

# THE STENOGRAPHIC BRAIN: A SUPERPROCESSOR

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- SHORTHAND CHARACTERISTICS
- LEARNING
- GRADUAL SPEED ACHIEVEMENT
- BRAIN EXERCISE
- MISCELLANEA

“The art of writing as fast as one can speak is the greatest triumph of writing.”

Karl Faulmann

Writing is one of the best inventions of mankind. And shorthand, according to Karl Faulmann in his book “Historische Grammatik der Stenographie – (Wien, 1887), is its highest triumph.

The common spelling uses letters of the alphabet. Words and phrases are formed by joining letters and syllables, thus forming a written line: there is linearity. With the exception of the dot over the letter “i”, the small stroke that cuts the letter “t” and the punctuation marks, common spelling is performed almost without lifting the hand.

The shorthand writing differs significantly from common spelling: it has unique characteristics. Shorthand symbols are usually derived from geometry: small horizontal, vertical and oblique strokes, small circles, parts of circles, dots, half-lines, small hooks, sloping curves lines that are joined and disunited, assuming different positions: sometimes over, below, through the line, in the middle, as well as in front and behind. There is not – just as in common spelling – linearity. One raises his hand frequently. This frequent raising of hands tends to get imperceptible because of the speed and fluency on how one writes down in shorthand.

Shorthand is a graphic system that is governed, in general, by phonetics. Hence, the name given to shorthand is “a phonetic writing”. In shorthand, each symbol represents a particular sound. A single symbol may have several sizes to distinguish the meaning of sounds. And depending on the place it occupies on the ruling (at the bottom or at the top, here or there), it will represent a specific sound. A symbol attached to another has a sound with a meaning; when separated, it has another. A simple space between two

symbols may also have a distinguished sound with a meaning. The differentiated determinant of symbols and sounds details vary from method to method.

### ➤ COMPACTING

A key attribute of shorthand writing is its compactness. Unlike the common spelling which is extensive and slow, shorthand is a system of graphic symbols that impresses for being succinct, brief, and limited to bare essentials.

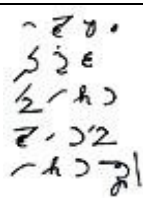
While common spelling uses two, three or four letters (in some languages even more) to form a syllable, shorthand performs an astonishing achievement of using a single symbol.

In addition to the basic symbols, shorthand has the so called “special initial symbols” and “special terminal symbols” which compress the already brief graphic system even more. That is, with just one shorthand symbol, we are able to abbreviate a set of spelling of common syllables. Example: a small shorthand symbol summarizes the termination “bility”.

Then, shorthand is, by excellence, the writing that compresses. It compresses into a single symbol, multiple initial and final syllables. It also achieves a greater compression rate when it summarizes whole sentences to a single shorthand symbol called “conventional symbols”, “abbreviations”, “brief forms.”

Using a Data Processing term, we are able to say that shorthand uses an audio-graphic “codec.” It is compacted when shorthanded and decompressed at the time of translation. The phrase that is heard is compressed into a single shorthanded symbol. At the time of translation, that small symbol will decompress into a whole sentence.

The intensity of a compression is that which sometimes makes a 120 word per minute dictation more difficult than those containing 135 words per minute. At a 120 word per minute dictation, a sentence may be composed of many extensive words, which require more compacting efforts, meaning more symbols to be written down. However, a dictated sentence with a speed of 135 words per minute, containing large amounts of terminal symbols, special initials and brief forms will have greater compression and, consequently, fewer shorthanded symbols to be translated.

Shorthand uses an audio-graphic “Codec” at the time of shorthand and decompresses at the time of translation		Shorthand uses an audio-graphic “Codec” at the time of shorthand and decompresses at the time of translation
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### ➤ SHORTHAND SYSTEMS AND METHODS

In the same way that there are several types of alphabets (Latin, Greek, Arabic, Cyrillic, etc.), there are also several shorthand systems. The majority are called geometric systems (symbols derived from geometry). There are still the cursive and the mixed systems. Systems that use the letters of the alphabet are called alphabetic systems.

