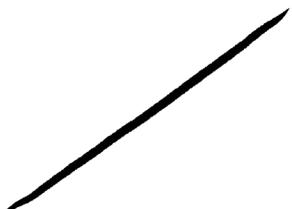


INTEGRATING VOICE & SPEECH INTO THE ORGANIC ACTING PROCESS.

AN INTERDISCIPLINARY APPROACH

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Abstract: The hypothesis of this article is that recent discoveries in the field of neuroscience can provide essential knowledge about the organic processes involved in stage speech specific to authentic acting creation, thus contributing to improving pedagogical approaches in both Voice & Speech and also Acting.

The article presents the premises for the integration of voice & speech into the organic approach of acting, from a neuroscientific point of view, as well as some tools and pedagogical approaches modelled from this perspective. Documentation in the field of neuroscience has allowed me to adapt a method of applied psychology in order to create exercises that enable the integration of new habits regarding voice production in everyday speech. These new exercises increase the work autonomy of students, who are encouraged to create micro personal habits, individualized according to their own needs and lifestyle. The re-evaluation of a well-known pedagogical tool – the vowel chain, from the viewpoint of the neurological processes of speech, allowed me to develop a working method that enables the integration of text recall along with activating emotionally competent stimuli, while correlating the speed of speech with the one of reprocessing ideas.

Keywords: organic acting, neuroscience, vowel chain, pedagogical instruments in Voice & Speech, applied psychology.

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1. Neuroscientific premises for integrating stage speech into the organic acting approach

In the organic approach of acting, we aim to integrate the psychological impulse, language, mind, body and voice of the actor in order to recreate a human experience that emerges from his whole being, not just from the conscious brain. How can we obtain this authentic human experience if the actor's stage speech must respond to conditions very different from his everyday speech? These conditionings are generated both by the reception needs of the spectator, in a theatrical space with dimensions and acoustic properties very different from the spaces in which we speak in everyday life, and by the use of speech at much higher emotional intensities than in ordinary life.

The starting point of my research is an important concept of contemporary theatre pedagogy, that of **organic**. What is the physiological reality behind this concept, when we refer to the actor's voice and speech? Can neuroscience provide useful information about what happens in an actor's body and mind when he recreates an authentic human experience, expressed through someone else's words, learned by heart? Can a deeper understanding of anatomy, physiology, neurology, and applied psychology increase the effectiveness of our pedagogical methods and tools?

In pursuit of answers to these questions, I turned first to the prominent neurobiologist Antonio Damasio's research on emotions and feelings. The concept of **organic acting** refers to a type of integrated experience of the dramatical situation and implicitly of the text spoken by the actor. Understanding the neurobiology of emotions and feelings offers a way to approach the mind-body problem, an essential problem to understand this concept in depth.

Emotions are related to the body, feelings are related to the mind. Understanding how thoughts trigger emotions or how bodily emotions become that kind of thoughts

we call feelings gives us a remarkable perspective on the mind and body, the two seemingly different manifestations of a single, unitary organism. (Damasio, 2010, p.11)

In neurobiological terms, emotions are complex sets of automatic, nervous, and chemical responses produced by the brain, following a distinct pattern when it detects an emotional competent stimulus (ECS). ECS is an object or event whose presence, **in reality or in memory**, triggers emotion. "The immediate result of these responses is a temporary change in the state of the body and the state of the brain structures that map the body and support thinking" (Damasio, 2010, p. 54).

Stanislavskian's appeal to emotional memory and the *magical if*, now finds its scientific, organic foundation in the functioning of the human brain. The way the brain processes these ECSs has a direct impact on the onset of emotions and feelings, as Damasio demonstrates. "Whether it is a fresh image, present in reality or one reconstructed after a memory, the effect is the same. If the stimulus is emotionally competent, then an emotion appears, and only its intensity varies." (Damasio, 2010, p. 57)

Could be true that in order to have free access to the emotionally competent stimuli, the conscious mind of the actor should not control simultaneously **how** the speech is produced? If so, every new ability that the actor has to learn in order to improve the voice and speech production, it should be performed with as little conscious control as possible. Most of those new abilities are new ways of using the body, addressing physical processes as posture, respiration, tuning and articulation. The process of learning new physical abilities has been observed in many neurological studies, in particular those regarding learning sports.

