed reading seminar, there is something that does not form part of the exercises, but is always present. We think that this may actually be the most effective part of the training. This is the teacher's desire that each participant read as quickly as possible.

This desire is very similar to the instruction "read as quickly as possible, but you still have to comprehend everything!", which is the only instruction in the training format "comprehension-maintaining speed training" (page 40). The difference lies only in the half sentence "but you still have to comprehend everything."

7 *It is conceivable that the "panoramic vision" effect discussed on page 174 is the historical origin of the recommendation "widen the vision span."*

It now depends on what exactly happens in the seminar. If the teacher does not push the pace too hard or the participants simply do not let themselves be “rushed,” there is a chance that the participants will practice in a comprehension-maintaining way. Such exercises will be effective and increase the tempo of inner speech, even if they run under a completely different and previously criticized motto such as “read groups of words.” If, on the other hand, the teacher immediately forces the participants into a speed range at which comprehension can no longer be maintained, the participants will only try to optimize their skimming with such exercises, instead of increasing the speed of their inner speech.

Reasonable course duration

In bad cases, the rauding rate remains unchanged after a 2-day seminar. In good cases, it may be increased by 20%.[8] With a sufficiently long course duration (a “core duration” of more than 14 days) significantly more (a 66% speed increase) is achievable,[9] and so the question arises as to the reasonable duration of a speed reading seminar. Our opinion now is that a seminar of one to two days doesn’t make sense. It is not enough time to train the participants to their limits, and too long to fill it with meaningful content (because the theory of basic speed reading is quickly taught, and more than one or two hours of exercises per day is not useful).

Computer programs

The situation is different for speed reading computer programs or apps. There are two reasons why speed reading apps are not covered in depth in this book. One is the fast pace of the market: Any list of speed reading apps would quickly become obsolete. However, the main reason is that the concepts and exercises of speed reading apps are basically the same as those we know from face-to-face seminars and guidebooks. The programmers of speed reading apps make use of exactly this knowledge base and implement it in a program; they do not necessarily contribute new insights into speed reading.

Nevertheless, speed reading apps have decisive advantages over seminars: In practice, they will probably lead to significantly greater speed increases. The exercises may be the same as in the seminars, but the participants distribute their exercise time more sensibly. For a 1 to 2-day seminar, it is typical for the participants to do nothing after the seminar. Users of speed reading apps, however, will certainly not use them for two days in one go and then put them away, but rather practice with them for a few minutes a day over a period of several weeks. This would therefore be very similar to the training format “comprehension-maintaining speed training,” which was recommended on page 39.

8 *Probably not by more than 20%, see argument starting on page 50.*

9 *See page 45*

RSVP

In connection with speed reading, programs are sometimes discussed that display the text to be read on the screen as follows: The words of the text are projected in quick succession onto the same position on the screen. In reading research, this presentation technique is called "Rapid Serial Visual Presentation" (RSVP). A reader is spared the saccades (eye-jumps) from word to word. It was argued that saving these eye movements could increase the reading rate. Unfortunately, the eye movements are neither time-consuming,[10] nor are they the limiting factor for basic speed reading. Purely visually (including the allegedly time-consuming saccades) 700 to 900 wpm reading rate is possible. It is the maximum rauding rate of 600 Wpm that limits the reading rate during basic speed reading.

"Rapid Serial Visual Presentation" does not lend itself to advanced speed reading either: Projecting only one word at a time on the screen would slow down speed reading, because the speed reader cannot take advantage of two-dimensional vision. Whole "viewing circles" would have to be projected onto the screen. It would be very difficult to write a feasible and practice-oriented program, because "two-dimensional" speed readers adapt their reading rate very dynamically to the respective text passages. The constantly changing optimal height and width of the viewing circles would hardly be predictable for the program.

PhotoReading

One of the most controversial speed reading methods is PhotoReading, which was presented by Scheele (1993, 1997, 2001)[11]. PhotoReading makes such fantastic promises that it could be described as the yeti of speed reading methods! The core of the method is to "mentally photograph" the book with 25,000 wpm.[12] Onscreen, it would not be unusual for someone to PhotoRead at rates of 100,000 to 1,000,000 wpm.[13]

On page 35, we have argued that the visual system allows a maximum speed of 2,500 wpm due to the word identity span, and that a maximum of 10,000 wpm would be conceivable if the perceptual span could be completely used for word recognition (which is only partially possible at best). PhotoReading therefore promises something that the visual system does not provide. A second peculiarity is that the visually captured information would not be available immediately, but first have to be "activated." At least 20 minutes (but ideally 24 hours) should be waited

10 The average saccade duration is 30 ms, see page 9.

11 1st edition in English: 1993. We quote from the 2nd English edition of 1997 and from the 4th German edition of 2001.

12 Scheele (1997, p. 1)

13 Scheele (2001, p. 100).

before activation.[14] This distinguishes PhotoReading from all other speed reading methods, which assume that you already understand the text while speed reading.[15]

Science has not ignored PhotoReading, but investigated it. On behalf of NASA, McNamara (1999) found that PhotoReading does not work. Admittedly, this result is not overly interesting, because it meets expectations. What is interesting is the assertion that PhotoReading creates a false sense of security in the reader for the comprehension level achieved (McNamara, 1999, p. 12). The comprehension self-assessment praised by us on page 132 is thus undermined by PhotoReading.

McNamara speculates on the reasons for this. One explanation is that the reader relaxes before each phase of PhotoReading and supports this with positive, affirmative thoughts, like “all that I PhotoRead makes a lasting impression on my inner mind and is available to me.”[16] This could reduce the willingness or the ability of the readers to recognize that the technology does not work for them.

“Kennedy could read at 1,200 wpm”

Here, we want to deal with a historical speed reading myth. TIME magazine wrote that John F. Kennedy could read at 1,200 wpm. How this number came about was reported in 1964 by the very same journalist: Hugh Sidey, TIME magazine’s White House reporter. The following information is taken from Sidey (1964, p. 35):

Hugh Sidey wanted to find out how fast Kennedy could read. The reading institute where Kennedy was supposed to have taken the course was called, but nobody could really remember that Kennedy had attended there.[17] A member of the training center suggested that Kennedy had probably read about at 700 or 800 wpm, twice the usual value of 400 wpm. Sidey talked to Kennedy about it, but he didn’t like the number.

Kennedy was not modest about his reading rate, and thought he read more quickly. One of his advisors, John Kenneth Galbraith, testified (because he had noted it on the clock) that Kennedy had read a 26-page memo in about 10 minutes. After the number of words was determined, the rate was about 1,000 wpm. Kennedy still felt that this was a little slow, so Sidey rounded it up to 1,200 wpm.

14 *Scheele (1997, p. 65).*

15 *Critics described PhotoReading’s 24-hour wait as the time the teacher could use to run away after the seminar.*

16 *Scheele (1997, p. 40)*

17 *If they called an Evelyn Wood Reading Dynamics training center, this would be no surprise. According to Biederman (2019, p. 69, 78, 207), Kennedy took a course at the Foundation for Better Reading (in Baltimore, while serving in Congress).*

This number then appeared in TIME magazine. Sidey then watched Kennedy on other occasions. He saw him go much more slowly in difficult passages, and in other reading matters much more quickly (and then came back with intelligent questions about the text).

What should we think about Sidey's story? Because Kennedy's comprehension level has not been measured, we can interpret the 1,000 wpm (and this is the only reasonably reliable measurement) in two ways. On the one hand, it is conceivable that Kennedy was only a fast normal reader (perhaps at 500 wpm) and had skimmed the memo or used reading management. On the other hand, it cannot be ruled out that Kennedy had learned the advanced speed reading in the course and had completely read and understood the memo at 1,000 wpm. Be that as it may, it is certain that Kennedy's reading rate was exaggerated in TIME magazine, and that this number finally found its way into speed reading books.

Benefits and Side Effects

THE FACT THAT SPEED READING can save time has certainly become clear from the previous chapters. We will now try to express these benefits in numbers, i.e. to "quantify" them. Then, we will discuss the risks and side effects that we have become aware of in connection with speed reading.

Benefits of basic speed reading

16 basic speed reading participants estimated their saved reading time. The estimation was carried out at the very end of the training, so that the participants already had a few days of experience with their new skills. The professional reading time saved was estimated; there is no data on the private reading time saved.

Among other things, the participants had to indicate how many days a year they work and how many hours they read per day (whether on paper or on-screen). The most difficult part of the estimate was to indicate the percentage of daily reading material that can be read at the high reading rate now learned (for example, because it is routine material or other texts, often from one's own field of expertise, where the reading rate rather than the reflection time is the limiting factor).

According to the participants' estimates, only 35% of the reading material was such routine texts, see Table T 16.1 on page 158. It should be noted, however, that 12 of the 16 participants were software developers and engineers, i.e. came from technical professions. The reading material for such professions typically does not contain so much "filling material" and often describes very complex facts. This can be very different in other professions.[1]

Not all the time saved must be used productively

One subtlety of the estimate was the percentage of the time they had saved that the participants intended to use productively. Behind this consideration are ultimately health aspects: Anyone who uses the saved reading time to carry out work that is more stressful than reading has taken an unwanted step in the direction of "burnout." It is therefore possible to reserve part of the time saved for relaxing and use the rest productively. On average, the participants intended to use only 81% of their time saved productively.

1 *In terms of research methodology, the "external validity" of the benefit estimation of the 16 participants is therefore not particularly high.*

Together with the measurements “reading rate before training” and “reading rate after training,” the result of the estimate was that a participant would save, on average, 50 hours of reading time per year. This is possible without a loss in quality, because it was trained with the format “comprehension-maintaining speed training” (comprehension before the training averaged 96%, after the training 97%).[2]

50 hours saved per year (in technical professions)

	Basic speed reading: Benefit estimation of 16 participants	Average	Maximum	Minimum	Standard deviation
1	working days per year	216	300	200	23
2	daily working time (h)	8.1	9.5	7.4	0.4
3	working time per year (h)	1,748	2,400	1,546	199
4	daily reading time (h)	2.6	5.5	1.0	1.0
5	reading time per year (h)	563	1,155	200	231
6	**percentage of routine texts**	**35%**	85%	0%	21%
7	reducible reading time per year (h)	167	315	0	81
8	reading rate before training (Wpm)	269	345	232	30
9	reading rate after training (Wpm)	443	594	300	75
10	speed increase	66%	156%	24%	34%
11	part of the saved time that participant wants to use productively	81%	100%	60%	12%
12	**saved reading time per year (h)**	**50**	115	0	28
13	training time (h)	7.5	15.0	4.5	3.2
14	training costs (in h)	14.8	105.0	4.5	25.8
15	total investment (h)	22.2	118.0	9.0	28.0
16	return on investment after one year	231%	721%	-100%	212%
17	return on investment after 10 years	32	81	-1	21
18	**productivity increase**	**2.9%**	6.1%	0.0%	1.5%

Lines 1, 2, 4, 6, 11 and 14 were estimated by the participants. Lines 8, 9 and 13 were measured. Lines 3 (from 1, 2), 5 (from 1, 4), 7 (from 5, 6), 10 (from 8, 9), 12 (from 7, 10, 11), 15 (from 13, 14), 16 (from 12, 15), 17 (from 12, 15) were calculated per participant. The average of the participants is shown (averages were not calculated from other averages).

T16.1
Benefit estimation of 16 participants (mainly from technical professions)

The lasting benefit of 50 hours saved per year is countered by an investment (required only once). This is made up in time spent by the participant (7.5 hours on average) and financial costs for the training. The

2 *For courses in which the participants suffer a loss of comprehension, the benefit estimation would have to be carried out with the effective reading rate (page 13) instead of the reading rate.*

financial costs were converted into hours, usually on the basis of the hourly wage of the participants. The estimation of the participants then resulted in an average total investment of 22 hours for learning basic speed reading.

32 times the investment back within 10 years (in technical professions)

The "return on investment" could then be calculated from this. Over 10 years, a participant can expect to get an average of 32 times the investment back in the form of saved reading time.

Productivity increase of about 3% (in technical professions)

In the end, the saved reading time per year and the annual working time were used to calculate how much more productive the participant has become through speed reading. The average productivity increase of the 16 participants was 2.9%. This value makes an almost miserable impression, especially if one compares it with the expectations that usually arise after consulting speed reading guidebooks. One could now question the "internal validity" of this benefit estimation and assume that the participants systematically estimated too pessimistically. From my perspective, there are no signs of this.

Possible productivity increase of 40% (in some professions)

It is more likely that technical professions do benefit from speed reading, but by no means as strongly as some other professions. Let us take, as an example, a profession in which 8 and not 2.6 hours of reading per day are needed, and 90% instead of 35% of the reading material consists of routine material. In this case, about 500 reading hours per year will be saved, which corresponds to an increase in productivity of about 40%.

Side effect on other languages

Learning basic speed reading in one language has a positive side effect on the reading rate of the other languages a participant knows. We currently (2021) have data from only two participants, but the effect seems to be very strong. Student B. B. increased his reading rate by 179 Wpm with texts in his native language, German. As a side effect, his English reading rate increased by 110 Wpm. With texts in English, he was then able to increase his English reading rate by a further 52 Wpm. Student R. M. increased his reading rate by 130 Wpm with texts in his school language, Russian. In doing so, his reading rate increased by 97 Wpm in his native language, Azerbaijani, by 132 Wpm in English, and by 131 Wpm in German.[3]

Benefits of advanced speed reading

For advanced speed reading, there is not yet an estimation of the expected benefit from any participant. Such an estimation would also be much more difficult to carry out than with basic speed reading, among other things because the participant would have to make assumptions

3 *Full data to be published separately.*

about which percentage of the reading material can be read with which reading type (normal, visual line reading, two-dimensional speed reading with 2,400, 4,800, 10,000 wpm).

However, we have real reading data for a high school student (Participant PN25, page 252) who estimated every two weeks during a six-month period how long he had read and with which reading type in these two weeks. Private and school reading were added together and not recorded separately. However, the reading times for paper (books etc.) and on-screen were recorded separately.

The participant started documentation seven weeks after his breakthrough, so he was still at a beginner's stage and had only used advanced speed reading on paper and hardly any on-screen, as can be seen in Table T 16.2.

Reading times of Participant PN25 within 6 months	Reading rate	Reading time in h	Equivalent to h at 300 wpm[1]	Saved reading time in h
On paper				
normal reading	300 wpm	30.6	30.6	0.0
visual line reading	800 wpm	26.8	67.1	40.3
two-dimensional speed reading	2,400 wpm	20.5	81.3	60.8
two-dimensional speed reading	4,800 wpm	0.8	3.6	2.8
two-dimensional speed reading	10,000 wpm	1.1	7.5	6.3
On-screen				
normal reading	300 wpm	124.5	124.5	0.0
visual line reading	800 wpm	3.8	9.6	5.8
two-dimensional speed reading	2,400 wpm	0.1	0.2	0.1
two-dimensional speed reading	4,800 wpm	0.0	0.0	0.0
two-dimensional speed reading	10,000 wpm	0.0	0.0	0.0
Sum		208.1	324.4	116.2

1 Weighted with the comprehension level; assuming 100% comprehension at 300 wpm, 95% at 800 wpm, 50% at 2,400 wpm, 30% at 4,800 wpm, 20% at 10,000 wpm.

T16.2
Reading times of Participant PN25 within 6 months

Although still a beginner, he was able to save 116 hours of reading in these six months, which equates to a saving of over 200 hours per year. This is more than four times as much as the 50 hours saved per year by the average basic speed reading participant.

However, we should not draw too many conclusions from this individual case, and instead try to make a few statements about productivity increases and returns on investment with advanced speed reading, based on general considerations.

On page 59, we argued that anyone who has successfully learned two-dimensional speed reading can most likely read at 1,500 wpm or faster, and that a certain percentage of speed readers can read at 2,000 to 3,000 wpm.

However, because the comprehension level at these rates is no longer as high as with normal reading, we have to calculate the productivity increase based on the effective reading rate, instead of the reading rate. From page 211 onwards, we can see from the diagrams of the individual participants which effective reading rate they have achieved. All the successful participants achieved an effective reading rate of 1,250 wpm or more (although at that time they were all still speed reading beginners).

Possible productivity increase of 300% (in ideally suited professions)

We are therefore making a conservative estimate when we assume an effective reading rate of 1,250 wpm, which can be achieved with appropriate reading material. Normal readers manage around a 250 wpm effective reading rate,[4] which is five times less. Now, we allow for a little safety buffer (not all saved time has to be used productively, etc.) and reduce the promise to factor four, which can be achieved in higher productivity under ideal conditions (i.e. only in ideally suitable professions). Factor four means a 300% increase in productivity.

Return on investment

We do not even want to try to make a quantitative statement about the return on investment for advanced speed reading. Too many highly scattered parameters play a role. Different professions benefit to varying degrees from advanced speed reading. It varies greatly from participant to participant how the high cost of the training should be converted into hours, etc. My guess is that the return on investment is significantly lower for advanced speed reading than for basic speed reading. The low success rate (only 50% of participants learn it) must also be taken into account.[5]

In the medium term, e.g. over five years, advanced speed reading is probably mainly worthwhile for professional "frequent readers," especially if they are self-employed and benefit most from the higher productivity. Calculated over a lifetime, the number of people for whom the training is worthwhile is naturally much higher.

There are, however, people who simply say: "I am annoyed that others can do something I can't!" This was one of my personal reasons for

4 *269 Wpm start value * 96% comprehension = 258 Wpm effective reading rate (page 45)*

5 *One thing that should also be taken into account when considering the return on investment: If you read books too quickly, you have to buy more of them!*

learning advanced speed reading. With this attitude, there is no need to worry about the return on investment. One simply indulges in a "luxury good," not a material one, but an ideal one in the field of reading.

Sustainability

Basic speed reading

The long-term benefit estimation with basic speed reading trusts that the higher rauding rate can be maintained over years, either "by itself" or with a few refresher exercises. Over the course of a few months, the training of basic speed reading seems to be sustainable. This can be deduced from the data of the participants who took a break of several months during the training and then resumed the exercises. After the break, these participants were as fast as before the break.[6]

For a period of several years, I only know the data of one person: myself. In 2002, I could increase my reading rate from 233 to about 450 wpm. In 2013, my (normal) reading rate was only about 400 wpm. It is possible that the decrease in speed started in 2006, when advanced speed reading worked for me for the first time. From then on, I had no reason to read normally quickly, because I could "switch" to advanced speed reading at any time. Roughly speaking, my rauding rate decreased by about 7 wpm per year. A value of this magnitude is so low that it may be possible to make up for it with a 10-minute refresher exercise per year.[7]

My guess is that typical participants don't need any explicit refresher exercises to keep up their reading rates. It should suffice if, during the year, a small fraction of the reading material is read at the maximum rate learned, for example due to time pressure or because the text is rather unimportant and the desire exists to "read it away" quickly. These would be implicit refresher exercises that are likely to be as effective as explicit, consciously conducted refresher exercises.

Advanced speed reading

The situation is more confusing for advanced speed reading. For basic speed reading the worst case is that the maximum rate decreases slightly over the years, while for advanced speed reading you can unlearn it. More specifically, there is a danger that once the breakthrough is achieved, too little is done to integrate the newly-learned ability into everyday reading life.

At the beginning, it takes a certain amount of effort to switch to the mode of purely visual reading, because normal reading feels more comfortable. It took me about three years until I automatically got into the

6 *For example PN24 (page 178), PN26 (page 180), PN33 (page 190) and PN39 (page 194)*

7 *Cf. page 47, speed increase of 64 Wpm per exercise hour*

advanced speed reading of difficult texts without needing to motivate myself internally. The longer one does not practice advanced speed reading in the months after the breakthrough, the more difficult it is to switch to the purely visual mode. In extreme cases it is no longer possible, and one would have to repeat some training in order to have the ability again.

The normal case should be that after the breakthrough, purely visual reading is used regularly and thus becomes part of everyday reading. The ability will even improve over the first few years as you become more proficient (comparable to learning to read normally in school). Later in life, when the eyes become weaker, the maximum achievable rate will decrease, because the visual system is the deciding factor in advanced speed reading.[8]

Risks and side effects

The risks and side effects of speed reading are generally manageable, so long as you know about them. The most serious is the risk of reading and speech disorders that can occur when learning advanced speed reading. We will discuss this risk in detail, and then discuss some further risks and side effects for the sake of completeness.

Reading and speech disorders

The effect of reading disorders was mentioned by R. and W. U. Michelmann (1995, p. 22, 173, 185–188). So far, I have not seen any other guidebooks or scientific publications that point this out.[9] R. and W. U. Michelmann not only made the first mention of the effect, but the first description of an effective countermeasure: "fostering the sound mechanics" by reading texts out loud, for example, for ten minutes.[10]

Reading and/or speech disorders

While R. and W. U. Michelmann still speak of "reading disorders," I now refer to the effect as "reading and speech disorders" or "reading and/or speech disorders," because so far only speech disorders have occurred among my participants in the training of the advanced speed reading (which could easily have developed into reading disorders if they had not been recognized in time).

8 *See also the report by natural speed reader R. C. on page 110.*
9 *In 2003, this was another indicator to me that R. and W. U. Michelmann probably had the most knowledge about speed reading. I also joined their association "Deutsche Gesellschaft für berufliches Lesen" (the German Society for Professional Reading), and in 2005 I learned purely visual speed reading with R. and W. U. Michelmann.*
10 *R. and W. U. Michelmann (1995, p. 173, 189)*

R. and W. U. Michelmann detail two cases, one of which concerns the author Rotraut Michelmann herself: "[She] did not have a good opinion of reading courses at that time, because one of them had caused her reading disorders." "She was always slipping in the lines." "She had interrupted her medical studies, had to slowly approach trouble-free reading with comics, and had to work her way back up to the technical literature."[11]

Another example given by R. and W. U. Michelmann is that of Mr C., who had tried for half a year (with a metronome) to stop subvocalizing in order to read more quickly. He often fell asleep while reading at his desk, and was caught by his boss once doing so. Common explanations like tiredness or health problems did not apply (this may not be a typical case for reading disorders, if one wants to call it "reading disorder" at all).

Reading aloud as a diagnostic measure

Warned of these and similar verbally transmitted incidents, the participants in the advanced speed reading documented from page 211 paid attention to the first signs of problems. As a diagnostic measure, they read a text aloud for one minute after the exercise, and checked whether everything was functioning unchanged or whether speaking was "sloppier," "more uncontrolled" or faster than usual.

Reading aloud as a corrective exercise

If reading or speech disorders occur, participants should read a text aloud for about five to ten minutes in order to maintain the "sound mechanics of conventional reading" (using the terminology of R. and W. U. Michelmann). Like R. and W. U. Michelmann, we assumed that it was important to read the text aloud, because not only reading but speaking too must be cultivated.

One quarter of participants affected

Five of the 21 participants experienced speech disorders of one kind or another during the training. The fact that they did not report reading disorders was probably only because the speech disorders were recognized too quickly and could not develop into reading disorders. Here are the reports by the participants:

Participant PN07, training day 16: The participant spoke "more sloppily" on the phone. (I noticed this as his teacher, not the participant himself). The problem was likely solved after a few days with corrective exercises, because the records do not contain any entries to the contrary.

Participant PN08, training day 38: "I have the feeling that I am speaking a little more quickly and more 'uncontrolled' than normal. I wouldn't call it stuttering yet". The problem could be solved after about three days with corrective exercises, and did not occur afterwards.

11 *Translated by P. Roesler.*

Participant PN12, training day 8: "I speak more quickly and chaotically. When I practice in the evening, it is sometimes difficult for me to express myself orally the next morning." The problem was to a certain extent manageable with 10 to 15 minutes of corrective exercises, but for at least five weeks the effect still occurred after practice sessions.

Participant PN14, around training day 31: "I think I have spoken indistinctly sometimes over the last few days. People have sometimes asked questions. That's why I've been doing corrective exercises and reading aloud longer."

Participant PN19, training day 29: "In several conversations today, I have noticed that I speak very quickly and sometimes unclearly. The people I talk to keep asking me what I have said." On training day 38: "I was at a trade fair and they pointed out to me that I spoke very quickly".

Unavoidable risk in learning advanced speed reading?

From these experiences, the following assumptions can be made: Even if the advanced speed reading is practiced according to the right method, reading and speech disorders can occur. It's likely that only basic speed reading participants will be spared.

Short "incubation period"?

The "incubation period" seems to be short. With close self-observation, any reading and speech disorders that occur can probably be detected within two to three days and can be remedied immediately through corrective exercises, so they aren't set off unnoticed for weeks and then cannot be gotten rid of for weeks. This can only happen if participants and teachers do not know the risk, and therefore do not correctly interpret initial signs.