Each shorthand method is totally different. The symbols of each method, as well as the rules in which they are based, differ so greatly in the meaning of sound that a stenographer of a particular method is not able to read what a stenographer of another method wrote.

Going through shorthand history, one can notice that shorthand systems have evolved significantly and its authors have always looked for greater simplicity, better layout, better delineation, endeavoring to produce a more agile, flexible and effective system. In general, an author seeking to correct flaws of a system ends up creating a new one. Another author analyzes several systems, extracting the best of each one to build a new one.

That was the case of Samuel Taylor, an Oxford professor, called “The Father of the Modern Shorthand.” In 1786, after having examined several shorthand systems, he created a revolutionary method for the time which became known as the Taylor System. Thus, Taylor expressed himself by talking about his decision to create a new system: *“In the course of my dedication to this study, I examined thoroughly over forty publications and manuscripts on Shorthand, some of them undoubtedly have their perfections; but there are none in which I am fully satisfied.”*

Hundreds of shorthand systems were generated from other systems since the time of the Tironian Notes (the first organized shorthand system – 1<sup>st</sup> Century B.C).

#### ➤ SPACE MANAGEMENT

Another shorthand feature is the fact that, besides writing down the symbols on paper with speed and fluency, the stenographer will have to simultaneously manage and control their writing *space* because the lack of such space management, in an appropriate manner, could result in difficulties to understand certain symbols at the time of translation.

The importance of a careful space management is better understood when we realize that the primary purpose of shorthand is its interpretation/translation. A symbol closer, farther, further down or further up in relation to where the other one is supposed to be, undoubtedly makes a translation more difficult to be correctly interpreted. Therefore, at the same time that the stenographer is writing in shorthand, they need to be building a visual map of each symbol on paper so that each one stays in place. This technique concerning space management is acquired when the learner takes on speed shorthand training as well as through the habit of translating everything written in shorthand. Only through translation is when an error can be detected (spatial-graphic) as well as know the reason why such error occurred. Thus, shorthand reading has an important educational role in training, development and refinement of the shorthand learner.

#### ➤ ACCURACY

Another major difference between the two writing systems (the common and shorthand) is related to the accuracy in which one writes. While perfection in common spelling of letters is not so necessary for later understanding, in shorthand, the stroke perfection is crucial. And such symbol perfection, that specific neat stroke design has to be learned, trained, developed and improved since the beginning of the learning process. It should be practiced and improved in each and every new speed of dictation.

The stenographer, while writing in shorthand, will keep an eye on accuracy, making a perfect stroke so that it can be subsequently translated. There is, in particular, an *integrated processing* of the brain, which takes care of several things at the same time. This is a major and intellectual activity: listen then convert the sound heard into a graphic sign, look for perfection and correct possible errors (or “data scrambling”), “inner view the shorthanded symbol in their brain” and, finally, write it on paper. By writing a wrong shorthand symbol on paper, the brain realizes the error and thus, the information “returns” to the hand which fixes it in a fraction of a second, quickly erasing the error and writing down the correct symbol.

➤ THE SHORTHAND SPEED IS IN THE BRAIN

It is important to understand that the shorthand speed is in the brain and not on the hand, as many may think. It is in the brain that the shorthand symbols are developed. That’s where sounds are transformed into graphic signs. The hand will write down a signal sent by the brain.

When the brain fails to “draw instantly” the sounds of a word, because of doubt, the hand locks in hesitation and is not able to produce a shorthand sign. Thus, the graphic fluency is interrupted, with one or several words being lost and, consequently, the shorthand interpretation is impaired.

Regarding common spelling, shorthand is neither more nor less difficult to learn: it is just a different spelling system.

Indeed, what makes shorthand seem “harder, more complex,” is the fact that, its daily use in terms of time is significantly much shorter than conventional writing. So, let’s take a closer look at this topic.