„When the brain receives a task, it reconfigures its own circuit connections until it can perform the task with maximum efficiency. The task is printed in the machine." (Eagleman, 2017, p. 94) This tactic has two big advantages for survival. The first one is the speed. The automation allows a very quick decision making. This is the process that permits a quick response when hitting a ball that is coming at a speed of 150km/hour. „Only when the heavy conscious system is pushed back can fast programs do their job." (Eagleman, 2017, p. 94). The second advantage is the energy saving. So, the brain is creating by repetition this programs that are very efficient and consume very little of the conscious attention. In time, those algorithms became so called *zombie programs* built into the circuit. „Most of our actions — from **speaking** to grabbing a cup of coffee — are driven by such subprograms. Some of these subprograms are instinctive, others are learned." (Eagleman, 2017, p. 168) My hypothesis is that, if the act of speaking is governed by such *zombie programs*, that we use daily since childhood and are part of our automatic response in our everyday life, the actor, in order **to act organically and use new abilities of speech**, should first modify these old zombie programs in his private life.

In order to be able to be well heard and understood in various theatrical spaces and / or at high emotional intensity, an optimisation of voice production and speech is required. This improvement should not alter the naturalness and

authenticity of speech, nor lead to a pompous and artificial way of speaking, but it should support the veracity of the dramatic situation suggested by the author. Based on the neurological understanding of the speech production and of the learning process described above, achieving these goals involves **two main stages**:

A. The process of learning and integrating in the subconscious part of the brain new habits / body predispositions / reflex responses embedded in the neural control mechanism of voice production;

B. The organic activation of these new reflexes related to voice and speech production and modulation in specific conditions of stage creation process.

A. The process of learning and integrating in the subconscious part of the brain new habits/body predispositions/reflex responses embedded in the neural control mechanism of voice production. Incorporating new habits in stage and everyday speech.

The coordination between the actor's mind, body, emotions and voice must become second nature, accessible at any moment of the stage experience, and „the voice can be trained by the intellect, but should not be inhibited by the intellect” (Linklater, 2006, pp. 8). This second nature is learned. The process of learning any physical ability, be it tennis or cycling for example, requires a first stage in which the conscious mind is fully involved. At the beginning we must pay attention to the handlebars, maintaining balance, correlating pedalling movements, applying the brake, etc. After enough repetitions and adjustments, the need for control of the conscious mind disappears and many of the actions involved become reflexive (Eagelman, 2017, p. 93). We can ride a bike and at the same time pay attention to traffic, have a conversation or admire a landscape. Our attention is free to turn to anything else, because now *the body knows on its own*. Similarly, the skills related to the use of the body during speech should first be learned consciously and afterwards absorbed in other areas of the brain, thus developing into new reflex habits that will not affect / undermine the attention at the points of concentration or partner.

After these new habits have been integrated in everyday life, they become second nature, operating spontaneously in the actor's stage behaviour. In order to incorporate these new ways of using the body in everyday behaviour and speech I used the method of *tiny habits*, developed by Prof. B.J. Fogg, director of Behaviour Design Lab at Stanford University. The *tiny habits method* is based on **Fogg Behaviour Model**.

The FBM highlights three principal elements, each of which has subcomponents. Specifically, the FBM outlines Core Motivators (Motivation), Simplicity Factors (Ability), and the types of Prompts/Triggers. The subcomponents define the larger elements. For example, in the FBM the word Ability refers to the how the Simplicity Factors work together in the context of a Prompt. A behavior is triggered when the 3 stated elements are manifested simultaneously: Motivation, Ability, Prompt/Trigger. Motivation is the desire to perform the behavior. Ability is the capacity to perform it. And the Prompt is the clue that triggers it. (Fogg, 2020, p. 308).

Fogg's research shows that in order to achieve new habits on the long term, motivation is not the most important factor, being very fluctuant on big periods of time. Analysing more than 40000 participants, Fogg concludes that is more efficient to work on the ability to perform new habits and on finding the right prompts that can trigger the execution of the new habit. Based on those conclusions, Fogg created the *tiny habits method*, described briefly below, where the new type of voice & speech exercises created following this method are explained.