Other risks and side effects

Orthopedic problems

Because advanced speed reading is trained with the help of finger sweeps, the index finger of the writing hand is exposed to unusual strain. Some participants report cramp in the index finger, pain in the finger and wrist or aching muscles in the arm or index finger. There is also a risk of tendovaginitis (typewriter's cramp). That has not yet happened to my participants, but I remember hearing about such a case during training with R. and W. U. Michelmann.

Speaking more quickly

Let's get down to learning basic speed reading. If you can read normally more quickly than before the training, you can also speak more quickly, as we reasoned on page 135. It would be an undesirable side effect if a participant actually spoke more quickly in everyday life or at work (unless, perhaps, they were an auctioneer at a livestock auction. Then, they could recite the offered sums of money more quickly!). In many professions, speaking quickly is a sign of a lack of confidence.

Speaking slowly and with a slightly deeper voice is recommended when making important statements.[12]

The 16 participants in the training for basic speed reading did not speak more quickly. However, the danger is not purely hypothetical, as I can report from my own experience. In the months after the first speed reading course I attended, in June 2002, someone who had not seen me for a few weeks or months told me that I was speaking more quickly than before.

Feeling "rushed"

This course had another undesirable side effect which, like "speaking faster," lasted for months. I often felt a little rushed when reading. I could hardly read without saying to myself "read faster, read faster." Because this effect was not reported by any of the 37 participants in basic or advanced speed reading, I at least partially blamed the problem on the training format of the course, which used many of the exercises criticized in the chapter "Myths and Half-Truths."

Ease of work, or work intensification?

The last risk to be mentioned here concerns both basic and advanced speed reading, and was alluded to at the beginning of this chapter. Because time is saved, one could actually create the space for rest breaks in stressful everyday work by using speed reading. The question is, which speed reader really does this? The danger is that one uses the time saved 100% productively, and thus has a more strenuous job than before.

In my opinion, the last question discussed largely determines whether speed reading makes sense for a person or not. For me, it was right to learn to speed read, and it turned out to be as useful as learning the ten-finger system on the keyboard. However, there have been enough people in recent years who have refused the free offer to be able to learn to speed read as a test candidate. I have always regarded this attitude as a perfectly sensible life decision. My respect for these people has not diminished in any way. Quite the opposite, in fact.

It works without speed reading

That one can accomplish great intellectual achievements and create important and extensive works without speed reading is demonstrated by countless productive scientists and writers. Most of them do not know how to speed read. A prominent example was Charles Darwin, the founder of modern evolutionary theory. If we believe Carroll (1970, p. 8), Darwin was a very slow reader—so slow that it became a joke among his associates.

12 Source: psychological regulars' table knowledge

Miscellaneous

In this chapter, we will deal with the brain areas active in speed reading, with different writing systems and languages and with possibilities to further accelerate speed reading. What these topics have in common is that we still know very little about them, and our statements are often only assumptions. Therefore, we will speculate a lot in this chapter.

Brain areas

We haven't said much so far about the brain areas that are active in normal reading and advanced speed reading. There was only general talk of the "language areas," which allow inner speech up to a rate of 600 Wpm, and are much less active in advanced speed reading than in normal reading.

Dehaene (2009, p. 63) has a very interesting diagram showing which brain areas are active in normal reading.[1] He compares this new and differentiated model with the decades-old neurological model of reading. The old model looked at Wernicke's area (for the auditory images of words) and Broca's area (for the motor images of words), which, together with the visual center, are almost completely responsible for reading. The new model is much more complex, and involves more than ten different brain areas. These areas can be grouped according to their task: one is responsible for visual inputs, one for the visual form of words ("the brain's letterbox"), several for the access to meaning, several for the access to pronunciation and articulation, and one for top-down attention and serial reading. According to Dehaene (2009, p. 64/65), even this new model must be viewed as provisional, because many areas and connections are still unknown.

This should not prevent us from making at least some initial assumptions about the brain areas active in speed reading. We will differentiate between the speed reading types "advanced speed reading," "basic speed reading" and "reading management."

Advanced speed reading

According to the observations of purely visual speed readers, inner speech is omitted, ideally completely, during advanced speed reading. Some purely visual speed readers report that they still articulate internally a few words per page, perhaps three to five words.

1 *Also available on the Internet: http://readinginthebrain.pagesperso-orange.fr/figures.htm, Figure 2.2 (accessed on: Nov 5th, 2015)*

For Japanese speed readers, there is a study by Fujimaki et al. (2004) that supports these self-observations. Four speed readers and four normal readers were examined using functional magnetic resonance imaging (fMRI). The subjects read at a normal reading rate (a few words per second) or at speed reading rates of 10 to 100 words per second, depending on the test conditions. We can indirectly conclude from the information in the publication that the four speed readers mastered advanced speed reading. The three slowest of the four speed readers understood the novel to be read, and the fastest subject had difficulties with a detailed summary, but stated that they had understood the plot.

The activity in Wernicke's and Broca's areas of the speed readers actually decreased. If the speed readers read normally however, their brain activities did not differ from those of normal readers. From this point of view everything is as expected, and we have found the corresponding neuronal counterpart for learning goal A (omit subvocalization).

However, learning goal B (grasp meaning purely visually) has not yet been explained neurologically. Although some participants are able to suppress subvocalization, they are not yet able to grasp meaning purely visually. This difference in successful participants must be reflected somewhere in the brain, for example through a lack of activity in a brain region that forms a kind of "bypass road" around the language areas. This neuronal difference is not yet localized. We consider this the most interesting research task in the "neurology of speed reading."

For learning advanced speed reading, it is plausible from the above that something must also change in the "wiring" of the brain areas, and it is not done with the areal-internal down-regulation of activities.

Basic speed reading

As far as basic speed reading is concerned, it is not to be expected that anything will have to change in the "wiring" of the brain. It can be assumed that the language areas show more activity at 450 wpm than at 250 wpm, for example. According to Fujimaki et al. (2004, p. 241), there are already studies[2] that support this expectation: The activity in Wernicke's and Broca's areas increases as the speed of normal reading increases.

Reading management

For reading management, there have certainly not yet been any investigations with imaging methods (fMRI etc.). This would not be advisable either, because in my opinion there is little likelihood of anything useful coming from it. "Metacognitive strategies" such as reading management are probably performed individually in such different ways that similarities in the brain's activity patterns would be difficult to detect.

2 *Price et al. (1996), Wise et al. (1999), Shergill et al. (2002)*

Neurofeedback

These considerations are not only of purely theoretical interest. They provide information on how the training of advanced speed reading could be supported by machines, for example by neurofeedback (a method with which the subjects can regulate their own brain activity). Niels Birbaumer, a psychologist at the University of Tübingen (Germany) and expert in this field, gave an initial assessment at a conference of the German Society for Speed Reading in 2011. The task regarding advanced speed reading is formulated concretely enough, and is basically within the same framework as other questions on neurofeedback. There is a lot to suggest that a research project with a usual duration of 3 to 4 years in this field could produce useful results. The number of subjects required to have mastered purely visual speed reading should be set at "15 to 20, instead of only 5."[3]

In order to support learning goal A (omit subvocalization) mechanically, it is probably not absolutely necessary to measure the brain activities of the participants. If inner speech is also associated with muscle movements in the larynx region (for which there is good evidence), this can be detected very easily with an electromyogram (EMG). For this, only electrodes have to be attached in the neck area.[4]

Stroke

We would like to briefly mention two other topics that are directly or indirectly related to brain areas. One concerns strokes. If a person has mastered both normal reading and purely visual speed reading, they have acquired a certain neuronal redundancy for the ability to read. This can be an advantage if brain damage occurs, for example, as the result of a stroke. If the stroke affects a brain area that is only necessary for one of the two types of reading, at least the other type of reading still works. Corresponding internet reports can be regarded as quite credible.

Dyslexia

The second issue concerns dyslexia. Our impression is that some of the children diagnosed with dyslexia have difficulty with the "articulation part" of reading. For some of these children, it might be easier to learn purely visual (speed) reading than normal reading. We have also dealt with the case of a person suspected of having dyslexia who had mastered

3 This is a number that the German Society for Speed Reading cannot currently (2016) provide. The invitation to purely visual speed readers to get in touch (page 117) is therefore repeated here.

4 From this, a new training format for advanced speed reading could perhaps be developed, completely independent of the Wood/Michelmann tradition. With feedback from the electromyogram, the inner voice is "scared away" (learning goal A) and it is possible to see whether learning goal B is reached (grasp meaning purely visually). If so, the breakthrough for visual line reading would be achieved. In my experience, the second step (learning two-dimensional speed reading) is then no longer a problem, and most participants should succeed without having to learn the finger sweeps.

purely visual speed reading and had difficulty reading slowly (that is problematic in schools, for example, for thought-intensive exam tasks). There is therefore a certain overlap between "speed reading" and "dyslexia."

Writing systems and languages

In this book, we have covered reading and speed reading of English and German texts. Both languages use the same alphabetical writing system: the Latin system. This does not automatically guarantee that the achievable speed reading rates in terms of Wpm are the same in both languages. In the following, we will discuss this issue and try to draw conclusions for other languages and writing systems (although we still lack the empirical data).

Basic speed reading

On page 15 we noted that, according to Carver, the maximum rauding rate is 600 Wpm. Normal reading or basic speed reading cannot take place faster than 600 Wpm, at least for English texts.

In order to be able to make statements for other languages, we must first question the unit "Wpm." "Wpm" means "standard length words per minute," where a standard length word is defined as 6 letter spaces (page 11). A "letter space" is initially only an "optical" or "visual" condition. For the rauding rate, i.e. the tempo of inner speech, it would be more obvious to use "phonetic" units such as "syllables per minute" or "phonemes per minute."

For English, Carver specifies the following conversion from Wpm to spm ("syllables per minute"):

Conversion from Wpm to "syllables per minute"

spm = Wpm * 1.66 (for English texts)[1]

1 Carver (1990, p. 10)

This allows us to specify the "English 600 Wpm upper limit" of the rauding rate in "syllables per minute":

Upper limit of rauding rate (language independent?)

Upper limit of rauding rate: 1,000 spm (syllables per minute)[1]

1 Rounded up from 996 = 600 * 1.66

This statement should be much more "language-independent" than the same statement in Wpm, and perhaps applies approximately to all the languages of the world. The argument is based on the fact that the "language areas" in the brain of all humans allow the same maximum speed of speech utterances due to their basic physiological equipment. The current speaking speed may vary in different languages or countries for cultural reasons.[5] However, the maximum speech rate attainable through training (and thus the rauding rate upper limit) would be universal, because it is determined by brain physiology. Whether this thesis can be substantiated remains to be seen. It should also be taken into account that in some languages, the syllables can be more or less complex than those in English. Therefore, it remains a research task to determine the exact numerical value for each language's rauding rate upper limit.

Advanced speed reading

For advanced speed reading, we can only make a very general speculation, because we still lack the empirical data for other writing systems (such as Chinese), and there is no universally-valid upper limit for advanced speed reading (as it constitutes the rauding rate for normal reading).

In advanced speed reading, inner articulation does not play a role. Limiting factors are purely visual conditions, such as visual acuity and other parameters of the human visual system. If a visual speed reader reads without a two-dimensional component, i.e. performs visual line reading, then rates of 700 to 900 wpm are possible (page 36), as we have argued at least for texts in English and German.

That this "visual limit" of 700 to 900 wpm is above the "speech limit" of 600 Wpm does not seem to be a coincidence. It is probably the result of a historical development, namely the result of centuries of improving the fonts commonly used in a language. The visual limit for medieval chancery writings and other hard-to-read old fonts was certainly well below 700 to 900 wpm. There was always a pressure to optimize fonts. Suboptimal fonts were recognizable by statements such as "this font is difficult to read," or "this font is difficult to read in poor lighting or with poor eyesight." This pressure only stops when the visual limit of the common fonts is above the speech limit. This status has now probably been achieved in the Latin writing system, with many easily legible fonts such as Garamond or Times New Roman.

We can thus derive the following, carefully-formulated general assumption for other writing systems: In any writing system that was easy to read from the outset, or that has now been optimized to such an extent that readers consider it easy to read, reading rates on a magnitude similar to those documented for the Latin writing system are possible

5 *Speech rates, according to Pellegrino et al. (2011, p. 544): Mandarin 311 spm, German 358 spm, English 371 spm, Italian 419 spm, French 431 spm, Spanish 469 spm, Japanese 470 spm.*

for purely visual readers. This statement should apply to visual line reading and to two-dimensional speed reading, provided that the typical line lengths in the respective writing system under consideration are not too large (otherwise it is difficult to perform two-dimensional speed reading, see argument on page 101).

Special speed reading fonts

After talking about fonts and writing systems that already exist, we will discuss the next logical step. In order to enable even higher speed reading rates, suitable special writing systems could be developed, i.e. "speed reading fonts." For fast handwriting, stenography (shorthand) was invented. Something very analog can also be imagined for speed reading. We will first talk briefly about stenography, and then about speed reading fonts.

"Stenography" is a generic term for various shorthand systems. Not only are there different shorthand systems for different languages, but sometimes several "competing" shorthand systems were invented for the same language. Modern shorthand systems adopt elements of ordinary handwriting, but also contain abbreviations for frequent syllables and words (so we are dealing with a mixture of letter, syllable and word scripts).

Even in the golden days of stenography, it was learned only by a small part of the population: mainly people who needed it professionally (for example, secretaries).

Let us now turn to speed reading fonts. The developers of speed reading fonts also have the freedom to make use of the large "construction kit" used by all types of writing systems. Elements from letter, syllabary and word scripts can be combined. Speed reading fonts must be optimized in at least two ways. First, you have to make sure that the word symbols are short so that more words fit into a viewing circle. Second, the word symbols should look so different that they can be distinguished even if they are further away from the fixation point. This makes the usable viewing circles as large as possible. Specifying optimal line lengths and optimal line spacing would also be part of designing a speed reading font.

One should have no illusions about the expected spread of such fonts. Speed reading fonts (if anyone takes the trouble to develop them at all) will only be used by a small group of specialists. Nor is it to be expected that books or journals will ever be printed in such a font. The market is simply too small for such a thing. The most obvious application for speed reading fonts would be in computer programs or apps into which normal texts are copied and which then display these texts converted into the speed reading font on-screen.

Tachylexia and tachylexigraphy

Because no one can see into the future, it is unclear whether we have just discussed a nice idea or whether there will ever be speed reading fonts. The appropriate artificial words should nonetheless be mentioned here: Following "dyslexia" for "reading disorder," we propose "tachylexia" for "speed reading" and "tachylexigraphy" for "speed reading font."[6]

The use of two eyes

When it comes to the wish to optimize speed reading, besides better writing systems, another completely different idea should be pursued: the better use of both eyes.

Everything that has been covered in this book so far (including finger sweeps and their corresponding tessellations, two-dimensional vision, etc.) also works "one-eyed." Every speed reader can convince themself of this by covering one eye. Speed reading then works in principle exactly the same as before. When I try it out, my visual acuity feels a little worse than when I read with both eyes. Speed reading feels more tedious, and the reading rate has probably dropped a little (but definitely not to half-speed).

Because most speed readers fixate the left and right eyes on the same text position (as all normal readers do too), they do not exploit the potential which lies in using both eyes. There are purely visual speed readers that do it differently, or have done it.

Kim Peek, who has already been mentioned several times, held a book very close to his face and read the left pages with the left eye and the right pages with the right eye. Another example is Nicole Jekel, the author of a speed reading book for controllers and managers (Jekel, 2013). At a conference of the German Society for Speed Reading in 2014, she described her kind of purely visual speed reading. Her left eye fixates on the left part of the page, and her right eye on the right part of the page. The resulting "viewing circle" is one line wide, and covers about three lines in height. It is to be assumed that some natural speed readers read similarly. The remark of the natural speed reader M. M. on page 111, that when reading newspaper columns the "eyes cannot spread," indicates this.

6 *According to Greek* ταχύς, *tachýs ("fast"),* λέξις, *léxis ("speaking," "expression") and* γράφειν, *gráphein ("writing," "scribing"). Source: Dr Fabian Horn, Department of Greek and Latin Philology, Ludwig Maximilian University of Munich (personal communication, Nov 23rd, 2015).*

Panoramic vision

We are probably dealing here with an effect which is called "panoramic vision" in ophthalmology. The patient has an enlarged binocular visual field due to "squinting outwards." When speed reading, the eyes are not likely to squint outwards, but will probably look parallel into the distance and—this is important—at the same time focus on the level of the text. Initially, "double images" will be seen, until at some point (after days of practice?) panoramic vision is achieved through sensory adjustment processes. Panoramic vision may be undesirable from the point of view of ophthalmology; for speed reading, it would be a method of stretching the "viewing circle" horizontally and being able to cover the type area with fewer fixations. A reading speed up to two times faster would thus, theoretically, be attainable.

Epilogue

THIS BOOK HAS PRESENTED new insights and experience gained over nearly 20 years. At the same time, an attempt was made to bring this knowledge in line with scientific studies published over a period of more than 50 years. In the meantime, we assume that we have understood the speed reading effect, at least fundamentally, in its essential variants.

How uncertain and provisional this knowledge is can be seen in the many restrictive formulations that were necessary ("with this assumption it seems possible," "is it to be expected," "can the following be assumed," etc.). Scientists will not necessarily regret this situation. For many aspects of speed reading, they can be the first to carry out a study.

Every field of knowledge undergoes historical development. Old areas, such as astronomy or chemistry, originally contained a large proportion of "superstition." In the course of scientific progress and the professionalization of the actors, the errors are, ideally, gradually recognized and banished from the field of knowledge. In medicine, as an ancient science, methods are often still used that have never been verified experimentally. "Evidence-based medicine" is trying to tackle this problem. According to its researchers, medical treatment should only be carried out if its effectiveness has been empirically proven.

In our opinion, similar efforts are needed in the field of speed reading. Too many training methods have never been tested experimentally, and are only carried out because they have always been done this way. We urgently need an "evidence-based speed reading methodology." This book should be regarded as a contribution in this direction.

Appendices

Individual Results for Basic Speed Reading

IN THIS APPENDIX, we will document the training progress of the 16 participants who have completed basic speed reading training. We have already presented and discussed the average, minimum and maximum values of the 16 participants on page 45.

The 16 participants recorded comments and observations, usually at the end of a training session, which amounted to about 16 pages. These pages were published in the German version of this book but are not included in this English version, as all the important comments and observations have already been mentioned in the "Training Format for Basic Speed Reading" chapter.

The test conditions were essentially the same for the 16 participants, but did differ in some respects.

Change of text base

The texts for the measurements and exercises were changed from the fourth participant onwards. The first group of participants read texts from an automobile travel report that was of an average difficulty (see page 191). The other participants read texts from a novel that was easy to read (see page 195).

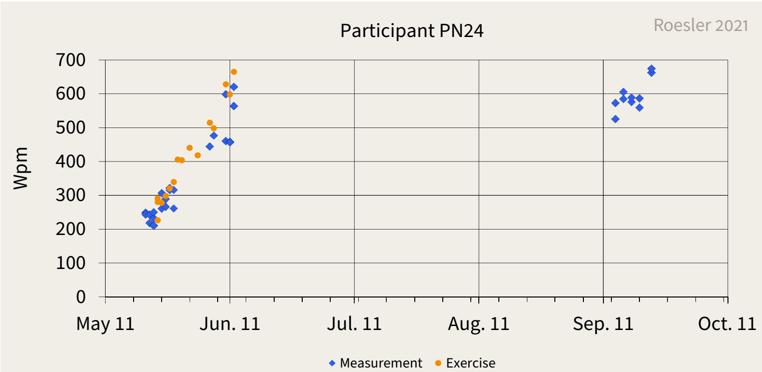
Exercise 1 as a "dry run"

For the first eight of the 16 participants, the first exercise was not adjusted to 20% above the start value (which is quite a reasonable increase for the first exercise), but was carried out as a "dry run," adjusted to 0% above the start value and which should have been carried out without effort. However, the "dry run" proved to be unnecessary and was therefore discontinued.

A general remark regarding the appendix: As with most books, the density of useful information in the appendix is lower than in the previous chapters. For many readers, it might be a better idea to use "reading management" than to read through all of the remaining pages.

Participant PN24

University professor, 47 years old



F19.1
Training progress PN24

Course duration: 4.2 months (including introductory meeting on May 11th 2011)
Core duration: 18 days (from exercise 2 on May 14th 2011 to exercise 14 on May 30th 2011)

	Reading rate	Effective reading rate	Comprehension level
Start value	232 Wpm[1]	–	not recorded
Final value	594 Wpm[2]	–	not recorded
Increase	156% (362 Wpm)	–	

1 Standard deviation 7%, 8 measurements
2 Standard deviation 8%, 10 measurements

T19.1
Training result PN24

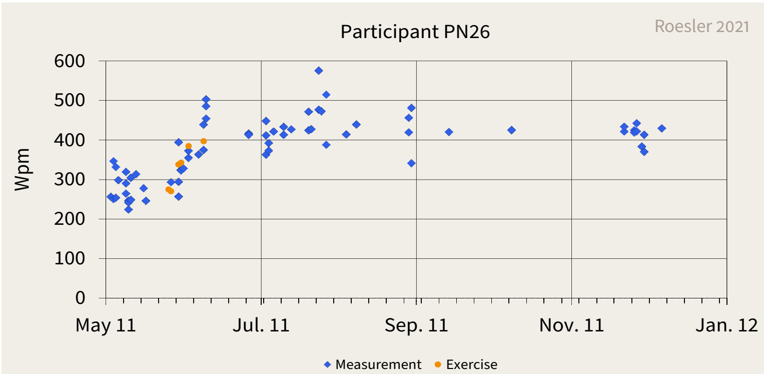
Activity	Time in hh:mm	Comment
Measures	01:10	Average comprehension level: Not recorded
Exercises	04:01	Average comprehension level: Not recorded Exercise time in core duration: 03:40, gradient: 99 Wpm/h
Phone calls	04:03	
Meetings	00:00	
Other	00:00	
Sum	09:14	

T19.2
Time spent by PN24

With 362 Wpm, participant PN24 achieved the highest absolute and with 156% the highest relative speed increase of the 16 participants. The increase in speed within the core duration was, with 99 Wpm per hour, the second highest value of the 16 participants. PN24 had also tried to learn advanced speed reading (see page 250), but did not succeed.

Participant PN26

Research and development manager, graduate engineer, 42 years old



F19.2
Training progress PN26

Course duration: 7.3 months (including introductory meeting on May 3rd 2011)
Core duration: 14 days (from exercise 2 on May 27th 2011 to exercise 6 on Jun 9th 2011)

	Reading rate	Effective reading rate	Comprehension level
Start value	277 Wpm[1]	---	not recorded
Final value	416 Wpm[2]	---	not recorded
Increase	50% (139 Wpm)	---	

1 Standard deviation 13%, 17 measurements
2 Standard deviation 5%, 10 measurements

T19.3
Training result PN26

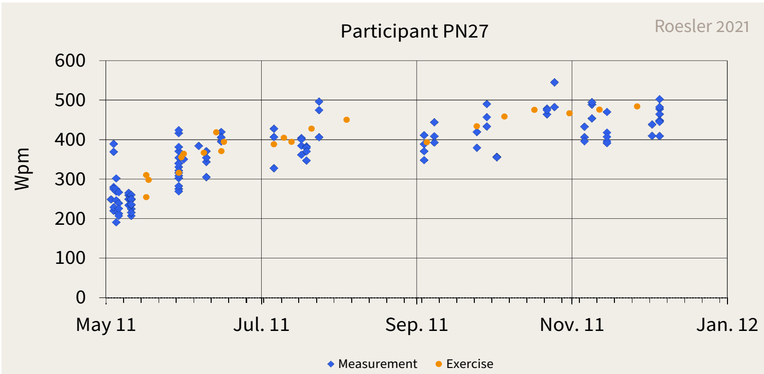
Activity	Time in hh:mm	Comment
Measures	01:13	Average comprehension level: Not recorded
Exercises	02:20	Average comprehension level: 89% Exercise time in core duration: 02:01, gradient: 69 Wpm/h
Phone calls	00:00	
Meetings	01:48	
Other	00:00	
Sum	05:21	

T19.4
Time spent by PN26

Participant PN26 had the shortest core duration of 14 days. However, PN26 ended the training at 416 Wpm somewhat arbitrarily, and it was not tested whether more Wpm could have been achieved with further exercises (without considerable comprehension loss).