As soon as a child becomes literate, they are soon plunged into a veritable ocean of letters. They grow up studying and are permanently in touch with reading and writing. They begin to read textbooks, storybooks, comic books, billboards, neon signs, advertisements, newspapers, journals, labels, etc, staying all day long in constant contact (a complete immersion) with reading and writing.

The development, progress and proficiency in reading/writing is permanently stimulated. The subject to be learned has a huge arsenal of reading and writing placed at their disposal all day, every day, every month, year after year and so on. The ability to read and write is perfected through a course of thousands of hours of practice. This total immersion in the alphabetic characters will give them a full command of reading and writing. And it comes to such a level of proficiency that, when seeing an advertisement, for example, a person no longer spells it or reads it letter by letter or word by word, but perceives its entirety, understanding the message instantly. When they see a bakery sign, they no longer read the letters individually, nor the syllables: they grasp the global meaning in just a glimpse: *bakery*.

The stenographer contact with shorthand (in relation to literacy in common spelling) is minimal in volume, quantity and intensity. This minimal daily contact with shorthand symbols and the lack of total immersion are undoubtedly the primary cause of “mental hesitation” when writing down in shorthand which hinders and delays not only the writing fluency and speed, but the reading fluency as well.

With our imagination, let's tour through a "shorthand city", where everything is written in shorthand. You are born in this city and are "literate" in shorthand and ever since you were a child you have seen, read and written everything in shorthand. Books, magazines, billboards, notices, advertisements, comic books, shop signboards, dubbed movies, all written in shorthand! You spend months, even years just seeing shorthand symbols, and reading and writing those symbols. In such circumstances, it is clear that all "mental hesitation" will be eliminated once and for all; therefore, you will have a total mastery on shorthand with reading speed and unimaginable writing fluency.

#### ➤ ACHIEVING SHORTHAND SPEED

The achievement of speed happens step by step, grade by grade through progressive, dictated training. The training is a real "shorthand workout", an intellectual exercise which matures, strengthens the brain's ability to increasingly produce shorthand symbols instantly (simultaneity).

The achievement of shorthand speed demands practice, time and applied study. It is necessary to "digest thoroughly" each dictation, to get the best intake. Words that are difficult to sketch and conventional signs in each dictation should be relentlessly trained, systematically reviewed several times a day, for several days without anything to distract one's concentration.

Shorthand is a daily conquest of "small victories". Each small victory will strengthen motivation: success generates success.

Referring to literacy, Juvencio Barbosa says in his book "Reading and Literacy":  
*"Accordingly, the learning process consists, first of all, of experienced moments or familiarity, interspersed by systematic moments, targeted to observation, comparison, deduction, etc"*

This approach to literacy in the common spelling is interesting because that is exactly what happens to "literacy" of shorthand symbols. To get familiarity with the symbols, a systematic study and training are essential, where it becomes necessary for the students to get involved with what they have learned in each lesson through "observation, comparison and deduction of symbols". It is with the systematic training that the students acquire familiarity with shorthand symbols, learn the outlines and union of the signs as well as how to identify and decipher every word in shorthand. Only with exercises and applied study, the sounds converted into graphic codes can be deciphered, interpreted and translated by intuitive sense.

#### ➤ THE BRAIN AND THE PROCESSING OF SHORTHAND SYMBOLS

Moving on speed training (more words added every minute) significantly increases the volume of data to be processed by the brain. It becomes an increasingly complex and intense intellectual activity! The more volume of data, the greater number of words are heard, requiring faster construction of mental shorthand symbols and greater doses of concentration.

Let's compare the speed of thought of a 20 word per minute text dictation to a 25 word per minute dictation.

At each speed there is an increase of mental work, especially at higher speeds, sometimes redoubling the time spent dominating the previous speed. We can compare this to climbing a ladder: the more you climb, the bigger are the steps; that is, the greater the distance (applied study time), the greater you must endure to get to the next level.