B. Organic activation of new reflex habits related to voice and speech production and modulation in the specific conditions of stage creation process.

The conditions that can cause major problems are:

- The actor does not use his own text, processed here and now, but a text previously learned by heart and stored in the memory. Hence, as I will show below, there is a need to correlate the reprocessing of the ideas and the emotional assimilation of the text learned by heart with the process of its vocal expression.

- The actor is very often subject to stage fright, the sympathetic system's automatic response to fear that leads to the subconscious reaction of fight-or-flight. This reaction can severely impede, from a physiological point of view, the freedom to access either the *magical if* (in terms of emotion neurology, a series of emotionally fit stimuli*) or the memorized text. Therefore, the organic activation of the new and efficient reflexes of voice and speech production and modulation in the specific conditions of stage creation process implies achieving the following objectives:

- Correlating the reprocessing the ideas and the emotional assimilation of the memorised text with the process of its vocal expression, while activating all emotionally competent stimuli (the logical mechanism specific to the process of authentic creation).

- Counteracting the harmful effects of fight-or-flight reaction.

1. Correlating the reprocessing the ideas of the memorised text with the process of its vocal expression, while activating emotionally competent stimuli

Speech physiology is extremely complex, at command level involving the interaction between areas of speech in the brain (Wernicke area and Broca area) and other areas of the brain. The signals are then sent to the motor nuclei of the brainstem and through the spinal cord to the nerves that coordinate the activity of the larynx, the muscles of the thorax and abdomen, the articulatory organs and the vocal tract.

The cerebral cortex is responsible for our consciousness, reason, empathy, memory, language comprehension, semantic knowledge and speech production. Language is processed mainly in the left hemisphere of the cortex. Language comprehension is achieved in the Wernicke area which stores verbal memory and develops the ability to formulate logical and coherent sentences through a rapid process of selecting and organizing words and their meanings. The Broca area,

located towards the front of the hemisphere, controls the motor memory and commands speech organs (Denes and Pinson, 2007, p. 126).

Research on the functioning of the two hemispheres of the brain has highlighted two different approaches in information processing: serial processing, which is sequential and the basis for language, specific to the left hemisphere and parallel processing of multiple stimuli from several senses in at the same time, specific to the right hemisphere (McGilchrist, 2010, p. 38). This characteristic of the right hemisphere to process simultaneously different sensory images is very suitable for the primitive thinking referred to by Professor Cojar (Cojar, 1998, p. 31). Moreover, the ability of the right hemisphere to process sensory information quickly and simultaneously provides evidence of the primordial origins of man, as a being who had to quickly process sensory stimuli in order to survive (Jamieson, 2007, p. 17).

The right hemisphere is empathetic, it helps to put ourselves in someone else's shoes. It is connected to the limbic system, the body and emotions, the vegetative system and the unconscious processes of the nervous system. The right hemisphere interprets facial expressions, body language and gestures, *intonations and timbre of the voice*. The left deals with the conscious processing of literal understanding and speaking of language, with syntax and vocabulary (McGilchrist, 2010, p. 413).

In short: „the left hemisphere processes knowledge, the right hemisphere processes experiences” (McGilchrist, 2010, p. 78).

The left hemisphere can be slower because it operates sequentially, step by step, using categories and meanings. The fact that the left hemisphere which controls language comprehension and speech production works sequentially has direct consequences on the communication of a memorized or read text, as is the case with the actor. One of the most obvious consequences is observed in very long and elaborate sentences.

My hypothesis is that, in the case of long texts learned by heart, there are often inconsistencies between the speed of speech processed in the Broca area and the speed of processing meaning, thought, processed in the Wernicke area and other regions of the brain, which are more engaged in the case of memorized text than communicating one's own. These discrepancies are the result of a mismatch between several neural processes that occur simultaneously or sequentially in the brain. Summarily, when assuming „the logical mechanism specific to the actor's art” (Cojar, 1998, p. 37), the following processes are correlated in the brain:

- recalling the text, (sequential) processing in the Wernicke area, left hemisphere;
- re-examining meanings (sequential processing, left hemisphere) by activating a complex of emotionally competent stimuli in the right hemisphere (simultaneous / parallel processing);
- motor control process required for speech production (Broca area, left hemisphere, probably faster sequential processing than Wernicke area).