Participant PN27

Graduate electrical engineer, 49 years old



F19.3
Training progress PN27

Course duration: 7.3 months (including introductory meeting on May 3rd 2011)
Core duration: 144 days (from exercise 2 on May 17th 2011 to exercise 18 on Oct 7th 2011)

	Reading rate	Effective reading rate	Comprehension level
Start value	253 Wpm[1]	---	not recorded
Final value	452 Wpm[2]	---	not recorded
Increase	79% (199 Wpm)	---	

1 Standard deviation 17%, 30 measurements
2 Standard deviation 7%, 10 measurements

T19.5
Training result PN27

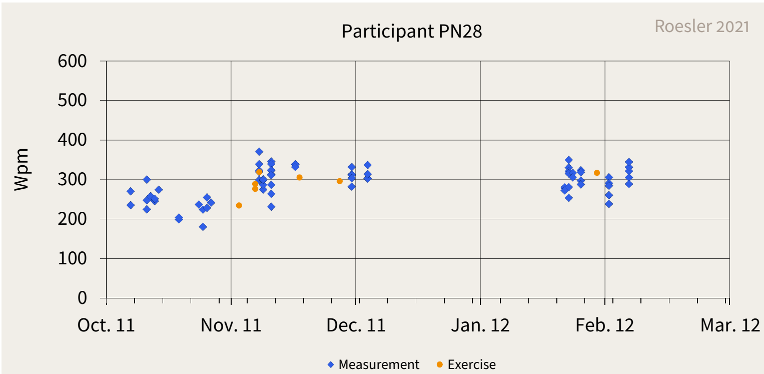
Activity	Time in hh:mm	Comment
Measures	02:24	Average comprehension level: Not recorded
Exercises	07:08	Average comprehension level: 83% Exercise time in core duration: 05:34, gradient: 36 Wpm/h
Phone calls	00:00	
Meetings	01:42	
Other	00:00	
Sum	11:14	

T19.6
Time spent by PN27

Participant PN27 had fairly typical start and final values for his training progress.

Participant PN28

Graduate engineer, 39 years old



F19.4
Training progress PN28

Course duration: 4.1 months (including introductory meeting on Oct 7th 2011)

Core duration: 86 days (from exercise 2 on Nov 7th 2011 to exercise 7 on Jan 31st 2012)[1]

	Reading rate	Effektive reading rate	Comprehension level
Start value	241 Wpm[1]	195 Wpm	81%
Final value	300 Wpm[2]	266 Wpm	89%
Increase	25% (59 Wpm)	36%	

1 Standard deviation 12%, 17 measurements
2 Standard deviation 9%, 25 measurements

T19.7
Training result PN28

Activity	Time in hh:mm	Comment
Measures	01:13	Average comprehension level: 83%
Exercises	01:39	Average comprehension level: 82% Exercise time in core duration: 01:25, gradient: 42 Wpm/h
Phone calls	00:00	
Meetings	01:43	
Other	00:00	
Total	04:35	

T19.8
Time spent by PN28

1 *Exercise 4 on Nov 8th, 2011 was only carried out with 70% comprehension, and can therefore not be regarded as the end of the core duration.*

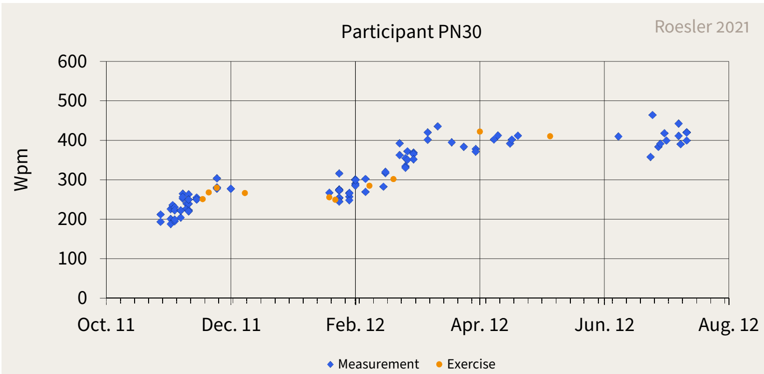
Participant PN28 showed the lowest increase in speed among the 16 participants with 59 Wpm, but did not complete any further exercises to see whether more Wpm would have been possible. ("I'm going to stop the training now, because I don't use the improved speed either professionally or privately.")

The participant noted that he tried as hard with the measurements as he did with the exercises (which was contrary to the instructions for the measurement: "read . . . with minimal effort").

The higher level of comprehension during the final measurements can be partly explained by the fact that they were carried out on the "Elsa" novel and not on the automobile travel report, as with the starting measurements. PN28 is the only participant for whom the text was changed during training.

Participant PN30

Team assistant, 45 years old



F19.5
Training progress PN30

Course duration: 9.5 months (including introductory meeting on Oct 7th 2011)
Core duration: 136 days (from exercise 2 on Nov 21st 2011 to exercise 9 on Apr 4th 2012)

	Reading rate	Effective reading rate	Comprehension level
Start value	245 Wpm[1]	227 Wpm	92%
Final value	408 Wpm[2]	360 Wpm	88%
Increase	66% (163 Wpm)	59%	

1 Standard deviation 6%, 14 measurements
2 Standard deviation 7%, 13 measurements

T19.9
Training result PN30

Activity	Time in hh:mm	Comment
Measures	02:22	Average comprehension level: 91%
Exercises	02:31	Average comprehension level: 92% Exercise time in core duration: 01:52, gradient: 87 Wpm/h
Phone calls	00:00	
Meetings	02:20	
Other	00:09	
Sum	07:22	

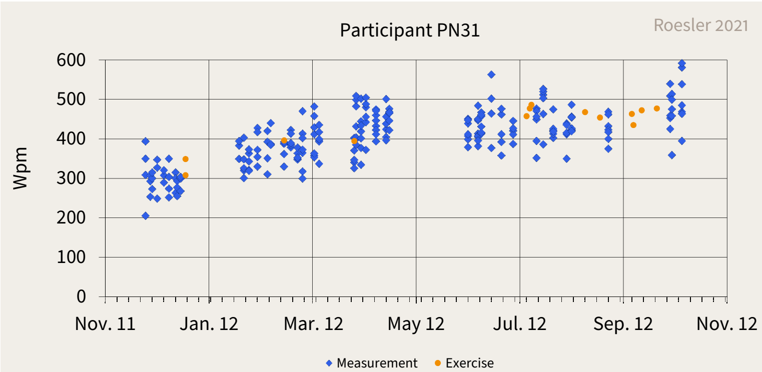
T19.10
Time spent by PN30

Interestingly, participant PN30 achieved her speed increase in two phases. At the beginning of February 2012, it looked as if, at just under 300 Wpm, her personal limit had been reached. This turned out to be only a temporary "plateau level," and no other participant experienced a similar effect.

On Feb 16th 2012, the participant noted that she tried as hard with the measurements as she did with the exercises.

Participant PN31

Project manager, physicist, 39 years old



F19.6
Training progress PN31

Course duration: 10.9 months (including introductory meeting on Nov 25th 2011)
Core duration: 207 days (from exercise 2 on Dec 19th 2011 to exercise 6 on Jul 12th 2012)

	Reading rate	Effective reading rate	Comprehension level
Start value	296 Wpm[1]	279 Wpm	94%
Final value	483 Wpm[2]	459 Wpm	95%
Increase	63%[3] (187 Wpm)	64%	

1 Standard deviation 13%, 29 measurements
2 Standard deviation 13%, 17 measurements
3 In reality probably a little lower, because the final measurements were carried out with considerable effort and the starting measurements were likely not.

T19.11
Training result PN31

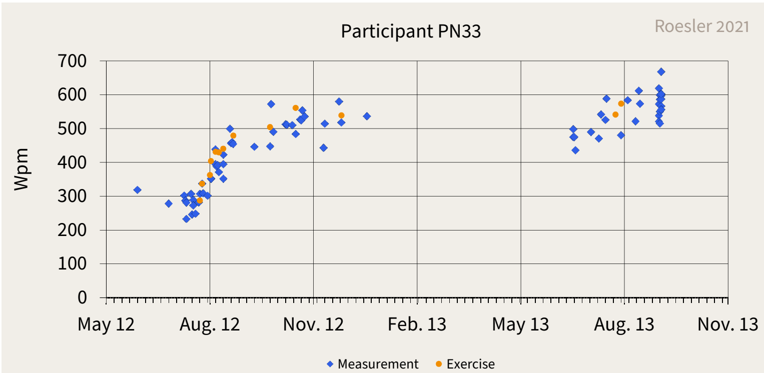
Activity	Time in hh:mm	Comment
Measures	02:26	Average comprehension level: 95%
Exercises	02:09	Average comprehension level: 95% Exercise time in core duration: 00:56, which would result in a gradient of 200 Wpm/h. Since the measurements were also carried out in "effort mode," 01:22 measurement time must be added: gradient 81 Wpm/h.
Phone calls	00:00	
Meetings	01:30	
Other	00:00	
Sum	06:05	

T19.12
Time spent by PN31

Participant PN31 achieved a speed increase not only through the exercises but also likely through the measurements, because these were carried out in “effort mode” (i.e. in exercise mode). Since an exercise consists of 25 individual passages and a measurement consists of a single passage, it can be assumed that 25 blue measurement points in Figure F 19.6 represent the same effectiveness as an orange exercise point.

Participant PN33

Graduate engineer, 45 years old



F19.7
Training progress PN33

Course duration: 10.2 months (including introductory meeting on May 14th 2012, but 6 months deducted for a longer break[2])
Core duration: 87 days (from exercise 1 on Jul 24th 2012 to exercise 10 on Oct 18th 2012)

	Reading rate	Effective reading rate	Comprehension level
Start value	281 Wpm[1]	265 Wpm	94%
Final value	577 Wpm[2]	543 Wpm	94%
Increase	105% (296 Wpm)	105%	

1 Standard deviation 9%, 13 measurements
2 Standard deviation 7%, 16 measurements

T19.13
Training result PN33

Activity	Time in hh:mm	Comment
Measures	01:14	Average comprehension level: 94%
Exercises	02:19	Average comprehension level: 87% Exercise time in core duration: 01:56, gradient: 153 Wpm/h
Phone calls	00:00	
Meetings	01:53	
Other	00:00	
Sum	05:26	

T19.14
Time spent by PN33

2 *This was because of the freelance trainer's absence from the participant's company.*

Participant PN33 found it very easy to practice basic speed reading. He had the highest Wpm gradient in the core duration and a very high final Wpm value. Whether this is an indication that such a participant is also good at learning advanced speed reading or even on the border of purely optical reading was examined a year later (see page 256). PN33 then learned advanced speed reading, but the time required for it was within a typical range.

Addendum to page 177, "Change of text base"

A typical passage from the "automobile travel report,"[1] which is of an average difficulty[2] (translated here into English):

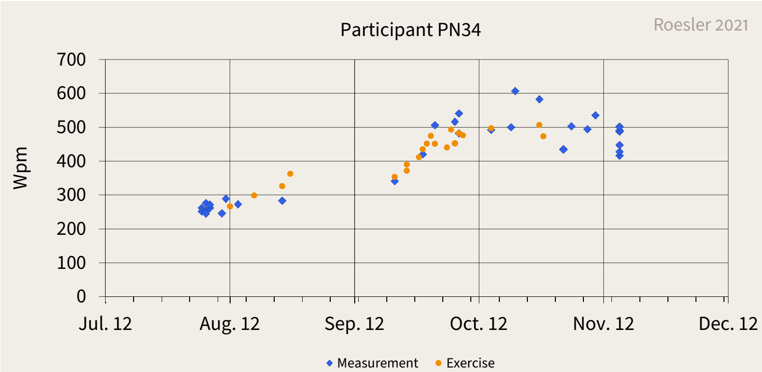
> I was almost more enchanted by the bronzes. To the one who knows them, one need only mention the names, and the memory of great happiness will rise before them; to the one who does not know them, no description serves. And so I mention only that which spoke to me most strongly: the Herculean dancers, the resting Mercury, the bearded Dionys. As with all large museums, the wealth from treasures piled high is a hindrance to enjoyment. For those who want to make a study, these giant collections are very convenient. For those who only want to indulge in the pleasure of beauty, small collections are much more pleasant. It is unfortunately the case that one wants to see as much as possible, and so many things are tempting that one loses one's sense of calm contemplation in front of the individual exhibit.

1 *Bierbaum, O. J. (1903). Eine empfindsame Reise im Automobil von Berlin nach Sorrent und zurück an den Rhein [A sentimental journey by automobile: From Berlin to Sorrento and back to the Rhine].*
A total of 511 text passages were taken from this, average length 133 W (standard length words), minimum length 117 W, maximum length 180 W, standard deviation 13.3 W, shown in the training Excel file in Arial 10

2 *Flesch value 48 (for the German text), the readability is thus "average (secondary school, vocational school)," as determined by www.leichtlesbar.ch (accessed on: Jan 10th, 2015)*

Participant PN34

Technical profession, age not disclosed



F19.8
Training progress PN34

Course duration: 5.9 months (including introductory meeting on May 14th 2012)
Core duration: 56 days (from exercise 1 on Aug 1st 2012 to exercise 14 on Sep 25th 2012)

	Reading rate	Effective reading rate	Comprehension level
Start value	262 Wpm[1]	249 Wpm	95%
Final value	473 Wpm[2]	449 Wpm	95%
Increase	81% (211 Wpm)	81%	

1 Standard deviation 6%, 9 measurements
2 Standard deviation 8%, 12 measurements

T19.15
Training result PN34

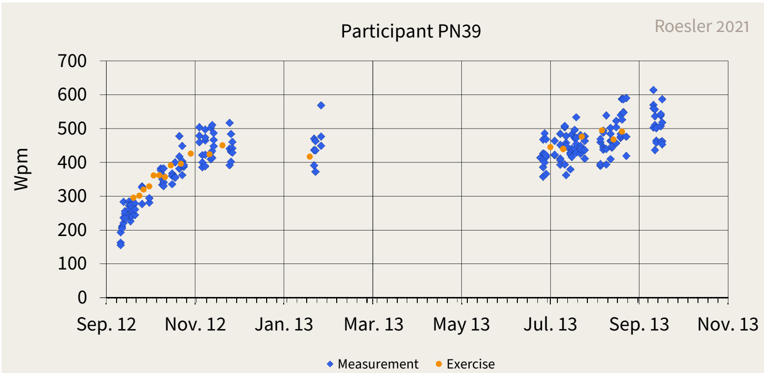
Activity	Time in hh:mm	Comment
Measures	00:36	Average comprehension level: 94%
Exercises	03:39	Average comprehension level: 92% Exercise time in core duration: 02:45, gradient: 77 Wpm/h
Phone calls	00:00	
Meetings	00:56	
Other	00:00	
Sum	05:11	

T19.16
Time spent by PN34

PN34 had fairly typical start and final values for his training progress.

Participant PN39

Graduate physicist, 46 years old



F19.9
Training progress PN39

Course duration: 7.3 months (including introductory meeting on Aug 22nd 2012, but 6 months deducted for longer breaks)
Core duration: 148 days (from exercise 1 on Sep 20th 2012 to exercise 17 on Aug 13th 2013, longer breaks deducted)

	Reading rate	Effective reading rate	Comprehension level
Start value	254 Wpm[1]	237 Wpm	93%
Final value	502 Wpm[2]	477 Wpm	95%
Increase	95% (248 Wpm)	101%	

1 Standard deviation 8%, 6 measurements
2 Standard deviation 9%, 16 measurements

T19.17
Training result PN39

Activity	Time in hh:mm	Comment
Measures	03:14	Average comprehension level: 95%
Exercises	05:18	Average comprehension level: 95% Exercise time in core duration: 04:50, gradient: 51 Wpm/h
Phone calls	00:03	
Meetings	01:09	
Other	00:00	
Sum	09:44	

T19.18
Time spent by PN39

Participant PN39 reached a fairly high final value of 502 Wpm and is now among the fastest 2% of readers (see Table T 2.2 on page 12).

Addendum to page 177, "Change of text base"

A typical passage from the "Elsa" novel,[1] which is easy to read[2] (translated here into English):

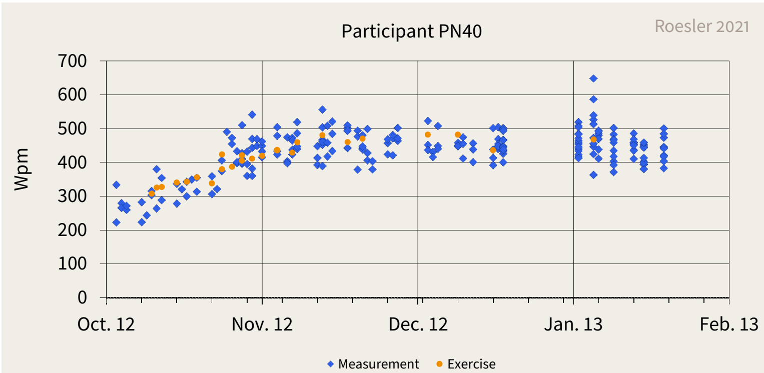
> But we did that immediately. All I need now is the opener for the can of milk and then and then I'm gonna fix this thing, but to avoid stress I'll wait until the air is clear and mum gets my brother and sister out of the tub. Finally, voices and splashing around in the bathroom. Now get on with it, it's pretty hard going. We've done it! Great, now at least my waist is really looking good! I'll be the prettiest one by far. Actually, I could spice everything up with granny's cream from the red pot. Everyone used to laugh when I used it, but now I know the right amount to use so that I look fresh and rosy afterwards.

1 *Steiner, L. (2006). ELSA – ein Sonntagskind [ELSA—A Sunday child]. A total of 513 text passages were taken from this, average length 127 W, minimum length 116 W, maximum length 170 W, standard deviation 7.9 W, shown in the training Excel file in Arial 10.*

2 *Flesch value 65 (for the German text), the difficulty is thus "easy (graduating class)," as determined by www.leichtlesbar.ch (accessed on: Jan 10th, 2015)*

Participant PN40

Medical student, 26 years old



F19.10
Training progress PN40

Course duration: 4.7 months (including introductory phone call on Oct 3rd 2012)
Core duration: 35 days (from exercise 1 on Oct 10th 2012 to exercise 18 on Nov 13th 2012)

	Reading rate	Effective reading rate	Comprehension level
Start value	256 Wpm[1]	253 Wpm	99%
Final value	449 Wpm[2]	449 Wpm	100%
Increase	75% (193 Wpm)	77%	

1 Standard deviation 9%, 9 measurements
2 Standard deviation 11%, 73 measurements

T19.19
Training result PN40

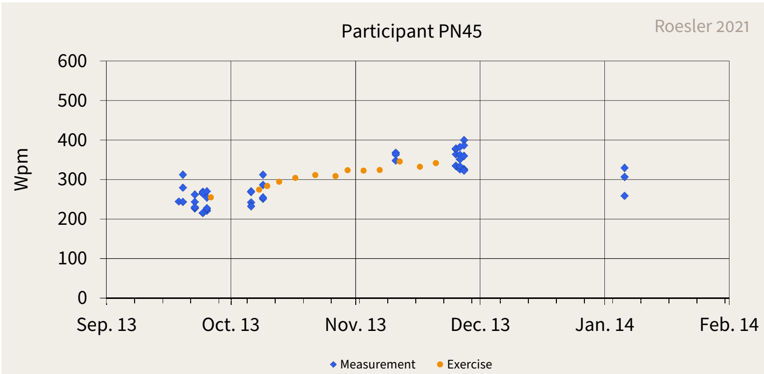
Activity	Time in hh:mm	Comment
Measures	03:11	Average comprehension level: 99.9%
Exercises	05:16	Average comprehension level: 98.9% Exercise time in core duration: 04:14, gradient: 46 Wpm/h
Phone calls	06:57	
Meetings	00:00	
Other	00:00	
Sum	15:24	

T19.20
Time spent by PN40

Participant PN40 had fairly typical start and final values for her training progress.

Participant PN45

Software developer, 38 years old



F19.11
Training progress PN45

Course duration: 3.7 months (including introductory meeting on Sep 19th 2013)
Core duration: 35 days (from exercise 1 on Sep 27th 2013 to exercise 11 on Nov 13th 2013)

	Reading rate	Effective reading rate	Comprehension level
Start value	242 Wpm[1]	242 Wpm	100%
Final value	356 Wpm[2]	348 Wpm	98%
Increase	47% (114 Wpm)	44%	

1 Standard deviation 9%, 18 measurements
2 Standard deviation 7%, 15 measurements

T19.21
Training result PN45

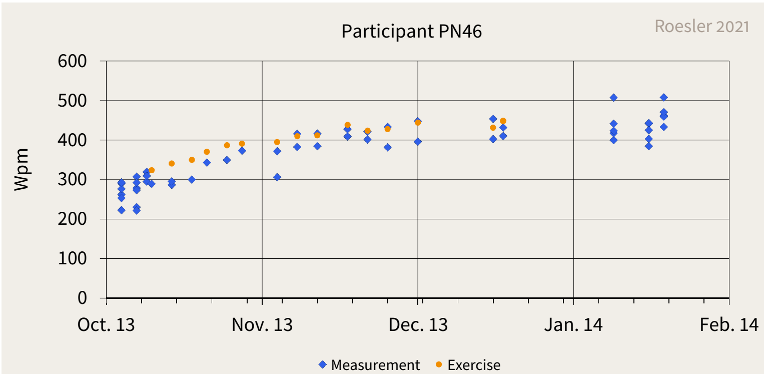
Activity	Time in hh:mm	Comment
Measures	00:49	Average comprehension level: 98.6%
Exercises	04:47	Average comprehension level: 99.4% Exercise time in core duration: 04:08, gradient: 28 Wpm/h
Phone calls	00:07	
Meetings	01:12	
Other	00:00	
Sum	06:55	

T19.22
Time spent by PN45

The increase in speed achieved by participant PN45 was probably not sustainable, as three measurements in January 2014 suggest. This effect has not yet been noticed with other participants.

Participant PN46

Graduate mechanical engineer, 48 years old



F19.12
Training progress PN46

Course duration: 3.8 months (including introductory meeting on Sep 30th 2013)

Core duration: 40 days (from exercise 1 on Oct 10th 2013 to exercise 10 on Nov 18th 2013)

	Reading rate	Effective reading rate	Comprehension level
Start value	275 Wpm[1]	271 Wpm	99%
Final value	441 Wpm[2]	441 Wpm	100%
Increase	61% (166 Wpm)	63%	

1 Standard deviation 11%, 15 measurements
2 Standard deviation 8%, 15 measurements

T19.23
Training result PN46

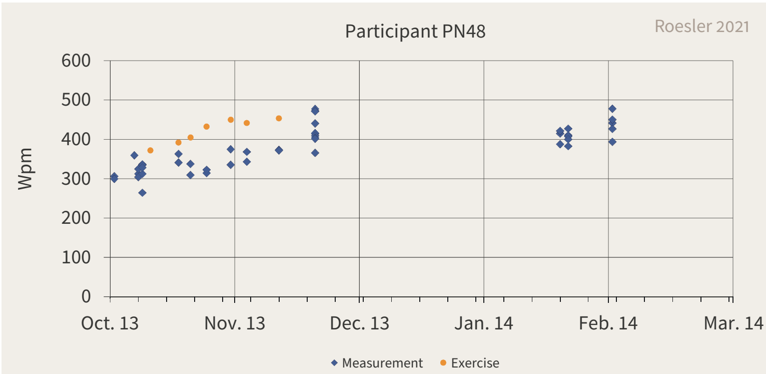
Activity	Time in hh:mm	Comment
Measures	00:50	Average comprehension level: 99.6%
Exercises	02:54	Average comprehension level: 99.3% Exercise time in core duration: 02:08, gradient: 78 Wpm/h
Phone calls	00:00	
Meetings	01:35	
Other	00:00	
Sum	05:19	

T19.24
Time spent by PN46

A good example of ideal training progress is that of Participant PN46. His diagram shows a nice, smooth curve progression, with key parameters which are otherwise average for participants.