It is interesting to note that, while the volume of sounds converted into graphic codes (stenographic symbols) is increasing, it is at the same time being compressed into one minute time. It is worth saying, the more volume of processed data, the greater is the compression. Twenty words per minute, sixty words per minute, and later, one hundred words per minute! Not to mention the amount of shorthand symbols required for certain words with many syllables, which are written in shorthand with only basic symbols, that is, without any special terminal and/or initial sign compression as so offered by the brief forms.

A daily practice demonstrates that to move from a high speed of 120 wpm to 130 wpm requires more training time, increased amounts of dictation, greater dedication, more methodological study as well as perseverance.

Using a term from Data Processing, we can say that each time the speed increases, we perform an “upgrade” in the brain areas responsible for all the learning, training and shorthand speed acquisition, as well as those multiple simultaneous operations (hear the sound, turn it into a graphic symbol in the brain and write it down on paper by hand). We put a more powerful “processor” in our brain and a more effective memory RAM. Thanks to such more powerful processor and more effective memory RAM at each new speed, we mature, exercise better mastery and have better performance in the art of shorthand.

This particular point is important to emphasize: at the same time that speeds are getting higher (90, 100, 120 wpm), more training time is necessary. There is a whole maturity process that needs to be observed. As long as we train progressive speed dictations, we create new connections in our brain (synapses), which will gradually adapt to this increasing volume of processed data. They are high-speed connections in which speed is measured in words per minute. It is a stream of sounds that have been heard that are processed in graphic symbols in the brain and shorthanded onto paper.

In the process of writing down in shorthand, the brain sends the hand, sort of speaking, several instructions per second, to extract from a vast library (database) and select from a long-term memory a huge range of basic signals, abbreviations and initial and terminal signs where they are stored. At high speed, this represents a gigantic processing of information. This is a “high speed” (broadband) connection, in which speed is measured by words per minute.

The more the stenographic signals are consolidated into a long-term memory, the more solid will retention be and, thus, the faster will data flow out, enabling the brain to convert the sound that has been heard into a graphic symbol.

## ➤ THE APPLIED STUDY

Only a medium-to-long term engagement in a methodical and applied study, with constant repetitions, dedication and persistence, involving constant challenges to overcome and achieve the necessary maturity, will resolutely eliminate the mental hesitation and increase the brain-hand “speed connection”. In an applied study, the stenographer “refines” their shorthand basic structure knowledge (reinforcing foundations) and, little by little, enhances to new levels of proficiency culminating into mature skill development.

In the article “Bright Minds” by Philip E. Ross, from the “Scientific American” magazine, we consider the following very interesting quote: *“APPLIED STUDY is the key for success in chess, classical music, football and many other fields. New research indicates that motivation is more important than innate ability”*.

This same article adds: *“Motivation and intense training can also elucidate the exploits of famous child prodigies, such as the Austrian composer Wolfgang Amadeus Mozart and the American golfer Tiger Woods”*.

So, writing at high speed is something that is learned, acquired. However, to get there, it is necessary more than just innate ability, but a great deal of motivation, dedication, patience and hard work. You must train hard to make the strategy work and produce results. Without constant training (getting better each day), growing into higher shorthand speed is impossible, just as it is for a pianist to perform a difficult presentation from a great composer without such repetitive everyday training. A quick and effective mind of a stenographer is a skill developed from training rather than from an innate ability. Therefore, we need to practice and practice even more until “the boiling point” at each speed level has been reached.

The learning ability of shorthand is synonymous to the motor skill learning - a gradual development of a coordinated, reflex conditioning, automatic and accurate behavior. The progressive learning of such skill is reflected in the gradual increase of speed as to the brain-hand response. As the stenographer (or the shorthand student) methodically practices speed dictations (technical training), he gradually and increasingly acquires the peculiar characteristic of shorthand: listening to and writing down simultaneously different speakers, different cadences and voice inflections and different rhythms.