Consequently, there is a permanent dialogue between the two hemispheres of the actor's brain. Mainly in the right hemisphere, the creative imagination works simultaneously by activating visual, tactile, sound or olfactory images that operate as a build-up of emotionally competent stimuli (Damasio, 2010, p. 67), activating what Professor Cojar designated as „thinking in images saturated with psychic elements that allow the actor to be both civilian and Hamlet or Richard whose concepts, ways of thinking have been assimilated” (Cojar, 1998, p. 39).

The ability to work in such a complex way involves a **verb-vocal training** that must progressively integrate the practice of new speech habits in the complicated sequence of reprocessing the text and activating the creative imagination. This is also the reason why all speech exercises should have a final part that is engaging a real communication purpose, while activating and progressively training the complicated process described above.

2. Counteracting the harmful effects of fight-or-flight reaction

The fight-or-flight reaction is a complex mechanism that involves the almost instantaneous activation of several systems and prepares the body for the rapid and intense physical action required to avoid an immediate danger. Therefore, it is an unconscious and automatic response to fear. In case of stage fright, fear is generated by the dread of ridicule, of making mistakes, of being judged. This fear *automatically and unconsciously* triggers the fight-or-flight reaction, preparing the body for a completely different activity than the one essential to artistic creation. A series of processes are triggered in the body that are in serious contradiction with the requirements of effective voice production as well as free access to imagination and emotionally competent stimuli. (Cuthbertson-Lane, 2009, p. 75)

The second the brain registers a potential threat, the sympathetic system is activated, triggering in the body a cascade of electrical, neurochemical and hormonal signals. The effects of this cascade are revealed in the respiratory, muscular and cardiovascular system (Cuthbertson-Lane, 2009, pp. 77-83). These chemical and nervous signals initiate the rapid, clavicular breathing that is necessary in case of physical danger since an increase of oxygen supply in the blood and muscles is useful for fast and intense physical activity. Superficial and rapid clavicular breathing, useful if we need to run or fight, is completely counterproductive in voice production and the negative effects do not stop here. This type of breathing quickly consumes the excess carbon dioxide produced during intense physical activity. The chemical imbalance in the blood leads to respiratory alkalosis which can be beneficial in case of physical since it has a desensitizing effect on the body and brain and prevents excessive bleeding. It's helpful not to feel the pain of an injury if I have to fight or run. But if there is no physical injury, respiratory alkalosis can cause dizziness, reduced concentration, poor memory and emotional disconnection, severely affecting the cognitive and emotional processes involved in acting creativity. Combined with the effect of stress hormones, respiratory alkalosis can produce intense muscle contractions with obvious negative consequences on voice production and motor freedom. (Cuthbertson-Lane, 2009, p. 76).

Moreover, this chemical imbalance in the blood can be interpreted by the brain as evidence of future danger, triggering a spiral of chemical stress signals, further aggravating the situation.

In a life-or-death situation, emotions can be a dangerous luxury as they can divert attention from the rapid actions required to eliminate the danger. As a consequence, the body inhibits them through the sympathetic system, in order to focus on avoiding danger. The system is set to react now and feel later, when the individual is safe and has the time to process strong emotions (Cuthbertson-Lane, 2009, p. 77).

The parasympathetic nervous system counterbalances the action of the sympathetic by calming the body after the danger has been overcome. Herein, the vagus nerve plays an important role. The vagus nerve leaves the brainstem and descends into the body, penetrating the diaphragm in order to connect to the enteric system. In its pathway it supplies nerve fibres specific to the parasympathetic system to all organs between the neck and colon (except the adrenal glands) and controls some striated muscles, such as the pharyngeal constrictor and laryngeal muscles involved in voice production (Cuthbertson-Lane, 2009, p. 77).

II. Pedagogical tools and approaches based on neuroscientific premises and applied psychology

In the above, we saw the complicated neural process of thinking in *images saturated with psychic elements* (Cojar, 1998, p.39) involved in authentic acting creation. We also know that it is necessary to streamline and optimize voice and speech production so as to verb-vocally express intense emotional processes in the conditions specific to theatre space. This optimisation is achieved by assimilating new reflexive speech habits in real, personal life first in order to then function naturally and spontaneously in stage speech.