Participant PN48

Graduate mechanical engineer, 45 years old



F19.13
Training progress PN48

Course duration: 4.2 months (including introductory meeting on Sep 30th 2013)
Core duration: 21 days (from exercise 1 on Oct 11th 2013 to exercise 5 on Nov 31st 2013)

	Reading rate	Effective reading rate	Comprehension level
Start value	316 Wpm[1]	298 Wpm	94%
Final value	418 Wpm[2]	418 Wpm	100%
Increase	32% (102 Wpm)	40%	

1 Standard deviation 8%, 11 measurements
2 Standard deviation 6%, 13 measurements

T19.25
Training result PN48

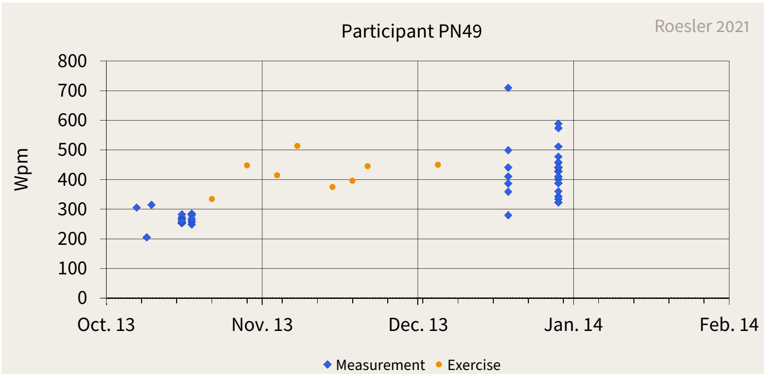
Activity	Time in hh:mm	Comment
Measures	00:31	Average comprehension level: 97%
Exercises	02:29	Average comprehension level: 90% Exercise time in core duration: 01:58, gradient: 52 Wpm/h
Phone calls	00:00	
Meetings	01:19	
Other	00:00	
Sum	04:19	

T19.26
Time spent by PN48

Participant PN48 had practiced only 2:29 h and had a relatively low increase of 32%. Probably it would have made sense to do 2–3 more exercises. My current (2021) strategy is: only when no more increase is observed over the last 5 exercises (and the other key figures such as exercise time etc. are within the usual range), the training is completed.

Participant PN49

Graduate physicist, 57 years old



F19.14
Training progress PN49

Course duration: 2.8 months (including introductory meeting on Oct 7th 2013)

Core duration: 46 days (from exercise 1 on Oct 22nd 2013 to exercise 8 on Dec 6th 2013)

	Reading rate	Effective reading rate	Comprehension level
Start value	268 Wpm[1]	264 Wpm	98%
Final value	434 Wpm[2]	434 Wpm	100%
Increase	62% (166 Wpm)	65%	

1 Standard deviation 9%, 16 measurements
2 Standard deviation 21%(!), 26 measurements

T19.27
Training result PN49

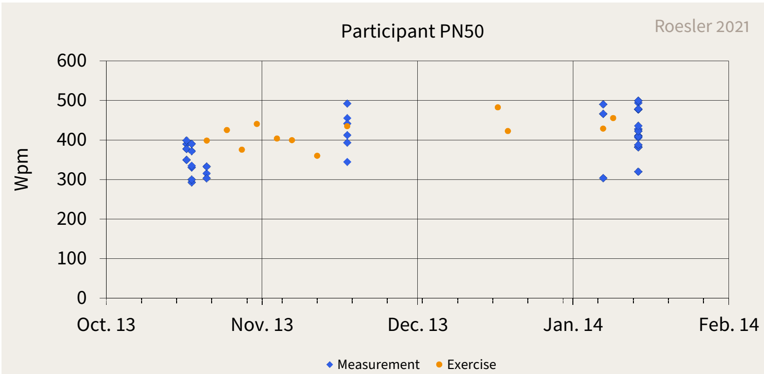
Activity	Time in hh:mm	Comment
Measures	00:35	Average comprehension level: 99.3%
Exercises	02:35	Average comprehension level: 97% Exercise time in core duration: 02:35, gradient: 64 Wpm/h
Phone calls	00:00	
Meetings	01:19	
Other	00:00	
Sum	04:29	

T19.28
Time spent by PN49

Participant PN49 turned out to be a (hitherto unrecognized) natural speed reader. For a more detailed discussion, see the “Observations” section on page 48.

Participant PN50

Graduate computer scientist, 44 years old



F19.15
Training progress PN50

Course duration: 3.0 months (including introductory meeting on Oct 17th 2013)

Core duration: 59 days (from exercise 1 on Oct 21st 2013 to exercise 9 on Dec 18th 2013)

	Reading rate	Effective reading rate	Comprehension level
Start value	345 Wpm[1]	345 Wpm	100%
Final value	427 Wpm[2]	427 Wpm	100%
Increase	24% (82 Wpm)	24%	

1 Standard deviation 11%, 13 measurements
2 Standard deviation 12%, 15 measurements

T19.29
Training result PN50

Activity	Time in hh:mm	Comment
Measures	00:14	Average comprehension level: 99.7%
Exercises	03:04	Average comprehension level: 99.0% Exercise time in core duration: 02:20, gradient: 35 Wpm/h
Phone calls	00:00	
Meetings	01:28	
Other	00:00	
Sum	04:46	

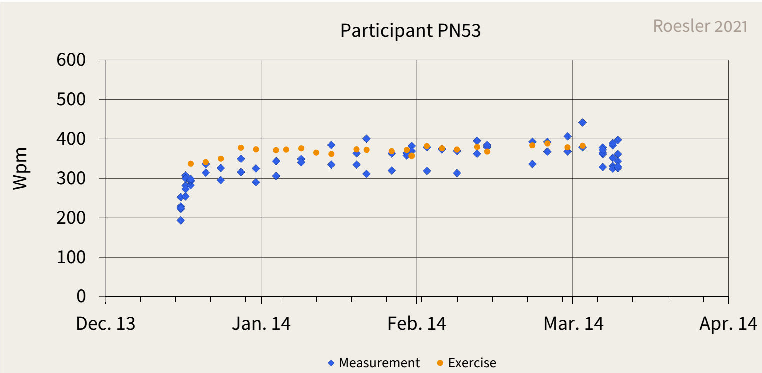
T19.30
Time spent by PN50

With 345 Wpm, participant PN50 was already among the fastest 20% of adult readers before the training (see page 12). It is therefore not surprising that only a low percentage speed increase of 24% was achievable.

Comments from the participant indicate that he could understand some words without subvocalization, and that it might have been very easy for him to learn advanced speed reading. However, this was not tested.

Participant PN53

Medical student, 26 years old



F19.16
Training progress PN53

Course duration: 2.9 months

Core duration: 23 days (from exercise 1 on Dec 18th 2013 to exercise 8 on Jan 9th 2014. Exercise 4 on Dec 28th 2013 was performed with less comprehension and cannot be regarded as the end of the core duration.)

	Reading rate	Effective reading rate	Comprehension level
Start value	267 Wpm[1]	248 Wpm	93%
Final value	356 Wpm[2]	350 Wpm	98%
Increase	34% (89 Wpm)	41%	

1 Standard deviation 13%, 15 measurements
2 Standard deviation 7%, 15 measurements

T19.31
Training result PN53

Activity	Time in hh:mm	Comment
Measures	01:07	Average comprehension level: 96%
Exercises	07:13	Average comprehension level: 96% Exercise time in core duration: 03:15, gradient: 27 Wpm/h
Phone calls	04:17	
Meetings	01:15	
Other	00:00	
Sum	13:52	

T19.32
Time spent by PN53

Participant PN53 had already dealt with the subject of speed reading before the training, and had carried out exercises from conventional speed reading guidebooks. These exercises tempt the reader to fall into skimming. It took participant PN53 some time to unlearn these “bad habits” and to carry out the training as intended, with “comprehension-maintaining speed training”.

Individual Results for Advanced Speed Reading

THIS CHAPTER SHOWS the training progress for the 21 participants who have completed the advanced speed reading training. The structure of the training format was detailed on page 63, and the summarized results for the 21 participants on page 87.

For some participants, the comments and observations were also documented. They were usually recorded at the end of a training session.[1]

Although the test conditions were similar for all 21 participants (format "high-speed training right from the start"), the training varied more than that of the 16 basic speed reading participants. This was partly due to the trainer's learning curve and the gradual introduction of new warm-up exercises (and diagnostic tools), but mainly because the learning progress of the individual participants was very different with advanced speed reading (many individual adjustments to the training format were necessary).

More so than in the documentation for basic speed reading, the data shown below is a summarized version of the raw data. For each training day, only the top value of the comprehension level and the top value of the effective reading rate are shown. In most cases, the rate at which the exercise was performed can be deduced indirectly from both values.[2] However, because both top values did not necessarily come from the same slalom or loop exercise, this cannot be deduced for each case.

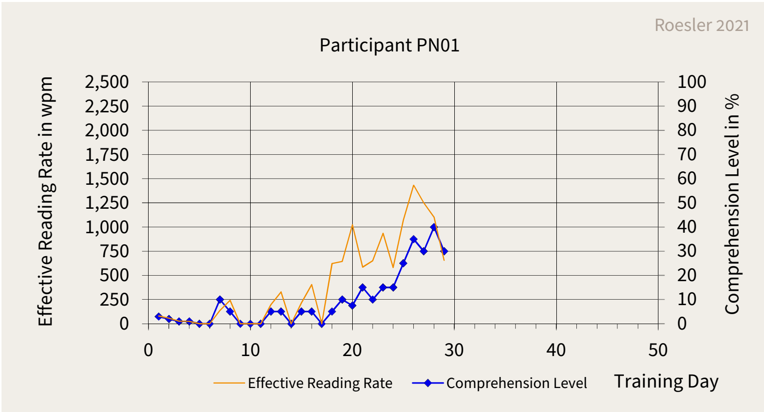
It is not possible to show the remaining raw data, which mostly consists of the following information for each training day: time spent (practicing, phone calls, meetings etc.), type of exercise, type of finger sweep, book number, target rate, target time, time required (thus actual rate), estimated comprehension level (thus effective reading rate).

All speed values are given in the unit wpm (not Wpm), because it would have been too time-consuming to determine the number of standard length words for each of the books used.

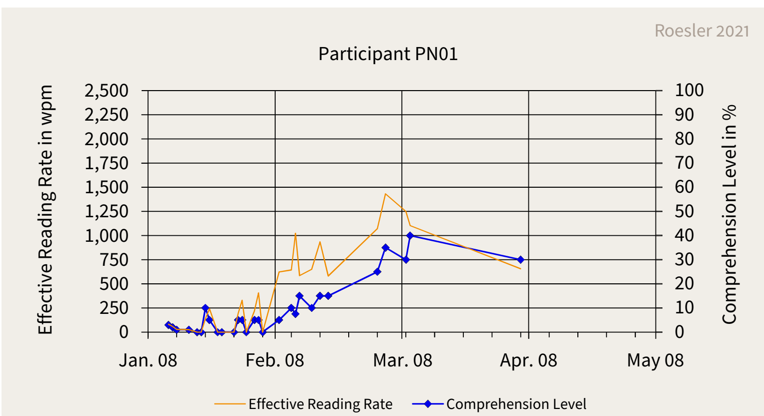
1 *The comments have been shortened, and are approximately 20% of the length of those contained in the first German edition of the book.*
2 *Reading rate = effective reading rate / comprehension level*

Participant PN01

Graduate electrical engineer, 31 years old



F 20.1
Training progress PN01
(by training days)



F 20.2
Training progress PN01
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	29	2.9	5.1	33.3
At “breakthrough”	26[1]	1.8	4.1	28.7

1 *Day 26 was defined as the breakthrough day, because 30% comprehension was achieved with an effective reading rate of over 1,000 wpm.*

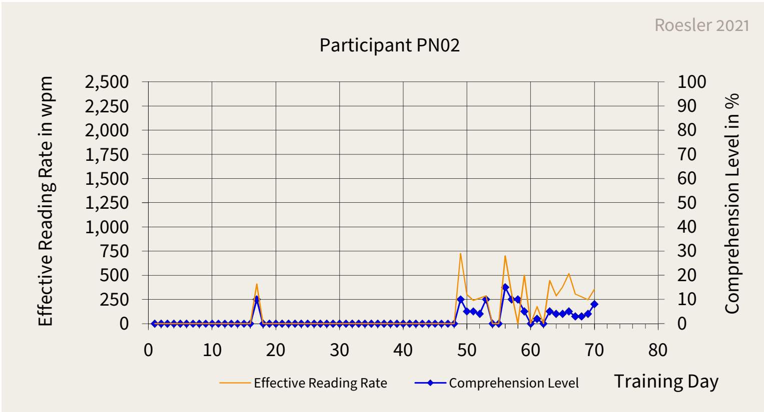
T 20.1
Time spent by PN01

Participant PN01 has mastered advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. The training required very little effort: At the time of the breakthrough, this participant showed the second best value of the seven successful participants for all four recorded parameters (training days, course duration, net practice time and total time spent). Comments from participant PN01 (shortened to about 20% of the original text):

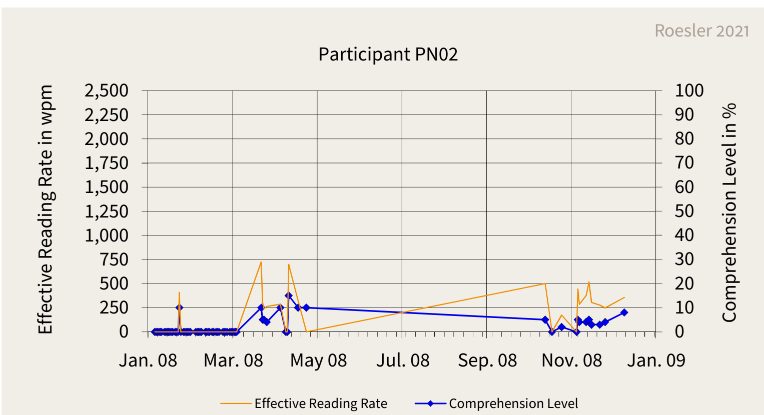
- **Jan 6th, 2008, training day 1.** Single words grasped, 1-3% comprehension.
- **Jan 15th, 2008, training day 7.** 2,400 wpm exercise: some "reading feeling" (but also too slow). What exactly does "reading feeling" mean?
- **Jan 22nd, 2008, training day 11.** Book 1a with 5,000 wpm: I think I can sometimes grasp 2 to 3 words, sometimes two lines.
- **Jan 23rd, 2008, training day 12.** Book 1a: Works well, words and parts of sentences grasped. However, to say that this is "reading feeling" would be an exaggeration.
- **Jan 24th, 2008, training day 13.** Book 1a: grasped sentence fragments, slalom works well.
- **Jan 28th, 2008, training day 16.** Book 7a: I slowly have the feeling that I understand something, maybe an inkling of reading feeling, but mostly in the passages that are too slow.
- **Feb 2nd, 2008, training day 18.** Despite pauses and high speed, understood some words. At 4,800 wpm, good comprehension initially (10%), then a decline.
- **Feb 7th, 2008, training day 21**. 4,800 wpm on book 10b: Reading feeling comes slowly, problem instead seems to be the rapid processing of information in the head.
- **Feb 10th, 2008, training day 22.** 10,000 wpm: Reading feeling comes slowly.
- **Feb 12th, 2008, training day 23.** "Slow" loop works well, loop up to now was probably too fast. Good fixations, I could roughly reproduce chapter content.
- **Apr 1st, 2008, training day 29.** After every 3 minutes of speed reading I took a short break to regain concentration.
- **Jul 1st, 2008.** Just had a newspaper article in my hand, two columns on a letter page; speed reading still works with about 50% text comprehension (it was only one page, therefore not timed).

Participant PN02

Sociology student, 29 years old



F20.3
Training progress PN02
(by training days)



F20.4
Training progress PN02
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	70	11.5	16.6	73.2
At “breakthrough”	–	–	–	–

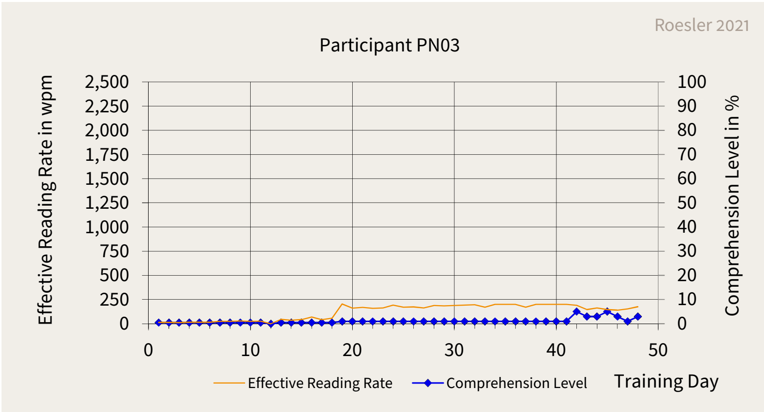
T20.2
Time spent by PN02

Participant PN02 did not master advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. With 16.6 net practice hours, PN02 practiced significantly more than the seven successful participants needed at the time of their breakthroughs (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format (e.g. new functioning warm-up exercises or “additions” to the finger sweep exercises). With PN02, learning goal B (grasp meaning purely visually) and perhaps learning goal A (omit subvocalization) did not work. For Figure F 20.3: From day 49, PN02 in fact did not comprehend more than before, but only changed the evaluation scale.

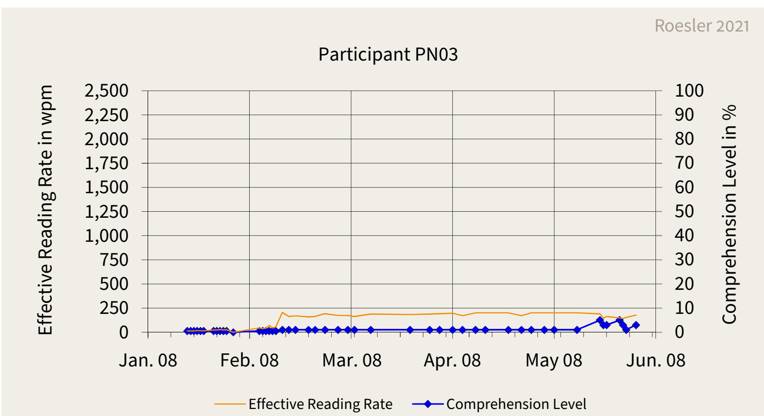
The comments of Participant PN02 were not translated into English, as was the case for all participants without breakthrough.

Participant PN03

Mechanical engineer, 38 years old



F 20.5
Training progress PN03
(by training days)



F 20.6
Training progress PN03
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	48	4.6	12.0	50.5
At “breakthrough”	–	–	–	–

T 20.3
Time spent by PN03

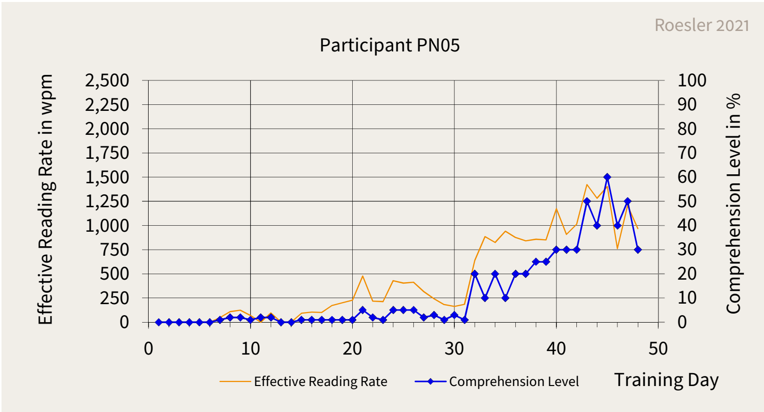
Participant PN03 did not master advanced speed reading. Training was done with swinging finger, at least until day 28. Reading and speech disorders did not occur during training. With 12.0 net practice hours, PN03 practiced at the upper limit of that which the seven successful participants needed at the time of their breakthroughs (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format.

Supplement to page 63, "Notable differences to the original Michelmann training format"

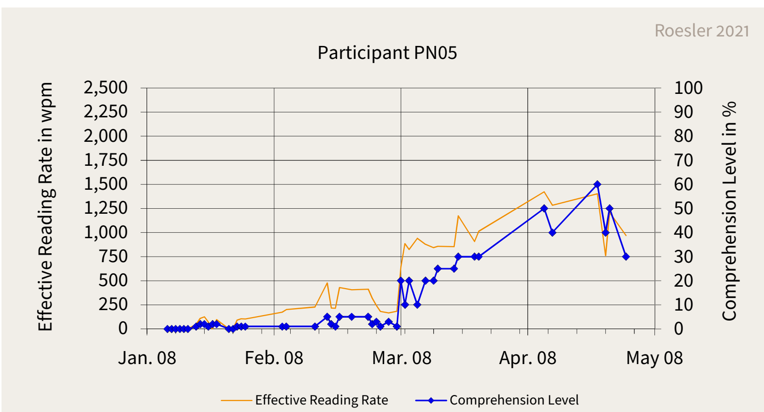
- Recording the progress specifically for each of the four learning goals (A to D). No transition to an application phase if the breakthrough is not achieved.
- Interspersing exercises with 2,400 or 4,800 wpm from the third week onwards, in order to better identify the time of the breakthrough.
- Use of the warm-up exercise "horizontal 8" (preparing for the loop finger sweep used from the third week onwards).
- Analysis of eye movements in addition to the finger sweep analysis.
- Use of webcam and video recordings to evaluate eye movements and finger sweeps.
- Use of comprehension self-assessment (instead of "text images" method and multiple choice questions).
- (From participant PN08) Accessing the speed range below two-dimensional speed reading by practicing visual line reading.

Participant PN05

Graduate computer scientist in medicine, 51 years old



F 20.7
Training progress PN05
(by training days)



F 20.8
Training progress PN05
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	48	3.7	8.2	66.9
At “breakthrough”	40[1]	2.4	6.3	46.6

1 *Day 40 was defined as the breakthrough day, because 30% comprehension was achieved with an effective reading rate of over 1,000 wpm.*

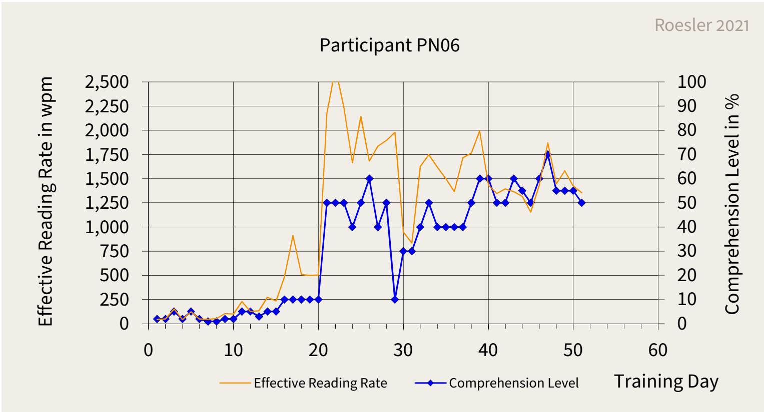
T 20.4
Time spent by PN05

Participant PN05 has mastered advanced speed reading. From day 20 on, PN05 mostly practiced without swinging finger and from day 27 dropped it completely (and is thus the only successful participant "without swinging finger"). Reading and speech disorders did not occur during training. Comments from participant PN05 (shortened to about 25% of the original text):

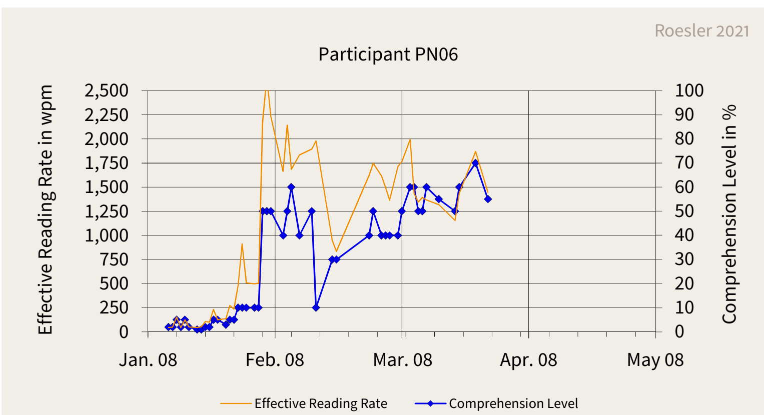
- **Jan 14th, 2008, training day 8.** I am slowly starting to see larger areas clearly.
- **Jan 21st, 2008, training day 13.** Is 10,000 wpm even possible with book 4a (1.1 seconds per page)? The blank pages are annoying. I'm about to throw the book against the wall.
- **Jan 25th, 2008, training day 17.** With exercises 2 and 3, I slowly get a similar impression to rapid page turning.
- **Mar 2nd, 2008, training day 31.** At 20,000 wpm, larger blocks are perceived clearly more often.
- **Mar 3rd, 2008, training day 32.** During the training at 4,800 wpm, I got an impression from the text that was similar to skimming.
- **Mar 4th, 2008, training day 33.** View is widening. At 20,000 wpm I notice more words than usual.
- **Mar 9th, 2008, training day 36.** 10,000 wpm is comparable to very fast skimming: Larger text blocks are clearly recognizable.
- **Mar 17th, 2008, training day 40**. At 4,800 wpm it feels like skimming. For fun, I did the speed reading test on the PC: At approx. 1,000 wpm, I answered 10 out of 11 questions correctly.
- **Mar 31st, 2008, training day 41.** At 4,800 wpm I recognized little at the beginning but more at the end. Feeling like skimming. I perceived the text consciously, but still too little sticks.
- **Apr 4th, 2008, training day 45:** I tried an exercise at 2,400 wpm. Grasped a lot of the storyline. However, too little sticks still. Captured more during the final 20,000 wpm.
- **Apr 22nd, 2008, training day 46.** Quite a lot of concentration problems today. At times I understood nothing at all, at other times I understood 80%.
- **Apr 23rd, 2008, training day 47.** At 2,400 wpm I make less fixations than calculated (20 instead of 27), but I have the impression that I am able to perceive the whole content.