About this acquired skill and its location in the brain, the article “Learning Skills” by Larry Squire and Eric Kandel, in the “Living Mind & Brain” magazine states: *“After the task has been practiced for a long time, the prefrontal cortex, the parietal cortex and the cerebellum activities decrease, while the motor cortex and adjacent areas increase. The latter two regions may be those that, along with the neostriatum, store information related to the long-term memory capabilities and allow the execution of fluent movements of acquired skills.”*

## ➤ MEMORIZATION

Both in the learning and speed training phases, as well as in all shorthand activities, memory plays an important role. Throughout the study of shorthand, there is an ongoing exercise with the memory. This exercise becomes unmatched, as each new speed training requires faster work from the memory. Explaining this in a colloquial language,

it is like saying that, in a dictation of 60 wpm, we give orders to the memory: “think and develop the signs at a 60 wpm speed!” In a dictation of 70: “now think and develop those signs even faster!” And so on...

There is logic in saying that shorthand and memory retention are two terms that are complementary, because shorthand is not conceivable without a permanent memorization exercise.

It is a fact that there are two types of memory: short-term and long-term. The short-term memory is transient, ephemeral. In order to become a long-term memory, called permanent memory, *repetitive practice*, or *smart mental associations* is necessary to help with memorization.

The so called “mnemonic process” is able to develop and facilitate memorization, perform such associations to the point that, the object to be stored, is quickly and indelibly fixed in the memory. All the mnemonic resources can and should be used in shorthand learning and speed training. The repetitive practice is unsurpassable in terms of fixing within the *permanent memory*, the stenographic and conventional signs. It is an indisputable fact: the deeper entrenched the stenographic symbols are in a *permanent memory*, less hesitation will exist and more fluent and faster will writing down in shorthand be.

#### ➤ TWO SPELLING SYSTEMS “TALK”

An interesting fact that happens often with those who are learning shorthand is to mentally write in shorthand everything they see written on street signs.

When a beginner or advanced shorthand student is walking or driving and looks at a street sign, by instinct, they “mentally” write in stenographic symbols what they see. In fact, they practically read, in the new writing system they are learning (shorthand), what is written in the spelling system they already know (the common spelling). It is as if the two spelling systems “talked between themselves.”

The reason is easy to explain. As the student is engaged in learning a new spelling and their brain is involved in the learning process, they begin to mentally practice this new spelling and make comparisons with the previously learned spelling.

It is interesting to note that, the more a student is motivated in learning shorthand and the more they are applied in such study, the greater will the “conversation” degree be between the two spellings. There are students that, upon reading a word on a sign, usually write that word mentally, to a point of making movements with their fingers in the air, as if they were writing in shorthand.

This “conversation” between the two spellings is beneficial and efficient for the learning process. This indicates the highest degree of desire and engagement a student has in learning a new spelling.

#### ➤ MOTIVATION AND JOY OF VICTORY

Great musicians, athletes and professionals whose activities require high levels of skills, ability, mastery, proficiency and expertise acquire such skills through motivation and



mainly through applied study. Driven by competition, by the desire for success and the joy of victory, they spare no efforts to achieve their goals, studying with great passion, performing tests with dedication, training hard every day, weeks and months. They usually spend several hours a day training to get to the highest level of a skill.

That may also happen with the one who is learning shorthand, because the innate gift counts less depending more on the continued and applied study: focus on the goal, self-stimulation, intuition, target setting, concentration, care as to each detail, exercise done with concern, attendance discipline, regular training attendance, recycling, relentless repetition, regular everyday study. Thus, they acquire the knowledge and necessary practice of each lesson as well as the maturation on each learning level. Competence is achieved at every level of shorthand speed and, little by little, the experience, the subtleties and secrets of the art of shorthand are acquired.

#### ➤ THE EXTRAORDINARY VALUE OF SHORTHAND

As a brain exercise, shorthand has a unique value. That is, a unique exercise in attention and mental agility. It develops coordination and motor response. It sharpens the intelligence. It exercises the memory. It cultivates and stimulates rapid and precise decision, perception and discernment. It develops a high degree of concentration ability. It develops an interpretive skill and increases the ability to hear nuances.

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