Participant PN06

Computer scientist, 47 years old



F 20.9
Training progress PN06
(by training days)



F 20.10
Training progress PN06
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	51	4.0	11.3	76.1
At "breakthrough"	21[1]	0.8	3.2	32.6

1 *Can be pinpointed to the day*

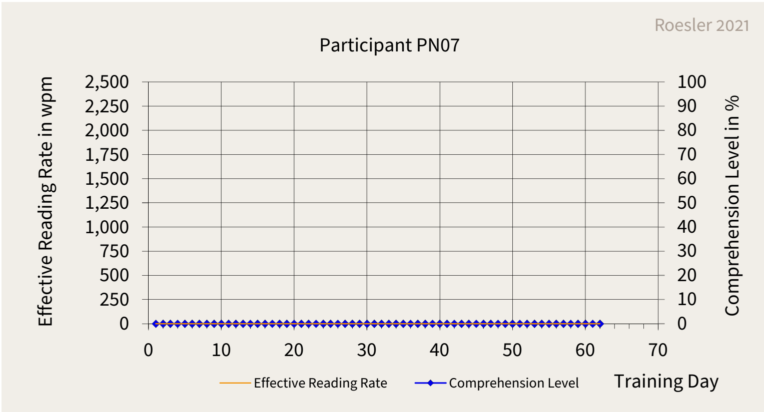
T 20.5
Time spent by PN06

Participant PN06 has mastered advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. At the breakthrough, the number of training days, course duration and net practice time were lower than those of the other six successful participants. PN06 plays a musical instrument and always had to use "two-dimensional vision" when reading notes (several voices in a score). Perhaps this was a decisive factor in the early success of PN06. Comments from participant PN06 (shortened to about 6% of the original text):

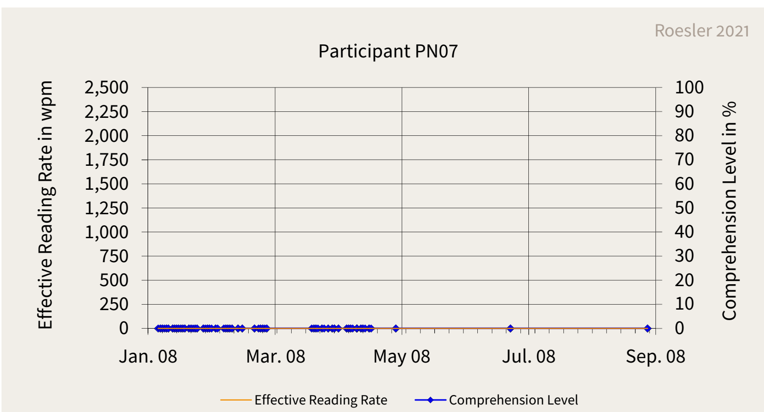
- **Jan 15th, 2008, training day 9.** Basic comprehension of what the text is about (brewing beer, a wedding, etc.).
- **Jan 23rd, 2008, training day 16.** I can read a fairly large amount of the text both during fast page turning and when using the loop. The feeling of "reading" sets in.
- **Jan 27th, 2008, training day 19.** I continue to have a "reading feeling," I can read text passages and roughly grasp the content.
- **Jan 29th, 2008, training day 21.** Comprehension at 4,800 wpm was relatively high, I think I have seen almost half of the text. Unfortunately, the text disappeared from memory very quickly.
- **Jan 31st, 2008, training day 23.** At 4,800 wpm I now have the impression of having grasped at least half of the text. The captured text disappeared from my mind very quickly, but I still know very well what the plot was about. Even with normal reading I can't repeat parts of the text afterwards, so the impression is quite similar.
- **Mar 8th, 2008, training day 42.** I often had a very good reading feeling. 50% comprehension for the 2,400 exercise is an average value.
- **Mar 9th, 2008, training day 43.** At 2,400 wpm I had quite a high level of comprehension, but content was incomplete (not everything stayed in my head).

Participant PN07

Industrial engineering student, 27 years old



F 20.11
Training progress PN07
(by training days)



F 20.12
Training progress PN07
(by date)

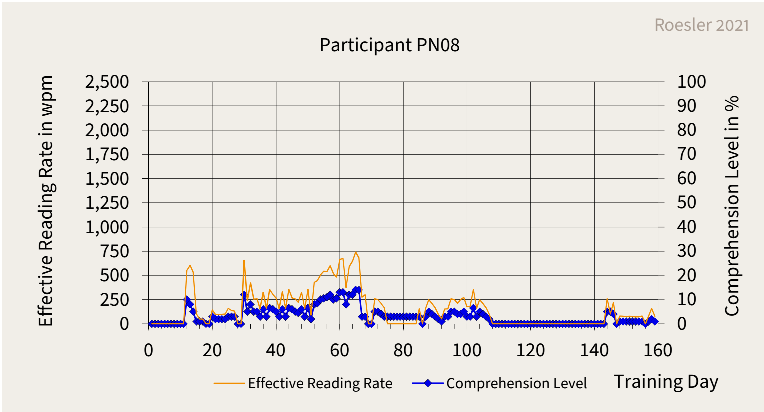
	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	62	8.0	15.7	78.7
At “breakthrough”	–	–	–	–

T 20.6
Time spent by PN07

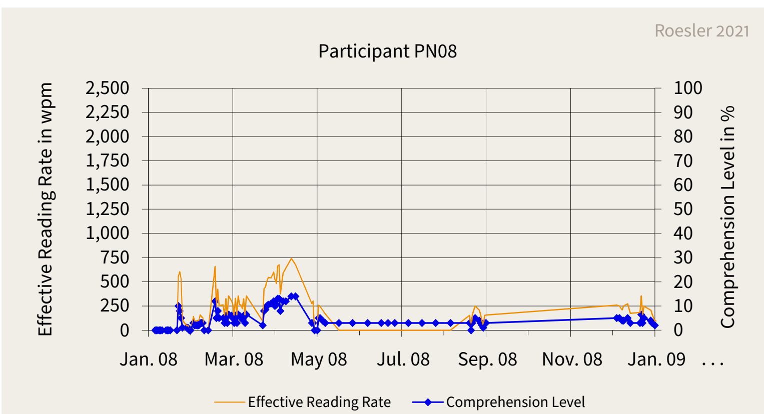
Participant PN07 did not master advanced speed reading. Training was done with swinging finger. Reading and speech disorders occurred on day 16. The participant spoke “more sloppily” on the phone. (The teacher noticed this, not the participant himself). The problem was likely solved after a few days with “corrective exercises”, because the records do not contain any entries to the contrary. With 15.7 net practice hours, PN07 practiced significantly more than the seven successful participants (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format.

Participant PN08

High school student, 16 years old



F 20.13
Training progress PN08
(by training days)



F 20.14
Training progress PN08
(by date up to training day 107)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	159	52.4	25.2	125.3
At “breakthrough”	–	–	–	–

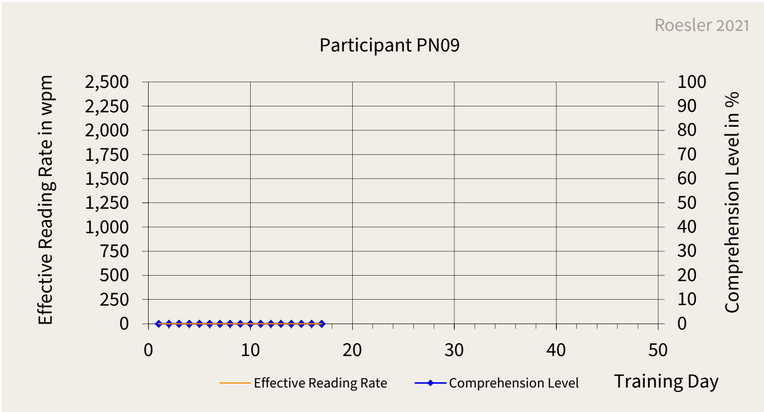
T 20.7
Time spent by PN08

Participant PN08 did not master advanced speed reading. Training was done with swinging finger (until day 147). Reading and speech disorders occurred on day 38: “I have the feeling that I am speaking a little more quickly and in a more ‘uncontrolled’ manner than normal. I wouldn’t call it stuttering yet.” This problem could be solved after about three days with “corrective exercises”, and did not occur afterwards.

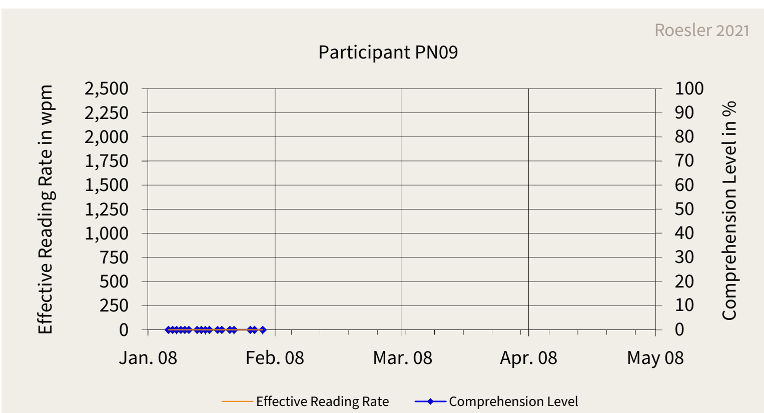
With 25.2 net practice hours, PN08 practiced significantly more than the seven successful participants (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format. With PN08, learning goal B (grasp meaning purely visually) did not work and learning goal A (omit subvocalization) was very problematic. For Figure F 20.13: The data for training days 75 to 84 was lost and thus subsequently estimated.

Participant PN09

Computer scientist, 45 years old



F 20.15
Training progress PN09
(by training days)



F 20.16
Training progress PN09
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	17	0.8	3.0	19.7
At “breakthrough”	–	–	–	–

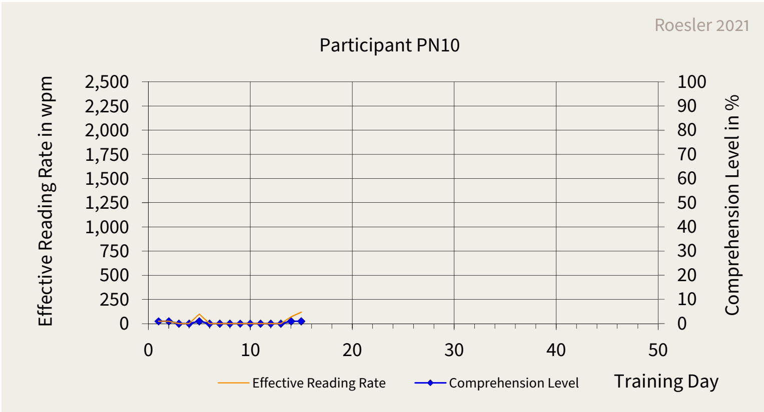
T 20.8
Time spent by PN09

Participant PN09 did not master advanced speed reading, but also did not train for long enough. The net practice time of 3.0 hours was below what the seven successful participants had needed at the time of their breakthroughs (3.2 to 11.8 hours). Training was done without swinging finger. Instead of foils with slalom lines, the participant used foils he had created himself. Only the fixation points on the imaginary slalom line were painted on, and were to be fixated on by the eye, one after another. Reading and speech disorders did not occur during training.

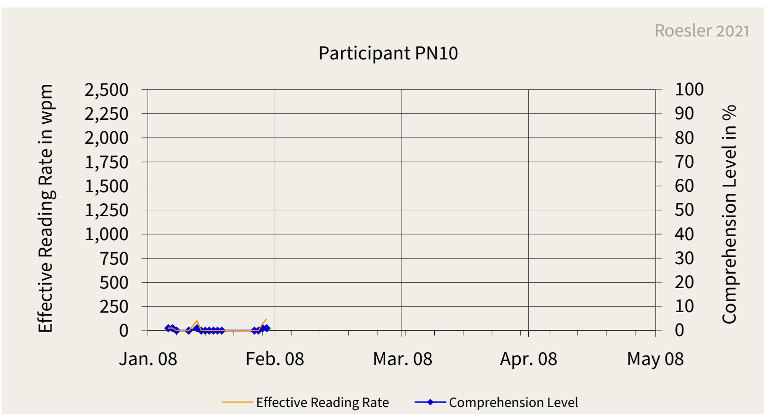
For Figure F 20.15: Participant PN09 never estimated the comprehension level for the exercises. It can be assumed that the comprehension was well below 10% (as with all other participants). 0% was entered in the diagram.

Participant PN10

Graduate engineer, graduate industrial engineer, 50 years old



F 20.17
Training progress PN10
(by training days)



F 20.18
Training progress PN10
(by date)

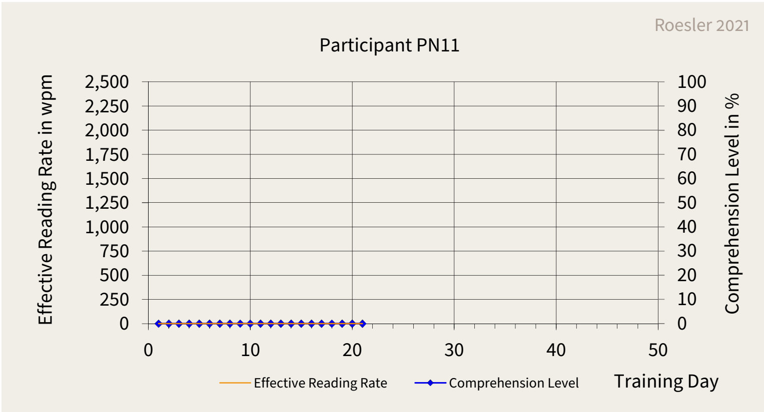
	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	15	0.8	2.9	21.7
At “breakthrough”	–	–	–	–

T 20.9
Time spent by PN10

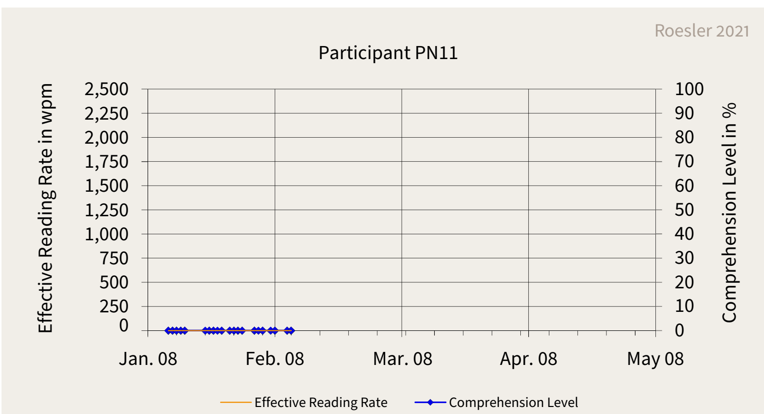
Participant PN10 did not master advanced speed reading, but also did not train for long enough. After a few days, training was done without swinging finger. Reading and speech disorders did not occur during training. The net practice time of 2.9 hours was below what the seven successful participants had needed at the time of their breakthroughs (3.2 to 11.8 hours). The data for TPN10 was less accurate than that of the other participants. About three quarters of the data was subsequently estimated.

Participant PN11

Graduate engineer, 29 years old



F 20.19
Training progress PN11
(by training days)



F 20.20
Training progress PN11
(by date)

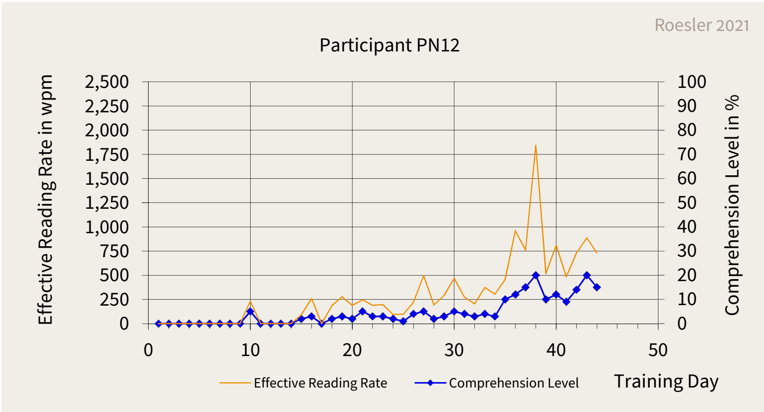
	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	21	1.0	3.3	28.1
At “breakthrough”	–	–	–	–

T 20.10
Time spent by PN11

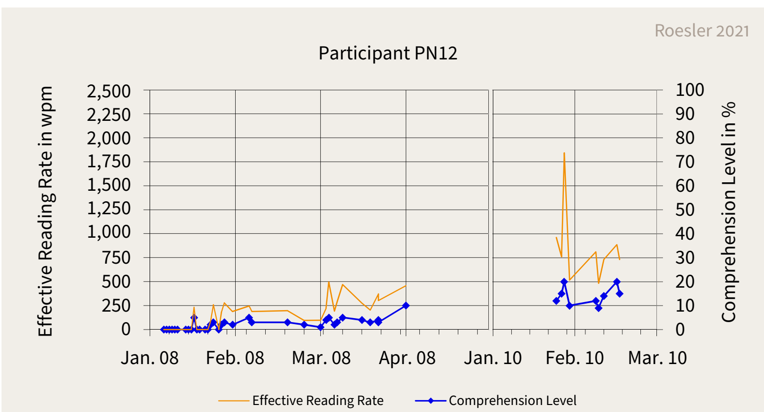
Participant PN11 did not master advanced speed reading, but also did not train for long enough. The net practice time of 3.3 hours was at the lower limit of what the seven successful participants had needed at the time of their breakthroughs (3.2 to 11.8 hours). Training was done with swinging finger. Reading and speech disorders did not occur during training. The data for PN11 is slightly less accurate than that of the other participants, and around a third of the data was subsequently estimated.

Participant PN12

Graduate industrial engineer, controller, 28 years old



F 20.21
Training progress PN12
(by training days)



F 20.22
Training progress PN12
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	44	50.1	7.5	67.3
At “breakthrough”	–	–	–	–

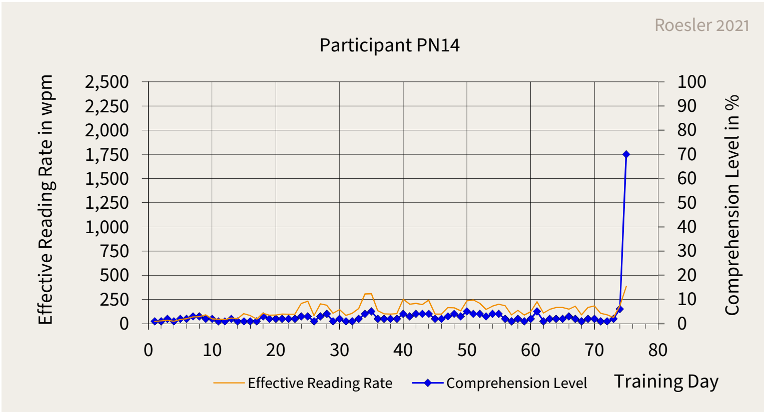
T 20.11
Time spent by PN12

Participant PN12 did not master advanced speed reading, but likely came quite close. The high effective reading rate on day 38, on which the participant initially comprehended up to 30% at 4,800 wpm, is striking. If this had been repeatable, it might have been the breakthrough for advanced speed reading. PN12 probably stopped training too early at 7.5 hours net practice time, which was only slightly above the average of the seven successful participants (who needed 7.1 hours on average until their breakthroughs).

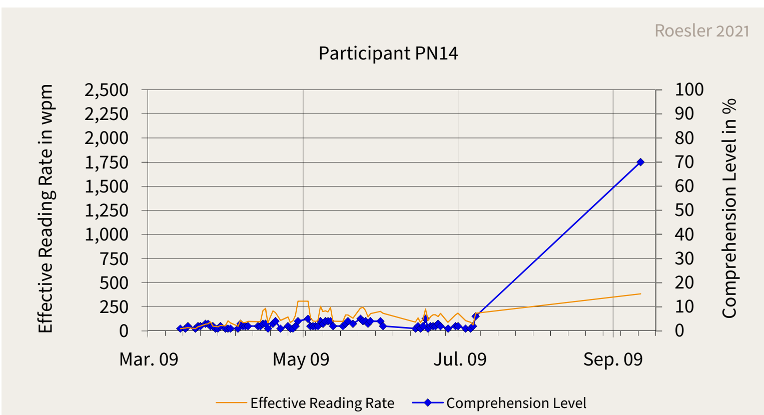
Reading and speech disorders occurred from day 8: “I speak more quickly and chaotically. When I practice in the evening, it is sometimes difficult for me to express myself orally the next morning”. The problem was manageable to a certain extent with 10 to 15 minutes of corrective exercises, but the effect occurred for at least five weeks after practice sessions.

Participant PN14

Graduate computer scientist, 43 years old



F20.23
Training progress PN14
(by training days)



F20.24
Training progress PN14
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	75	6.1	19.7	66.3
At “breakthrough”	–	–	–	–

T20.12
Time spent by PN14

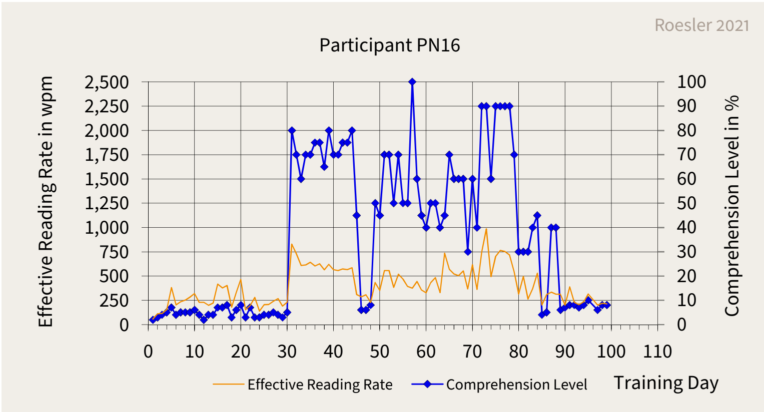
Participant PN14 did not master advanced speed reading. PN14 had practiced from day 8 without swinging finger. Reading and speech disorders occurred around day 31: “I think I have spoken indistinctly sometimes over the last few days. People have sometimes asked questions. That’s why I’ve been doing corrective exercises and reading aloud for longer.”

With 19.7 net practice hours, PN14 practiced significantly more than the seven successful participants at the time of their breakthroughs (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format. With PN14, learning goal B (grasp meaning purely visually) was not achieved. (We have no information for learning goals A, C and D.)

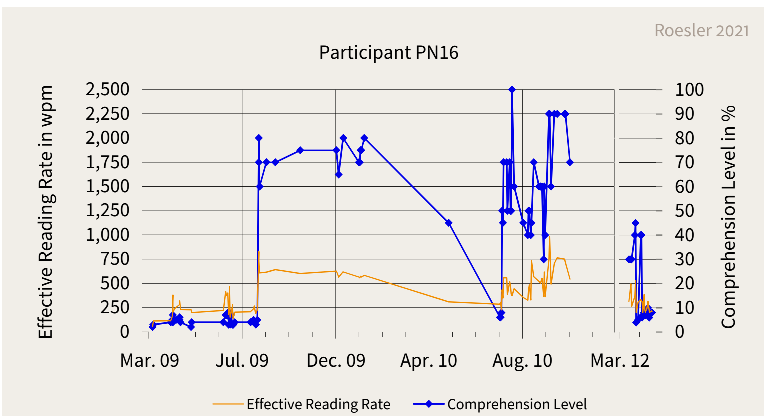
For Figure F 20.23: The high comprehension level of 70% on the last training day (day 75) is misleading. On this day, only visual line reading was attempted. This resulted in an effective reading rate of 385 wpm, which is a normal “subvocalized value.”

Participant PN16

Management consultant and trainer, 48 years old



F 20.25
Training progress PN16
(by training days)



F 20.26
Training progress PN16
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	99	37.1	32.3	75.3
At “breakthrough”	–	–	–	–

T 20.13
Time spent by PN16

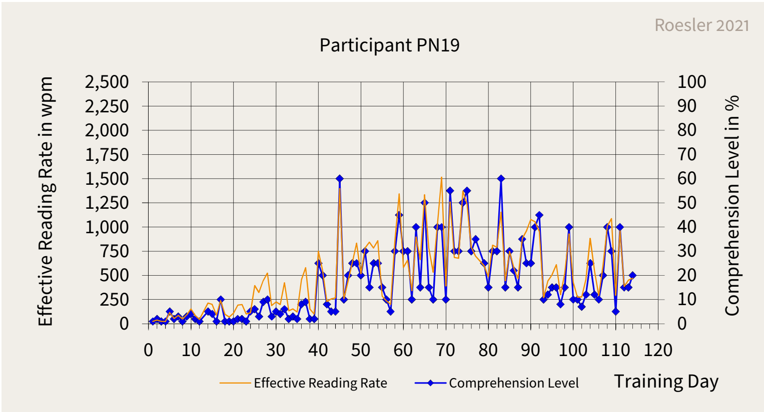
Participant PN16 did not master advanced speed reading (this was his second attempt, as the participant had already tried in vain with another specialized course). With PN16, learning goal B (grasp meaning purely visually) did not work.

The high comprehension values from day 31 in Figure F 20.25 were due to the fact that exercises with visual line reading were also carried out after day 31, thus dominating the daily best value. The effective reading rate, which from day 31 onwards oscillated around 500 wpm, was certainly only achieved by subvocalization. (Since PN16 has a rauding rate between 300 and 400 wpm, there is also the assumption that the participant systematically assessed the comprehension level too positively).

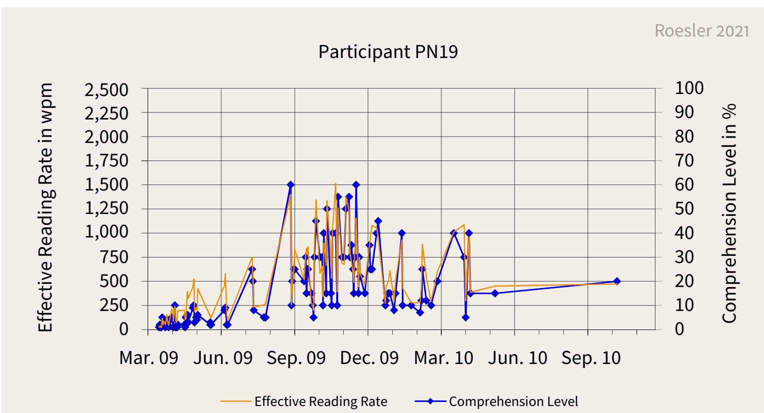
Training was done with swinging finger. Reading and speech disorders did not occur during training. With 32.3 net practice hours, PN16 practiced significantly more than the seven successful participants (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format.

Participant PN19

Graduate management consultant, 27 years old



F 20.27
Training progress PN19 (by training days)



F 20.28
Training progress PN19 (by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	114	19.4	35.3	133.1
At “breakthrough”	45[1]	5.6	11.8	68.3
Visual line reading	17[2]	0.7	3.0	23.9

1 Can be pinpointed to the day (see page 242, Aug 29th 2009, day 45)
2 Breakthrough for visual line reading (see page 239, training day 17 and page 241, training day 30)

T 20.14
Time spent by PN19

Participant PN19 has mastered advanced speed reading, but could not reproduce the effect long term or integrate it into everyday life. With PN19, visual line reading worked first. Training was done with swinging finger. Reading and speech disorders occurred on day 29: "In several conversations today, I have noticed that I speak very quickly and sometimes unclearly. The people I talk to keep asking me what I have said." Also on day 38: "Afterwards, I was at a trade fair and they pointed out to me that I spoke very quickly." PN19 we owe some self-observations which brain areas may play a special role in learning speed reading. Comments from participant PN19 (shortened to approx. 33%):

- **Mar 17th, 2009, training day 3.** During the finger sweep, I counted the individual finger sweeps to suppress the subvocalization ("one, two, three, . . .").
- **Mar 19th, 2009, training day 5.** After watching 3D images for an hour the day before, I felt more tension in the back of my head by the end of the hour. The feeling of tension was noticeable for all of the following day (comparable to muscle soreness but less painful, more pressing). Then today, during the second reading, I realized that something had happened. I perceived the text differently. It was somehow more two-dimensional and more 'in context'. My comprehension was not complete, but different and better than before. In the 3rd exercise, my perception became even stronger. I began to see individual facts as if in a film. There was a strong feeling of euphoria. "This can work," I thought, and then I really looked forward to the next day.
- **Apr 4th, 2009, training day 17.** Yesterday a meeting with the teacher took place. When we did the video recording and I was supposed to read at 2,400 wpm, I could comprehend about 10% of the text. That was a new record for me. Yesterday, when I was reading the current issue of a computer magazine on the subway after the meeting, I felt for the first time that I could read the text even without an inner voice. The effect occurred for about twenty lines.

Breakthrough for visual line reading

- **Apr 5th, 2009, training day 18.** Since the 10th training day, the unusual feeling in the back of my head occurred more frequently. It was noticeable approximately every other day during the exercises. I had the feeling particularly strongly for a longer period of time during and after a visit to a museum in the Villa Stuck (picture gallery) on Mar 3rd 2009, not while reading but while eating. Since training day 10, the feeling occurred mostly towards the end of the training. In the meantime, it has developed in such a way that I get the feeling after only 10 pages of warm-up exercises (rapid page turning and reading pages upside down). When I was reading an English book (ISBN 1841957860) normally today, I could suddenly switch from reading with an inner voice to reading without an inner voice after 70 pages. I felt the desire to experiment around this time, so I tried to read the text faster and to count internally ("1-2-3-4-1-2-3-4 . . ."). I suddenly noticed how the voice that I could always hear in the upper left hemisphere of my brain stopped subvocalizing, and an area of the brain that was located in the right area of the back of the head became active. The area was located a little further to the upper right than the area that had been stimulated by the Magic Eye books up to that point. I counted numbers only for one or two pages. In the beginning, I understood very little of the text. Then my comprehension got better, so that I gradually got all of it—that is, 100%. I tried not to count and that also worked. After each turn of the page, the inner voice switched on again at the beginning of the text, and I had to concentrate on making it fall silent. After two or three lines, it was silent again. At the same time, I had the feeling that I could read the text more quickly than before.

Visual line reading

- **Apr 18th, 2009, training day 24.** Today, in addition to the usual training program, I looked for ways to further minimize subvocalization. I came across the "Rapid Reader 6 Pro" program. This program uses a modified version of RSVP (Rapid Serial Visual Presentation) and displays individual words on the screen one after the other. After some experimentation, I set the speed to 950 wpm and ran the program for about 50 pages. I gradually noticed that I could pick up more and more, even though it was impossible to articulate internally at that speed. However, I could still hear individual words (especially at the ends of sentences). My comprehension in the meantime was about 70%. I felt activity in my brain after some time during the exercise.[3] First, a diffuse feeling in the back of the head, at the place where the activity was perceived after seeing the 3D images (the feeling was not as strong as with the 3D images); later, there was some additional activity on the opposite side of the brain to where I had previously heard the "inner voice". The activities felt like the first activities I had noticed at the back of my head. After practicing, it took 30–60 minutes for the feeling to subside. Throughout the next two days, I again felt strong activity in my head (similar to the sensation I felt after looking at 3D images for a long time

3 *The following statements contain two different types of uncertainty. The first concerns how exactly the participant can locate a region in his brain, and the second is about whether the region is correctly designated, for example, as "Wernicke's area." We can provide researchers with two video recordings in which the participant points to the corresponding areas in his brain. This eliminates the second uncertainty, and for the first the videos give a rough idea of how exactly the participant thinks he can locate these areas.*

on the 4th training day), but in more areas. I could feel something in the following areas: the visual cortex in the back of the head (medium), Wernicke's area left and right (low), Broca's area left and right (strong), in the temporal area left and right (medium).

- **Apr 20th, 2009, training day 25.** The feeling of activities in my brain has been going on for two days now. I noticed a really interesting effect today while reading the book "Der Mathematik-Verführer [The Math Seducer]". With no conscious effort, I read two pages without an inner voice and very quickly by my standards, with full comprehension.
- **Apr 28th, 2009, training day 28.** Today, for the first time, there was a "reading feeling" with the loop. This happened with both loop exercises. Something happened in my brain, a more two-dimensional perception. It lasted for approx. 20 to 30 seconds the first time (here more than 4% understood), approx. 1 min with the second exercise (more than 5%). I thought I understood almost everything, but something was still missing. This feeling was also there during the 4,800 exercise.
- **Apr 29th, 2009, training day 29.** For the first time, I felt a sharp pain in either the left Wernicke's area or a little further towards the visual cortex. The same thing happened on Apr 30th. Every day I try to get rid of the subvocalization during normal reading, and it often works.
- **May 1st, 2009, training day 30.** Yesterday I had a meeting with the trainer. Book 5b, warm-up exercise C630: 16 words in 5 lines, 13 words in 5 lines, 13 words in 5 lines. For every fixation (about 250 ms), two-dimensional vision is there immediately, even in slalom. Sometimes a word "screams out" on every other fixation. At 2,400 wpm, I saw all the words clearly enough (for sure). As a further experiment, I tried to read normally, but without subvocalization: book 21b, page 207, 17 seconds = 757 wpm, 60 to 70% comprehension. My guess: 100% is certainly possible. Trainer saw 2 to 3 fixations per line in the mirror. Addendum from the trainer: We later named this effect "visual line reading". Within the German Society for Speed Reading, participant PN19 is considered the discoverer (or at least re-discoverer, see page 23) of this special form of visual speed reading.

"Discovery" of visual line reading

- **May 20th, 2009, training day 35.** Started doing warm-up exercise B520 (from Aghte) every day.
- **Jun 9th, 2009, training day 38.** After 22 pages, the visual line reading worked. Book: Richard Branson—Losing my Virginity. Afterwards, I was at a trade fair and they pointed out to me that I spoke very quickly.
- **Jun 10th, 2009, training day 39.** Visual line reading did not work, but I made a fascinating discovery when using the Rapid Reader. When I set the speed to the maximum value (950 wpm), one usually can't

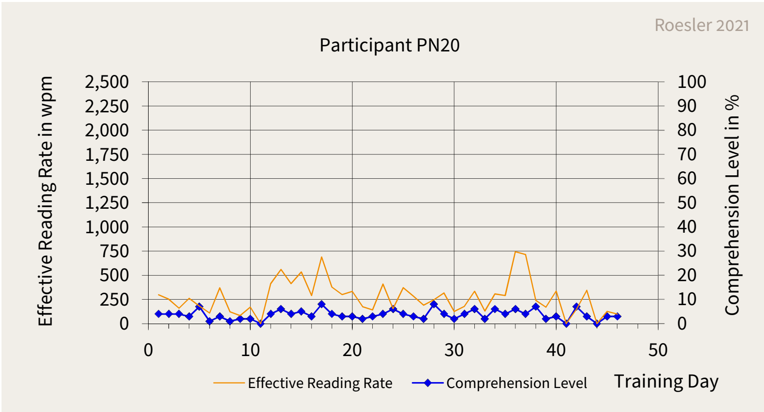
recognize the individual words in a dedicated way. After a while, however, you get used to it, and I was able to catch some whole sentences. Then I closed my eyes briefly, and when I opened them again I could clearly distinguish between individual words. I then tried to repeat the effect. This was also successful when I tried to use other areas of the brain, similarly to 3D vision. When I make an effort, I can thus often read whole sentences in single words. After this, my view breaks down again.

- **Jul 12th, 2009, training day 41.** Visual line reading worked after 5 pages. Journal: Manager Magazine.
- **Aug 29th, 2009.** Since the last training day on Jul 28th I have not done any "real" exercises, but used visual line reading freely. I estimate that I have used it every day for at least half an hour. The switching time is now about half a minute to a minute. Of the texts that I read daily, I read 80–90% with visual line reading.
- **Aug 29th, 2009, training day 45.** The breakthrough has come! The 'aha! effect' came during the C660 warm-up exercise. Here, I first oscillated my view back and forth over 3 lines about 15 times, trying to catch all three lines at once. When I noticed that this worked to some extent, I jumped three lines further and tried it there for about 10 times until it worked. Then I jumped three lines again and kept looking back and forth until I got a feel for it, and continued this way until the end of the page. Then I started again from the top on the same page, and only had to oscillate back and forth about 3 times before moving on to the next three lines. It got better and better, then I moved on to the next page, and then to another page. I noticed that the whole thing went quite quickly, so I just wanted to take my time. I measured 20 seconds for one page, which actually only corresponds to the speed of visual line reading. But that didn't deter me—practice makes perfect :) I started with the 2,400 slalom exercise. At the beginning, my comprehension was already quite high—about 50%—and then increased quite quickly to 90%, and then dropped after some time to about 60% .
- **Aug 30th, 2009, training day 46.** Today, unfortunately, I could not concentrate properly. Very disappointing!
- **Sep 24th, 2009, training day 55.** Today, the results were not great. When measuring my reading rate the day before yesterday, it was a little over 800 wpm (English language) at 80% comprehension.
- **Sep 30th, 2009, training day 59.** On that day (and the following day) after practicing, I had a slightly dizzy feeling in my head and could not concentrate as well as usual. This effect had already occurred a few months ago after a "breakthrough experience" (Villa Stuck).

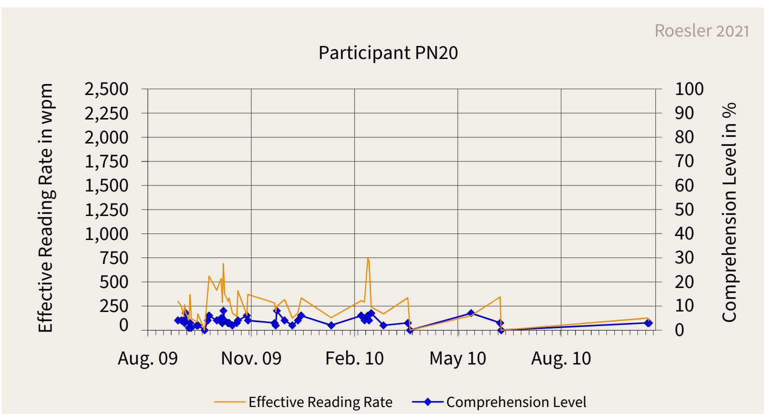
- **Oct 8th, 2009, training day 61.** On book 19z, I did the visual line reading as a warm-up exercise. Comprehension was not particularly good, about 60%.
- **Oct 20th, 2009, training day 67.** Today, once again, nothing works.
- **Oct 25th, 2009, training day 69.** Warm-up exercise C540 was very useful. Two-dimensional vision from the beginning. At first it felt like a foreign language with a different script, but at some point during the exercise I could read 50% of the words (upside down!).
- **Oct 28th, 2009, training day 71.** Unfortunately, I do not know why it worked well again today (but it would be nice to know). With the last exercise (slalom), my comprehension fluctuated. The better parts were at a comprehension of 55%.
- **Nov 25th, 2009, training day 86.** I managed the C660 warm-up exercise today with 5 lines at once instead of 3. Unfortunately, the result was still not satisfactory.
- **Dec 16th, 2009, training day 91.** On the last exercise I realized that too much work was concentrated on my left brain, and I tried to consciously use my right brain. I imagined being able to perceive the text in a more structured way, as I had noticed previously, and tried to achieve this feeling again. Suddenly, the switch took place and I was able to absorb much more.
- **Dec 31st, 2009, training day 95.** I couldn't quite concentrate again. I'm getting really tired of it.
- **Jan 17th, 2010, training day 99.** This morning I trained. I noticed that it was working reasonably well again, which had not been the case for some time.
- **Apr 12th, 2010, training day 111.** The subvocalization again had a disturbing effect on my reading rate. Unfortunately, I could only suppress it from time to time. On the other hand, my comprehension was comparatively high today.
- **Sep 21st, 2010.** For about 6 days, I have been doing 5–10 minutes of visual line reading in the "Handelsblatt [Trade Journal]" daily, but it has not worked well. Subvocalization was a major obstacle and could never be eliminated. Learning goal B (grasp meaning purely visually) would probably have worked.
- **Oct 17th, 2010, training day 114.** Overall, the results were better than expected. With the 10,000 wpm loop, the two-dimensional vision only appeared after 200 pages. Then, unfortunately, it disappeared again. However, my comprehension was quite good during the slalom exercise, with 2,400 wpm.

Participant PN20

Attorney, 34 years old



F 20.29
Training progress PN20
(by training days)



F 20.30
Training progress PN20
(by date)

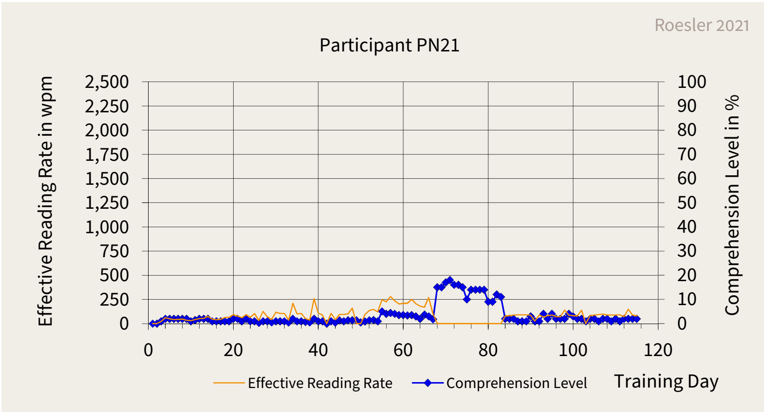
	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	51	15.6	12.0	41.5
At “breakthrough”	–	–	–	–

T 20.15
Time spent by PN20

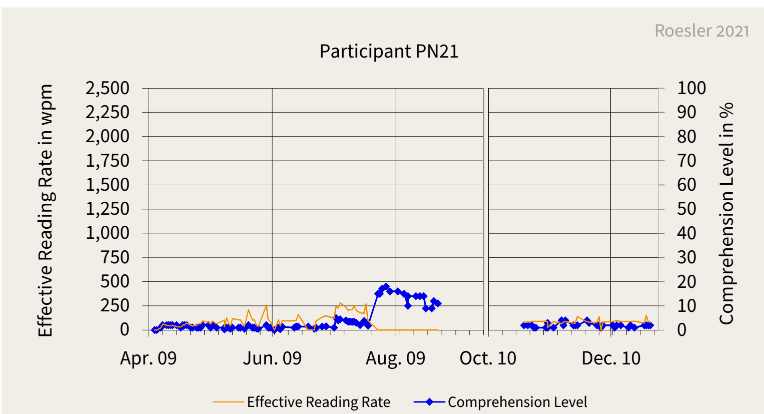
Participant PN20 did not master advanced speed reading (this was his second attempt, as the participant had already tried in vain with another specialized course). Training was done with swinging finger. Reading and speech disorders did not occur during training. With 12.0 net practice hours, PN20 practiced at the upper limit of that which the seven successful participants needed (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format. With PN20, learning goal B (grasp meaning purely visually) was not achieved.

Participant PN21

Student, 25 years old



F 20.31
Training progress PN21
(by training days)



F 20.32
Training progress PN21
(by date)

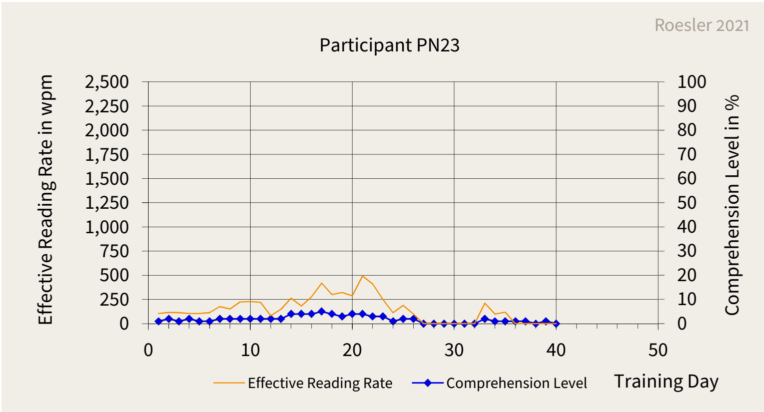
	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	115	21.1	36.4	105.7
At “breakthrough”	–	–	–	–

T 20.16
Time spent by PN21

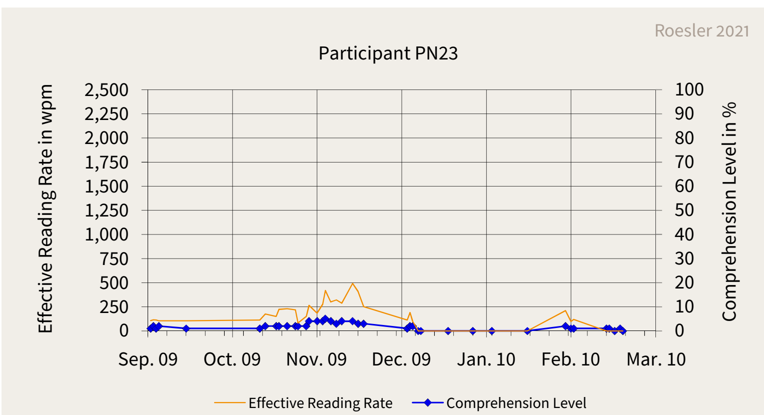
Participant PN21 did not master advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. With 36.4 net practice hours, PN21 practiced significantly more than the seven successful participants needed at the time of their breakthroughs (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format. With PN21, learning goal B (grasp meaning purely visually) was not achieved. (We have no information for learning goals A, C and D.)

Participant PN23

Graduate computer scientist, 27 years old



F20.33
Training progress PN23
(by training days)



F20.34
Training progress PN23
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	40	5.8	21.1	41.6
At “breakthrough”	–	–	–	–

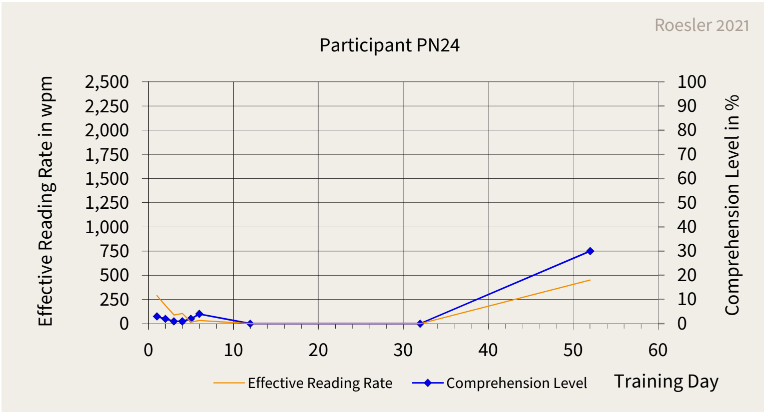
T20.17
Time spent by PN23

Participant PN23 did not master advanced speed reading (this was his second attempt, as the participant had already tried in vain with another specialized course). Training was done with swinging finger. Reading and speech disorders did not occur during training. With 21.1 net practice hours, PN 23 practiced significantly more than the seven successful participants (3.2 to 11.8 hours). It is therefore uncertain whether further practice would make sense. Perhaps the training should not be resumed until there is significant progress in the training format. With PN23, learning goal B (grasp meaning purely visually) was not achieved. Incidentally, PN23 is an extremely fast normal reader, reading at approx. 600 Wpm.[4]

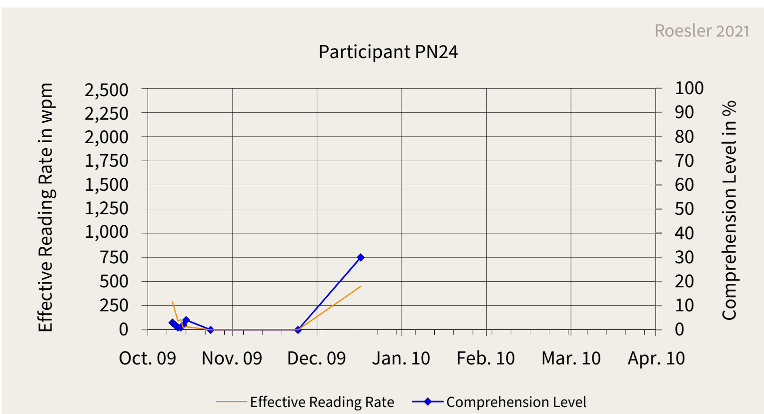
4 *600 Wpm for page 56 in "book 5b" (see page 102) and 627 Wpm for the German version of the Magliabechi text (see test from page 274). Participant: "I understood everything, but ignored the names (I always do this when reading)". If the names are taken out of the text, a speed of at least 590 Wpm remains. The participant read without recognizable regressions.*

Participant PN24

University professor, 47 years old



F 20.35
Training progress PN24
(by training days)



F 20.36
Training progress PN24
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	52	2.3	4.7[1]	25.4
At “breakthrough”	–	–	–	–

1 *Includes 2.2 hours of Aghte’s imagination drills between day 7 and 32*

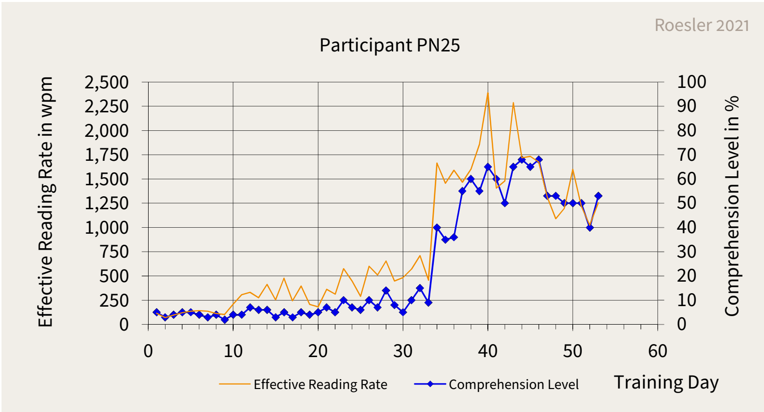
T 20.18
Time spent by PN24

Participant PN24 did not master advanced speed reading (this was his second attempt, as the participant had already tried in vain with another specialized course). By day 3, it was clear that learning goals A (omit subvocalization) and C (see with two-dimensional vision) would be achieved, and that the breakthrough would depend exclusively on learning goal B (grasp meaning purely visually). From days 7 to 32, imagination drills (in accordance with Aghte, 1965) were therefore performed (Figure F 20.35 can only be "normally" interpreted for days 1 to 6). PN24 practiced from day 5 onwards without swinging finger. Reading and speech disorders did not occur during training.

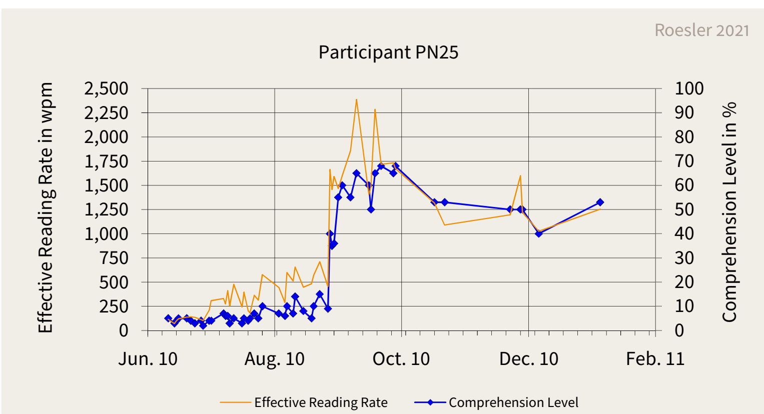
With 4.7 net practice hours, PN24 had not practiced for as long as most of the seven successful participants at the time of their breakthroughs (3.2 to 11.8 hours). Nevertheless, it is uncertain whether further practice would make sense, because almost at the beginning of the 4.7 net practice hours PN24 was able to "work" on learning goal B. This normally happens to other participants later in the training process, after learning goals A and C (according to our current hypothesis). Perhaps the training should not be resumed until there is significant progress on learning goal B in the training format. It was, incidentally, very easy for PN24 to learn basic speed reading (see page 178).

Participant PN25

High school student, 16 years old



F 20.37
Training progress PN25
(by training days)



F 20.38
Training progress PN25
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	53	7.0	11.2	45.0
At “breakthrough”	34[1]	2.7	6.7	29.6

1 *Can be pinpointed to the day*

T 20.19
Time spent by PN25

Participant PN25 has mastered advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. The total time spent for the training was roughly in the middle range of the seven successful participants. Comments from participant PN25 (shortened to approx. 35%).

- **Jun 20th, 2010, training day 5.** I had the feeling that I was still focusing too much on individual words (not looking at the whole text).
- **Jun 27th, 2010, training day 8.** Two-dimensional vision worked very well again today, especially after the warm-up exercise with the 3D book, and I found that I hardly focus on individual words anymore.
- **Jul 13th, 2010, training day 16.** The two-dimensional vision worked perfectly today when I read at 4,800 wpm, and I felt as if I had achieved this learning goal, at least today. However, I did not comprehend as much of what I was reading.
- **Jul 17th, 2010, training day 17.** Today I realized what it means not to articulate internally, but I also understood much less.
- **Jul 27th, 2010, training day 23.** Two-dimensional vision worked extremely well today when I read at 4,800 wpm, and it felt like I was looking at all the words. I also felt like I could already recognize a few words through visual reading, and I noticed very clearly today when I was articulating the words and when I wasn't. What also often happened was that I understood quite a bit on one page, yet by the time I was two pages in, I had no idea what was on the page before.
- **Aug 4th, 2010, training day 24.** When I was reading at 2,400 wpm, I noticed very clearly how I was not articulating internally and perceived the "word shape", but only comprehended it after a short delay. Sometimes I had to think about the "word shape" for some time before I understood what the word meant, but of course could not concentrate on the next words at that time (possibly 1 second).
- **Aug 12th, 2010, training day 28.** At 4,800 wpm, many words made sense even though I didn't subvocalize them, and I felt that I actually comprehended quite a lot. I also understood words today which were over and under each other. Note while trainer was watching me via webcam: At 10,000 wpm in book 22b, I probably saw 50–70% of the words clearly enough. At 2,400 wpm in Book 5b, I probably saw 100% of the words clearly enough.
- **Aug, 24th, 2010, training day 32.** I was able to suppress subvocalization most of the time, and especially at 4,800 wpm many words made sense. However, I could not yet really understand the plot.

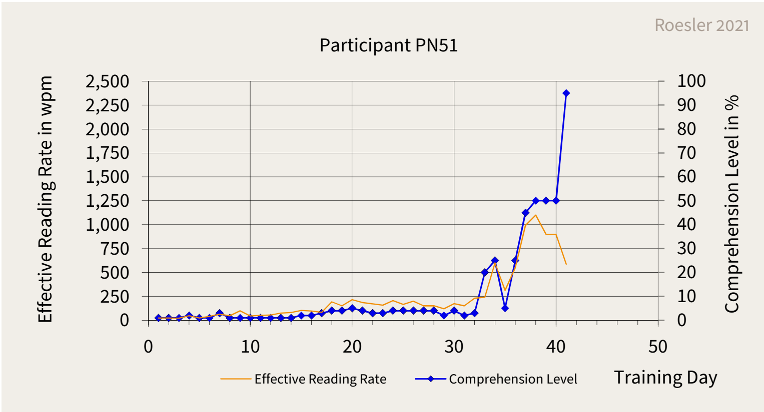
- **Aug 29th, 2010, training day 34.** When I read at 4,800 wpm, everything worked phenomenally, and I really noticed for the first time what it means to visually grasp meaning. At the beginning I wasn't quite sure if I was just subvocalizing more today, but by the end I was pretty sure I wasn't. I understood very many words, and also the connections of the words and sentences partly.
- **Aug 30th, 2010, training day 35.** It worked very well again. However, I noticed that I forget what I have read quite quickly.
- **Sep 2nd, 2010, training day 37.** It worked very well again, however I noticed that I capture words of four lines at the most.
- **Sep 4th, 2010, training day 38.** I think 60% comprehension is quite an achievement. However, I retain very little of what I read. Is my estimate too high? Sometimes I understand the meaning of one sentence, and then the next sentence I don't understand.
- **Sep 11th, 2010, training day 40.** I have been testing visual line reading for five days on real texts that I had to understand. The estimated time and comprehension on day 1 was 15 seconds and 60%, day 2 was 2 minutes and 70%, day 3 was 30 seconds and 80%, day 4 was 10 minutes and 80%, day 5 was 30 minutes and 98%. Trainer's note: I had not yet given the instruction to try visual line reading (I wanted to do this only a few days later, when speed reading stabilized).
- **Sep 20th, 2010, training day 43.** Today I noticed a huge step in my two-dimensional vision. I was sometimes able to grasp words from five to six lines. Grasping meaning visually also worked better than usual today. It was a good day of practice. Trainer: In everyday life, please use visual line reading, slalom, loop and rapid page turning.
- **Sep 29th, 2010, training day 45.** Worked well, however I felt like I didn't have enough time to comprehend more. It was as if I had too little time to look at the text, like I had too little thinking time to process the content.
- **Oct 9th, 2010.** On-screen I always read normally, on paper I read 50% normally and the rest with visual line reading, and thus more quickly. I can use visual line reading with little difficulty, at 2,400 wpm it takes a little more effort, but it's relatively easy.
- **Oct 17th, 2010.** With difficult texts (Siddhartha), comprehension drops to 70% with visual line reading. Visual line reading and 2,400 wpm are particularly useful when I have not read for homework and can then quickly read the text before class or skim it at 2,400 wpm (60% comprehension), thus recalling what I have read.

- **Oct 19th, 2010, training day 47.** Private reading: I read the Siddhartha text normally and had to concentrate very hard for about the first 5 minutes in order not to fall into visual line reading.
- **Nov 25th, 2010, training day 49.** At 10,000 wpm, I often didn't read the words, but just looked at the paragraphs distantly. At 2,400 wpm it got better, but it was still different to usual. This was the first time this effect had occurred.
- **Dec 22nd, 2010.** For the first time in the last few days I have noticed that, for a short time and with great concentration, I can read with 70% comprehension instead of the usual 50%.
- **Jan 11th, 2011.** Reading a very simple text (presumably for children), I understood up to 80% at 2,400 wpm.
- **Jan 25th, 2011.** After reading for a long time at 2,400 wpm, when I then switched to visual line reading I was able to understand more (about 95%) and much more easily than when I do visual line reading first.
- **Mar 13th, 2011.** In school, when we are supposed to find a certain section in a text and the others notice that I am looking for it, they stop looking for it because they figure that I am faster than them anyway. When we have to read a certain number of pages in a book for homework, I sometimes hear comments like, "Wow, you're lucky! You're almost done." When I was in the car and we drove through a lot of tunnels, and it was too dark and the car jolted too much, I could only read normally. That's when reading seemed really slow to me, and I didn't see any point in reading because I was usually much faster.
- **Mar 27th, 2011.** During visual line reading, and especially at 2,400 wpm, I noticed that I remember what I read more in "picture form" (as opposed to normal reading). The effect is present even hours after reading. I know what I read, but I have a harder time reproducing it verbally.
- **Dec 29th, 2011.** I use visual line reading very often, e.g. with magazines/newspaper articles. Preparation for job interview: Mishmash of normal reading and visual line reading, because only with visual line reading would I not have been able to memorize all the facts. 4,800 wpm, 10,000 wpm and rapid page turning are things I don't use at all, and 2,400 wpm not as often as I should (especially if the book is written in an unusual or old-fashioned language style). Today was the final training session.

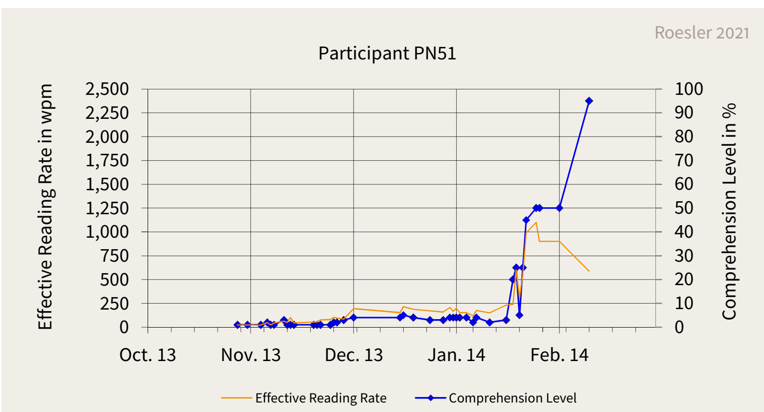
Participant PN25 documented how long he had read and with which reading type for half a year (from Oct 17th 2010 to Apr 18th 2011). For details, see Table T 16.2 on page 160.

Participant PN51

Graduate engineer, 46 years old



F 20.39
Training progress PN51
(by training days)



F 20.40
Training progress PN51
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	41	3.5	7.8	22.2
At “breakthrough”	37[1]	2.9	7.3	17.9

1 *Can be pinpointed to the day*

T 20.20
Time spent by PN51

Participant PN51 has mastered advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. The total time spent for the training was extremely low. This was certainly also due to the fact that participant and teacher worked in the same office and therefore there was no travel time needed for meetings with the teacher. For Figure F 20.39: The high comprehension level of 95% from the last training day (day 41) is misleading. On this day, only three measurements were performed with visual line reading (at a maximum rate of 619 wpm and a maximum comprehension of 95%). Comments from participant PN51 (shortened to approx. 50%):

- **Nov 8th, 2013, training day 6.** Slalom 2,400 wpm: I see 90% of the words on the page, half of them in a way that the brain can process in principle. Slalom 4,800 wpm: I see about 65% of the words on the page, half of them in a way that the brain can process in principle.
- **Nov 11th, 2013, training day 7.** Trainer: Eye movement and finger sweep are good, both at 4,800 and at 2,400 wpm. Participant: Probably covered 80% of the page, understood virtually nothing.
- **Nov 12th, 2013, training day 8.** Rapid page turning: Speed worked well—still unimaginable that anything can stick with this way of reading. Mechanically and focus-wise, I feel like it's getting more proficient.
- **Nov 20th, 2013, training day 11.** Slalom: The area I cover is getting bigger and bigger (estimated 80% of the area at 4,800 wpm). I am now concentrating on "non-vocalizing", which is not so easy with the buzzwords in the book. I am becoming increasingly confident that I will eventually be able to capture sufficient content using this method. Learning goal C (see with two-dimensional vision) probably works, and learning goal D (precisely set fixations) probably works too. Learning goal A (omit subvocalization): If things go well, I subvocalize about one word per page. According to my perception, I have three different states when reading. X: I see two-dimensionally and do not subvocalize (target state). Y: I see (and "read", subvocalize) a word more clearly, resulting in lower perception of the surrounding area. Z: I see through the page somewhat, though not quite as clearly, and try to avoid reading words exactly. My strategy is that if I notice I'm getting into Y, to get back into X via Z. At 10,000 wpm, it took me about half a second per fixation.
- **Nov 27th, 2013, training day 16.** At 4,800 wpm I notice that my eye movement is almost automatic, I no longer have to concentrate on the fixation points, it's virtually automatic. The area covered is about 70

to 80%. Tested on book 10b on four pages: At 2,400 wpm, I see almost 100% of the words.

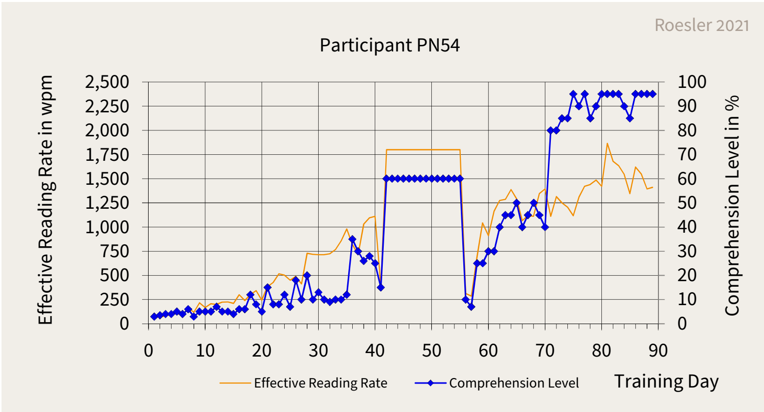
- **Dec 2nd, 2013, training day 18.** An observation of a very subjective nature: I have the impression that 10-finger typing at the keyboard is quicker than before, but this also results in a few typing errors.
- **Dec 29th, 2013, training day 23.** Worked well at 4,800 wpm. Now 90–100% scan rate, and just need to get it into my brain.
- **Jan 1st, 2014, training day 25.** I seem to read too slowly at 10,000 wpm, but the routine is good (an observer commented that it looks very professional and intense the way I do it).
- **Jan 7th, 2014, training day 29.** Read with different rates, and with and without guidance from the finger. I can clearly see how comprehension varies with this. In the long run, finger support seems to be useful.
- **Jan 17th, 2014, training day 32.** I have felt (for some time) that I could reach a high level of comprehension (>50%) at 2,400 wpm.
- **Jan 22nd, 2014, training day 36.** Hardly any subvocalization. Trainer: Visual line reading needs to be tested. Further exercise format: Mainly exercises at 2,400 wpm or less! Finger sweep at 10,000 wpm looks very unusual (tapping the page at various intervals, with the wrist wiggling back and forth), and at 2,400 wpm looks slightly unusual (wrist possibly turning 60 degrees). Visual line reading was tested briefly.
- **Jan 23rd, 2014, training day 37.** Trainer: Less than 2,400 wpm may also be acceptable, as long as subvocalization does not begin. The participant should reduce his speed to maximize comprehension. Are exercises at 10,000 wpm still necessary? Unclear. Participant can self-direct and recognize what is good for them. Good to understand as much as possible. Finger sweeps look strange. Participant: In the last exercises, it seemed to me that my brain was being used so much that it felt almost warm. On the whole, though, speed reading is really fun.
- **Jan 26th, 2014, training day 38.** In the last exercises I read large parts without the corresponding finger movement, it remains to be seen how it will settle in the long run. With slow reading speeds, occasional subvocalization occurs. Great concentration is needed to prevent this. There is the danger of reading too sloppily and mixing up all sorts of things (reading management, visual and normal reading).
- **Feb 2nd, 2014, training day 40.** At the weekend I finally had a little opportunity to use speed reading. I used visual line reading again and again, and I think it works perfectly (comprehension >90%).
- **Feb 11th, 2014, training day 41.** Observations: After a longer break (3 to 5 days), I notice that it takes 1-2 pages for visual reading to work properly again. I have the following comments on the optical line reading

exercises: 1st exercise: Almost always three fixations per line in the familiarization phase (second page read). 2nd exercise: After familiarization phase I did not subvocalize, as with the first exercise. Again, three fixations are mostly observed by the trainer (participant note: I sense only two fixations.) 3rd exercise: Book 22a, 515 wpm, 31 seconds, 35 lines per page, 3 fixations per line: approx. 300 ms fixation duration.

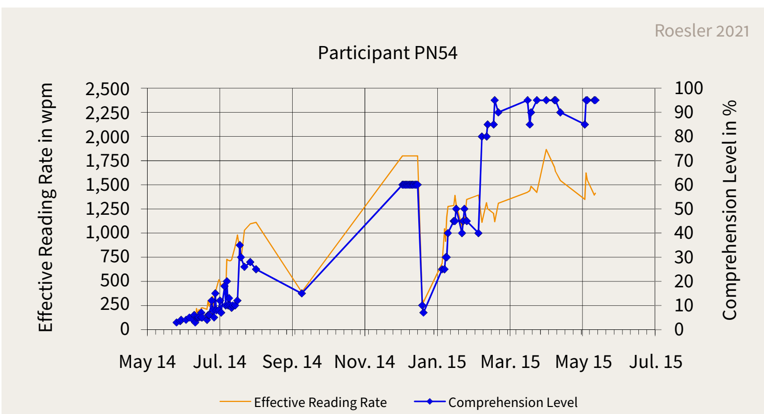
- **Mar 7th, 2014.** Applied visual reading while reading in a hotel and on other occasions. I think I read 2 smaller books (one was "The Little Machiavelli"). Comprehension level >90%, reading rate approx. 2,500 to 3,000 wpm. With the last book, no noticeable familiarization time was needed and I read it without any finger sweeping. 30 minutes at a time is no problem. Application in everyday work: I probably also read e-mails mostly visually, concept papers as well. Trainer's assessment: Participant has learned visual speed reading and also uses it. Trainer, participant: Set a date in three months for testing eye movement and reading rate. On Book 17a: Read with and without finger sweep at approximately 1,500 to 2,000 wpm, both work. Increased brain effort is felt when practicing without finger sweep.
- **March 19th, 2014.** Filming of finger sweep.
- **Jun 6th, 2014.** Whenever I read something, I use the technique. Every 2 to 3 weeks I read aloud and still try to use speed reading (and the fixations), but at the same time I read aloud from memory. Speed reading works either as well as or worse than in March 2014, because I haven't used it less lately. For example, with a book about Spain with a lot of names and dates, speed reading doesn't work well. I read both with and without finger sweep, though it tends to go better with it. I also speed read on-screen, but without finger sweep. In the last 3 months I have used speed reading for about 4 to 5 hours a week, perhaps for an hour at a time. I do speed reading in German and English, though in Spanish it is rather difficult (I can read Spanish as well as after about 6 years of Spanish lessons in school). I speed read e-mails. Reading at work: I read about 2 hours per day (25% on paper, 75% on screen). 50% of the time I read without subvocalization (also short e-mails).
- **Aug 13th, 2014.** I read the biography of Steve Jobs between June and early August, and it was about 650 pages. Of these, at least 70% were read without subvocalization, purely visually and with a two-dimensional component. Reading at work: lots of business travel, therefore about an hour per day (>90% on-screen). 50% of the time I read without subvocalization (including short e-mails). Occasionally, I read book 23a aloud. I try to use two-dimensional reading as well, and to achieve a preview of about 1-2 lines and to recite the text by heart.

Participant PN54

Graduate electrical engineer, 42 years old



F 20.41
Training progress PN54
(by training days)



F 20.42
Training progress PN54
(by date)

	Training days	Course duration (months)	Net practice time (hours)	Total time spent (hours)
At end of training	89	12.0	31.0	109.3
At "breakthrough"	36[1]	1.8	10.0	56.0

1 *With PN54, there was a smooth transition rather than a clearly identifiable breakthrough. Somewhat arbitrarily, we defined day 36 (35% comprehension level and a 818 wpm effective reading rate) as the breakthrough day.*

T 20.21
Time spent by PN54

Participant PN54 has mastered advanced speed reading. Training was done with swinging finger. Reading and speech disorders did not occur during training. At the time of the breakthrough, the number of training days was in the middle range of the seven successful participants. The course duration of 1.8 months was very short, while the net practice time of 10.0 hours was comparatively high. The long training break (from the beginning of September to the beginning of December 2014) apparently caused no disadvantages for participant PN54. Remarks on Figure F 20.41: Training days 42 to 55 were poorly documented and thus estimated retrospectively. The high comprehension levels of 80 to 95% from training day 71 onwards are misleading. These daily best values were dominated by visual line reading exercises, which were used for the first time from training day 71 onwards (in addition to finger sweep exercises). Instead, the participant's progress is best viewed by following the orange line. These show the best values of the effective reading rate, which come from finger sweep exercises with a "two-dimensional view". Comments from participant PN54 (shortened to approx. 30%):

- **May 25th, 2014,** Meeting in Munich. 2,400 slalom without template: comprehension 1–2%.
- **Jun 3rd, 2014, training day 4.** When practicing at 2,400 wpm, I had the impression that I sometimes saw the page completely, i.e. not just the finger and fuzzy all around. I counted the sweeps internally ("1-2-3...7"), which I feel is the only "inner voice" problem I still have.
- **Jun 14th, 2014, training day 11.** At 4,800 wpm, I see 2/3 of the words clearly. Discussion about two-dimensional vision. I (mis)understood it in terms of 3D images, and the trainer showed two-dimensional vision using book 5b, p. 96. I fixated on the word "And" in the first paragraph and recognized ten words. On book 5b, I adjusted the 2,400 wpm accurately (9 half-sweeps in 7 seconds per page): 95% of words seen clearly.
- **Jun 16th, 2014, training day 13.** Sore muscle in right index finger.
- **Jun 23rd, 2014, training day 17.** Tried warm-up exercise C630: 9 words recognized in the viewing circle, two-dimensional vision builds up over the course of several seconds (at 2,400 wpm, however, two-dimensional vision works). At 4,800 wpm, the fixation sequence meanders as intended, I see about 80% of the words on the page. At 2,400 wpm, the fixation sequence meanders as intended, with 3 to 4 fixations next to each other. I can see about 95% of the words on the page.
- **Jul 2nd, 2014, training day 24.** At 10,000 wpm two weeks ago, I perceived maybe 3–5 "half-sentences" per page in terms of content. Now there are significantly more, maybe 8–12. I notice at each practice

session how something is happening, how my perception and reading experience are changing.

- **Jul 15th, 2014, training day 34.** Two-dimensional vision is significantly worse at rapid page turning at 20,000 wpm than at 10,000 wpm. (Trainer: When rapid page turning, two-dimensional vision is more important than keeping fixation duration low. Try to achieve high levels of comprehension rather than "hitting wpm accurately.") Test on book 9b with 2,030 wpm: I see 100% of the words clearly, I do not subvocalize. I understand half-sentences visually and do so immediately during fixation. Test of optical line reading with two fixations per line on book 9b: Visual acuity is sufficient, but subvocalization is there. The inner narrator sometimes stumbles, but is clearly active.
- **Aug 2nd, 2014, training day 40.** I believe that I have mastered visual line reading because my comprehension is close to that of conventional reading. Trainer: Read daily reading material purely visually as often as possible, for example with visual line reading or two-dimensional reading at just over 1,000 wpm. Also test visual line reading on-screen, for example with e-mails.
- **Dec 19th, 2014, training days 42 to 55.** Practiced the last 14 training days "free" with 10–20 minutes each in my own books ("Automotive SPICE", in German language). Read 80–90% of the time at roughly 3,000 wpm, comprehension 50–70%. For visual line reading, comprehension was 80–90%.
- **Dec 22nd, 2014, training day 56.** At 2,700 wpm, I think I can see all the words on the page clearly.
- **Jan 11th, 2015, training day 60.** Learning goal A: Subvocalizing is no longer a problem at any speed. Learning goal B (grasp meaning purely visually) usually works immediately, beginning with the first finger sweep. Learning goal C: At 10,000 wpm, two-dimensional vision works very well in most places, but not always. At 2,400 wpm, I see an estimated 100% of the words on a page sufficiently clearly, at 4,800 wpm this is also the case (as long as the fixations are set properly, or as long as the finger is sweeping over the page at the correct offsets). At 10,000 wpm, I see about two-thirds of the words sharply. Text comprehension is 95% in normal reading. With visual line reading it is not quite as high, and also varies with time and text, but is always higher than 50% (it varies between 50% and full comprehension).
- **Feb 8th, 2015, training days 65 to 70.** The trainer had me test visual line reading with an easy-to-read book: Pages 7 and 8 of book 54j resulted in a value of 835 wpm and 100% comprehension. (Trainer: This means that visual line reading works perfectly. It would be ideal to establish

visual line reading as a standard reading method in everyday life). Performed the following experiments on book 54j: Finger sweep at 11 seconds per page (about 1,700 wpm) resulted in about 80% comprehension. Trainer on the general goal for the next few days: Develop a speed range between 1,000 and 2,000 wpm with a high level of comprehension (at least 70%), so that the gap between visual line reading and slalom at 2,400 wpm is closed.

- **Feb 25th, 2015, training day 76.** I would like to practice speed reading without finger sweep more. Trainer: There is little knowledge on how a "finger reader" best becomes a "non-finger reader," I can only think of Michael Buse from Berlin.
- **Mar 25th, 2015, training day 79.** Talked briefly with Michael Buse about speed reading without swinging finger.
- **Apr 6th, 2015,** meeting in Munich. Trainer made video recordings of eyes and finger sweep at different speeds on book 17b: 4,900 wpm, 70% of words seen clearly, 25–30% comprehension, resulting in an effective reading rate (ERR) of 1,350 wpm. 3,530 wpm, 100% of words seen clearly, 50% comprehension (ERR 1,765 wpm). 3,300 wpm, 100% of words seen clearly, 50% (or slightly more) comprehension (ERR 1,650 wpm or slightly more). 945 wpm, 90–95% comprehension (ERR 875 wpm). 1,650 wpm, 100% of words seen clearly, 80% comprehension (ERR 1,320 wpm). 1,260 wpm, 95% comprehension (ERR 1,200 wpm). 850 wpm, 90–95% comprehension (ERR 790 wpm), subvocalized less than at 945 wpm earlier. 510 wpm with visual line reading, 100% comprehension (ERR 510 wpm). 490 wpm with visual line reading, 100% comprehension (ERR 490 wpm), subvocalized a word every now and then.
- **May 21st, 2015.** I have the impression that in the last six weeks of practice, every now and then, unfortunately not yet stable, a kind of two-dimensional vision sets in that was not there before. Interestingly, this occurs at all speeds (800, 1,200, 2,400, 4,800, 10,000 wpm). The field of vision becomes significantly larger (vertically as well as horizontally). Unfortunately, the effect is not yet stably reproducible. I read a relatively large number of magazines privately. In recent weeks, I have mostly been reading them purely visually. Because of the small column width, I don't use a finger sweep but read in the middle of the column from top to bottom. There are about three lines between the fixations. When reading in bed I "classically" subvocalize, since a finger sweep is not possible there. (Trainer: Please practice visual line reading from now on when reading in bed.) On-screen, I do not yet read purely visually.

Warm-up Exercises

SUPPLEMENTARY INSTRUCTIONS and warm-up exercises used during advanced speed reading training (see page 63) will be dealt with in this appendix.

If an ordinary finger sweep exercise is to be modified (for example, by a request to count internally to the beat of the finger sweep), then we speak of "supplementary instructions" to the finger sweep exercises.

We call independent exercises "warm-up exercises", which are interspersed between the usual finger sweep exercises. An example of such a warm-up exercise is the number-finding picture presented on page 149.

The importance of supplementary instructions and warm-up exercises for learning to speed read is not entirely clear. It is likely that many participants would learn advanced speed reading with ordinary finger sweep exercises alone, without the need for any supplementary instructions or warm-up exercises. For some participants, however, supplementary instructions and warm-up exercises are crucial to achieving their breakthrough.

Warnings

Care should be taken with the two tables for supplementary instructions and warm-up exercises. Many of the items may well be ineffective exercises, and therefore likely candidates for the "Myths and Half Truths" chapter of this book. I have tried to grade the exercises, but under no circumstances should one rely on these grades. I have awarded them arbitrarily, often based on the assessment of only one participant. If a grade is missing, this is usually a sign that none of my students have tried this exercise.

For better referencing, each exercise was abbreviated (e.g. "A100"). The letter (A, B, C or D) indicates which learning goal is to be supported by the exercise. For more than one learning goal, the letter "M" was assigned (denoting a mix of learning goals). Supplementary instructions have numbers from 100 onwards, warm-up exercises from 500.

No.	Goal[1]	Grade	Description of supplementary instruction (and comments from participants)	Source[3]
A100	A	2	Counting internally ("1-2-3-4…") on the beat of the sweeps. *2008: Helps a lot*	GBs
A110	A	2	Counting internally ("1-2-3-4…") independent of the beat of the sweeps. *PN23: Helps me much more than A100..*	GBs
A120	A	1	Hum a melody or a song. *PN19: Well suited. PN08, PN00: Better than A100 and A110. PN08: Songs with words help more than those without.*	GBs
A130	A	4	Listen to music. *PN08: Irritating, because rhythm doesn't match the finger sweep (even if you vary the speed of the music).*	2008
A150	A	2	Continuously saying a word internally (e.g., "cigarette smoke," "Kalahari desert," or "quasimodogeniti"). *PN21: Useful exercise*	Aghte
A160	A	3	Go over a process (e.g. "how do I bake a cake?"). *PN08: Works well sometimes, but disturbs concentration.*	PN08
A180	A		"Make up" the story using one's own words (subvocalizing) on the basis of a few words having been read (this means that the story is partially invented). Stay in the "flow of speech".	PN20
A200	A		Chew lightly on chewing gum.	Aghte
A210	A		Suck candy.	GBs
A220	A		Bend left forefinger and bite your finger. When reading, move the lower jaw slightly forward and backward.	Aghte
A230	A		Like A220, but instead bite a wooden spoon or something similar. If necessary, press the wooden spoon down on the tongue at the same time.	Aghte
B100	B		If "grasping meaning purely visually" does not yet work, then practice loop, slalom and visual line reading with well-known texts (then the meaning is recognized because of familiarity and does not need to be created from scratch). See also B600.	2008
B150	B		"Take meaning along": Before the exercise, plan to understand the content and not just do everything correctly and mechanically. After the exercise, think about what you were able to remember. *PN08: Not good for me, because with subvocalization I at least understand something. Without subvocalization I understand nothing at all.*	2008
C100	C		Go for a "soft gaze."	GBs
C120	C		Focus your view "behind" the text. Practice with Magic Eye 3D book. Look straight into the distance.	2008

No.	Goal[1]	Grade	Description of supplementary instruction (and comments from participants)	Source[3]
C160	C?		"With the loop sweep, I used to try to set my fixation during each finger bend. Now, I am starting to follow the finger with my eyes all the time. This creates a much more fluid effect. It feels more like the finger is reading."	PN23
M100	B etc.	2	General advice, if a breakthrough is a long time coming: Create new stimuli.	Michel-mann
M120	B etc.	2	Take a totally new ("unpracticed") book. *2008: Helps*	2008
M140	B etc.	2	Take a large print book. *2008: Larger, clear type helps, but not extremely large print. For a detailed discussion, see page 103.*	Stan-cliffe
M200	A, B, C	2	In the middle of the exercise, downshift from 10,000 to 4,800 wpm. *2008: Helps*	2008
M250	C, D		Increase or shorten the fixation duration slightly. *PN00: For PN07 and 10,000 wpm this may have been useful.*	2008

1 Learning goal
A: omit subvocalization
B: grasp meaning purely visually
C: see with two-dimensional vision
D: set fixations precisely
2 Grades: 1 = very good, ..., 4 = benefit questionable
3 GBs: guidebooks
PNxx: participant number (PN00 = Peter Roesler)
2008: Participants from 2008, who are no longer identifiable.
Jaki: Personal communication with speed reading student Stephan Jaki, Feb 10th 2008
Aghte: Aghte (1965), Loeser: Loeser und Schnauss (1999), Michelmann: Recommendation attributed to R. und W. U. Michelmann, Ott: Ott (1972, p. 47), Stancliffe: Stancliffe (2003)

T 21.1
Supplementary instructions for finger sweep exercises

No.	Goal	Grade	Description of warm-up exercise (and comments from participants)	Source
B500	B	4	Imagination drill: Look at an object, such as a ballpoint pen. Close your eyes and imagine it as vividly as possible. Long-term goal: to be able to imagine objects quickly and completely. *PN00: So far, five participants who had problems with learning goal B have tried Aghte's imagination drills (two participants very thoroughly). None of them found that the imagination drills made a breakthrough possible, therefore this is only awarded grade 4.*	Aghte
B510	B	4	Imagination drill: Go to more complicated scenarios. For example, look out of the window, close your eyes and imagine the street scene and shop windows.	Aghte
B520	B	4	Imagination drill "imagined object with tag": Imagine a book, for example, and immediately the word "book" will appear printed below in the imagination. Do the same with activities like "running". It must not be subvocalized! After a few days, you can imagine the individual words very well.	Aghte
B530	B	4	Imagination drill: The same with simpler sentences, e.g. "the flower blossoms". Imagine first in "large print", later in smaller type.	Aghte
B540	B	4	Imagination drill: "Thought seeing". Imagine what you think of as printed words and sentences (without subvocalizing). At first, this proceeds more slowly than imagining objects.	Aghte
B550	B	4	Imagination drill: "See with your ears". Listen to the radio with your eyes closed and imagine single words from it printed (without subvocalizing), first with words like "umbrella" or "telephone". Alternatively, use a tape recorder to record individual words at 15-seconds intervals. You could perform the imagination drill while lying down.	Aghte
B560	B		Imagination drill: Imagine one sentence of the radio announcer completely in the ticker procedure, possibly ignore the next sentence for time reasons.	2008
B570	B		Imagination drill: Imagine a complete sentence from the radio announcer in chunks of two to three words flashing side by side. Then imagine the next chunk (overwriting the previous one), and so on.	2008
B575	B		Imagination drill: listen to a well-known song and imagine an "audio track" like an oscilloscope, a point that goes up and down with the melody and builds a "mountain" behind it. Then include the rhythm by a 3D expansion of the mountain.	PN08
B580	B		Imagination drill: Listening to a song and imagine the lyrics as a film.	PN08
B590	B	2	Imagination drill: As with B640, glide slowly over the page with two-dimensional vision, creating mental images for the perceived text.	PN16

No.	Goal	Grade	Description of warm-up exercise (and comments from participants)	Source
B600	B	4	For example, read five pages slowly and imagine the story very vividly. Then go over the pages with slalom (e.g. 2,400 wpm). The brain doesn't have to create meaning from scratch, it only has to recognize meaning. See also B100. *PN16: It's almost useless, as if I was using the finger sweep technique for the first time.*	2008
B630	B	4	Variation of search term technique: Do not constantly articulate the word to be searched for internally, but only imagine the picture of the word. *PN24: It worked, but for learning goal B it probably brings nothing except the possibility of determining learning progress.*	2008
C500	C	2	Turn the text upside down, let your gaze wander over the text and experience what seeing with two-dimensional vision is like. Don't focus on single words, but look at the page as you would look at a tree or a painting. Is the difference in the way of seeing it recognizable?	2008
C510	C		Like C500, but turn it upside down for a few pages, then back to normal, then upside down again, etc.	PN23
C520	C	2	Foreign-language books: Is it easier to see with two-dimensional vision for these books? The more exotic the language, the better? *PN03: Greek text held the right way up is slightly better than C500.* *PN00: Greek text held the right way up is better than C500.* *PN07: Greek text held the right way up is worse than C500.*	2008
C530	C	4	Try a text made up of nonsense words (Lorem Ipsum). *2008: Not so good*	2008
C540	C	1	Turn the text upside down and try to maintain the "holistic view" during the slalom finger sweep. Check if you can see all the text areas clearly enough. *PN08: 10,000 wpm upside down and then 4,800 wpm immediately held the correct way up brought a lot. The best effect from everything I've tried. The easiest way to set fixations is when the text is divided into paragraphs of four to five lines.*	2008
C550	C	4	Finger sweeps over an empty page. *PN05, PN06: Not so good, though it may be better if dots or small boxes were on the page. PN08: Not so good.*	2008
C560	C		Exercise with a home-made picture book using "hieroglyphic" symbols. One example could be a story of a woman walking on a mountain, with symbols for"woman", "walks", "mountain" etc.	PN00
C570	C	4	Text with about two letter rotators per page. No meaning is to be understood, only the words with the wrong word shape are to be identified. *PN08: At 10,000 and 2,400 wpm many errors were found, but no content was extracted. Practice doesn't help much.*	PN00

No.	Goal	Grade	Description of warm-up exercise (and comments from participants)	Source
C580	C	2	Look at a landline phone and do not fixate on the individual keys; try using “natural vision”. *PN01: Helps. PN08: I can’t focus very well on anything and don’t pay direct attention.*	PN01
C590	C	3	Look out the window, then at the page. *PN08: A small effect, but not significant. What helps is looking into the distance, but also trying to see an object that is close. PN00: Feels good.*	2008
C600	C	2	Watch a YouTube video on your screen for 5 minutes to make your vision more two-dimensional. The YouTube video should cover an area of approx. 5 x 5 to 10 x 10 cm on the screen. The eye distance to the screen should be about as large as the normal reading distance. In order to notice the difference, you should first let your eyes wander over a few pages, then watch the video for 5 minutes, and then let your eyes wander over a few pages again. *Jaki: Helps. PN00: First attempt was promising.*	Jaki
C610	C	2	YouTube video with growing ellipses around a fixation point, e.g. “bWare Speed Reading Level 1” (www.youtube.com/watch?v=6TVxfe01aVY, accessed on: Aug 11th, 2015), 1:16 to 1:40 and 2:20 to 2:45.	2008
C620	C	3	Number-finding picture, but without connecting lines and without circles around the numbers. *For detailed discussion, see page 149.*	Loeser
C630	C	2	Fixate upon a word in a paragraph (this may take several seconds) until two-dimensional vision is achieved, i.e. you can simultaneously recognize words in the lines above and below. Then fixate upon a word in another paragraph, and so on. The aim is that you are only allowed to go on after two-dimensional vision has been achieved.	2008
C640	C	2	Variation of C630. If two-dimensional vision is established, shift the fixation point minimally without the two-dimensional vision collapsing. If this improves, move around the whole page with your gaze.	PN00
C650	C	2	Slalom finger sweep with 2,400 or 4,800 wpm, but without downwards hand movement, i.e. “step on the spot” and scan the same three lines several times. Make sure that the two-dimensional vision works. If it does, allow a slight hand movement downwards. It is important that the oscillating rate is correct, so that 2 to 3 fixations or 3 to 4 fixations are next to each other.	PN00
C660	C	1	Like C650, but without finger sweep. *PN19: Helped me achieve my breakthrough!*	2008
C670	C	1	Like C660, but with the book upside down. *PN19: Very good*	2008

No.	Goal	Grade	Description of warm-up exercise (and comments from participants)	Source
C700	C	1	View 3D images, e.g. in the book “Magic Eye”. *PN19: Helps*	2008
C710	C		Same as C700, but using a self-made 3D book where the 3D object is a normal, multi-line text.	PN00
C720	C	2	Do a word search (in a magazine). *PN19: Helps, but not as powerful as looking at 3D images.*	2008
C740	C?	2	Place the ellipse template on the text, look at it for 1/4 second, close your eyes and try to remember it. Look at it sometimes for two seconds. *PN12: I could remember more and more over a 5 min period. PN00, PN07: Seems to be useful. PN06: Should be tried on the computer.*	PN12
C750	C	3	Flash card exercise to “widen the vision span”, the word becomes visible for 1/6 or 1/3 second and should be recognized. *PN08: Not very helpful.*	Ott
C760	C		To break up tunnel vision and promote peripheral vision, drum your fingers on a table 20 to 60 cm from each side of the text.	PN19
D500	D	2	“Horizontal 8” as “dry run” exercise for the loop finger sweep. *For a detailed discussion, see page 80*	PN00
D550	D		Variation of C540: Finger glides over the pages, but with changing speed and changing directions. The eye must follow the finger all the time and must not get stuck (probably trains learning goal D: “set fixations precisely”).	PN23
M500	C?, D?	4	It is unclear whether the search term technique (see page 123) is suitable as a warm-up exercise. *PN08: Can’t grasp content during this time, so it’s useless.*	2008
M550	C, A		“Blinking”: As I subvocalize when I fixate for too long, I close my eyes after about 1/4 second and interrupt the fixation. It is then easy to jump directly to the next fixation point and to maintain two-dimensional vision. The number of fixations per page is also easy to determine.	PN12
M600	C?, A?		Let the pages quickly run through your fingers, as in a flip book animation. (Depending on the speed, these are different exercises.)	2008

T 21.2
Warm-up exercises

Test Yourself: Determine your Vision Span

How many letters or words you can see clearly enough with a fixation? Determine this with the following test (based on Davis, 2004, p. 44):

- Select a line from a text. The line should ideally contain a few short words in the middle. (Lines 260, 393 and 518 on page 274 are well suited to this exercise.)
- Select a word in the middle of the line and cover the area to the left of the word with your left index finger. Use your right index finger to cover the area to the right of the word. Only the selected word should be seen in your "viewing window".
- Slowly move your index fingers outwards, so that more and more letters appear to the left and right of the selected word.
- Test how far you can go so that you can still identify all letters or words in the viewing window without looking away from the central word.
- Count the number of letter spaces the viewing window contains. (The space between two words counts as one letter space.)
- You can repeat the test on another line and take an average of the values.

We interpret the result of this test as your (horizontal) "vision span". Table T 4.1 on page 30 shows the comparative values of other participants.

Test Yourself: How Fast is Your Normal Reading Speed?

To find out how fast you can read in comparison to others, please:

- Read the training text about "Antonio di Marco Magliabechi" at your usual speed, the same as you read work documents, so that you understand most of the text (not as thoroughly as for an exam, but as you would read an interesting newspaper article).
- The number at the end of each line shows you how many words you have read.
- After 60 seconds of reading, you have your reading speed in wpm. Mark the number at the end of the line you are currently on.
- Should you be able to read the text in under 60 seconds, start reading it again from the beginning (and add 541 wpm to the final count, because the text is 541 words long).
- If you do not have a timer at hand, you can also do the following: Only read the title and the first 4 paragraphs (up to and including word 360, "memorized") and measure how many seconds it took you. Your reading speed in wpm is then calculated as follows: 360 * 60 / reading time in seconds.

You can now compare your reading speed with Figure F 2.2 on page 12. If you want to be accurate, first convert your reading speed from wpm to Wpm (standard words per minute):

Wpm = wpm * 0.98

(As Wpm is 2.0% less than wpm for this text.)

Antonio di Marco Magliabechi 004

Antonio di Marco Magliabechi was a contemporary of Spinoza, Sir Christopher 015
Wren, Sir Isaac Newton and Leibniz. He was born on 29 October 1633 in Leonardo da 031
Vinci's birthplace, Florence. His parents were so poor that they were unable to provide 045
him with any formal education, and at a young age he was apprenticed to a local fruit 062
dealer. Magliabechi spent his spare time in the shop trying to decipher what was on the 078
pamphlets and journals that were used to wrap the groceries. 088

One of the shop's regular customers was a local bookseller who noted the young 102
man's attempts to read the strange hieroglyphics before him. The bookseller took him to 116
his own shop and Magliabechi was almost immediately able to recognise, remember and 129
identify all the books. With the bookseller's help, Magliabechi eventually learnt to read 142
properly and began to combine his newfound reading ability with phenomenal 153
memorizing techniques which enabled him to remember nearly everything he read in its 166
entirety (including punctuation). 169

A sceptical author decided to put the lad's growing reputation for speed reading 182
and memory to the test and gave Magliabechi a new manuscript that he could never have 198
seen before, telling him to read it for pleasure. Magliabechi duly read the manuscript at a 214
remarkable speed and returned it almost immediately, confirming that he had read it in 228
its entirety. A little while after the event, the author pretended that he had lost his 244
manuscript and asked Magliabechi if he could help him to remember some of it. To his 260
astonishment, the young man wrote out the entire book for him, transcribing perfectly 273
every single word and every punctuation mark as if he had been copying from the 288
original. 289

As time went on, Magliabechi read at greater and greater speeds and memorized 302
increasingly large numbers of books. He eventually became so famous for the speed at 315
which he devoured and absorbed knowledge that experts in all subjects came to him for 331
instruction and source material in their own areas of interest. Whenever he was asked 345
questions he answered by quoting verbatim from the books he had read and 358
automatically memorized. 360

His reputation spread, and he was eventually hired by the Grand Duke of Tuscany 374
to act as his personal librarian. In order to be able to handle the volume of material in the 393
entire library, Magliabechi decided to develop his speed reading abilities to an almost 406
superhuman extent. Contemporaries reported that he could simply "dip" into a page, 418
apparently absorbing the contents in their entirety with only one or two visual fixations, 432
much to the amazement of those whom he allowed to watch him. He developed a 447
reputation for having read and memorized the entire library! 456

Like most geniuses, Magliabechi continued to develop his abilities as he became 469
older. The more he read and memorized, the faster he was able to read and the more he 486
was able to remember. The story goes that, in his later years, he would lie in bed 503
surrounded by volumes, each of which he would devour in less than half an hour, 518

memorizing them in turn until he fell asleep. This he continued to do until his death in 535
1714 at the age of 81. 541

Source: The Speed Reading Book, Tony Buzan, Pearson Education Limited, © 2010 Tony Buzan. By courtesy of the publisher.

List of Abbreviations

bpm
beats per minute

ERR
effective reading rate

h
hour

min
minute

ms
millisecond

PN
participant number

s
second

SD
standard deviation

spm
syllables per minute

wpm
words per minute

Wpm
standard length words per minute

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Name Index

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Peter Roesler

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What is the difference between “basic” and “advanced” speed reading?
How much of the text can you understand when you speed read?
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