As a result, the voice& speech training should progressively integrate the use of new speech habits into the effort of reprocessing the text and activating the creative imagination.

The foundation of voice& speech training is a process of conscious learning and subsequent assimilation in the subconscious area of the brain of new habits / body predispositions / reflex responses embedded in the neural control mechanism of voice production. If integrated at first in current, everyday speech, these new habits become second nature and get to be activated subconsciously in stage speech without interfering with the emotional processes of authentic acting creation.

To conclude, in order to achieve the development of the actor's vocal skills in correlation with emotional processes, the specific training should pursue three main objectives:

- Organic assimilation of new voice production habits (posture, breathing, vocal setting and articulation) in private life

- Using these new habits in reprocessing the text and activating the creative imagination
- Eliminating the harmful effects of fight-or-flight reaction

A. Organic assimilation of new and beneficial voice production habits in private life. The Tiny Habits Method applied in Stage Speech

I have created a new type of exercise – tiny habits – which enables new habits of using the body to be assimilated in private life.

B.J. Fogg's method generally aims at changing behaviours and relies on the relationship between the cerebral cortex (*the new brain*) and the subcortical systems (limbic system, brainstem), sometimes referred to as *the old brain*. *The new brain* consciously controls cognitive processes, reason and willpower. *The old brain* controls reflexes and subconscious activities, is more primitive and more directly connected to the body thus reacting automatically and subconsciously to pleasure / displeasure (pain) stimuli. Independently from the cerebral cortex, *the old brain* attaches a label of pleasure or displeasure to any new situation / behaviour / stimulus signalling the body either an opportunity or a danger (Fogg, 2020, p. 59).

When we aim to make changes on how the voice functions, we need to develop new behaviours that become reflexes which, in time, replace the old ones. Several conditions are required for this change in behaviour:

- new behaviours to be accepted by the old brain which subconsciously attaches a label of pleasure and not of discomfort or pain;
- new behaviours to be used often enough to form stronger neural circuits than the old ones, replacing them over time.

To meet the above conditions, the *tiny habits* method uses these three elements:

- Trigger. Establishing an existing daily habit (brushing teeth, accessing Facebook etc.) to which the new habit is attached.

- A very short and easy to do version of the new habit (tiny habit – abbreviated TH) over 2-3 repetitions, in a very short time (max. 30 seconds). This TH should not require a willpower effort.

- The reward/celebration of success. After each TH repetition we should give ourselves a small emotional reward that attaches the label of pleasure to the new habit and encourages its repetition in the future. This emotional reward should be experienced in the body in order to be perceived by the old brain (a slight touch of pleasant warmth, as when we receive an honest praise from someone we appreciate).

Following the structure above, I have developed exercises that integrate new habits of posture, breathing, vocal setting and articulation, acquired in class and trained in individual study, in the student's everyday life.

These exercises are developed in time, infusing the everyday speech and creating the second nature of efficient speaking. THs can also be integrated into the specific warm-up routine performed before acting classes.

I will describe in detail the method in a future paper dedicated exclusively to this subject.

B. Using new habits in the mental reprocessing of the memorised text and activating the creative imagination. The vowel chain – a versatile pedagogical tool

Consonants carry meaning, vowels carry emotion (Linklater, 2006, p. 93) is an easily demonstrable truth. From an evolutionary point of view, vocalization precedes articulation. Articulated language (containing consonants) appeared relatively late, when the human brain and communication started developing and incorporating an increasingly more notions that had to be expressed differently. Consonants are most likely the main product of the left hemisphere, responsible for sequential knowledge processing and abstraction. Inarticulate language (vowels, whether defined or not) appeared before and is directly related to the right hemisphere which processes emotionally competent stimuli faster, as we saw in the previous chapter. This hypothesis is verified by any situation that generates strong primary emotions (fear, anger or intense joy). The first reaction to a strong earthquake will be the inarticulate screams, that is more or less defined vowels. Therefore, we can presume that the vowels are an older *layer* of language, directly related to emotions and the right hemisphere.

I have adapted **Michael McCallion's pedagogical tool – the vowel chain** – in order to address the difficulties of the complex processes carried out in the actor's brain during authentic creation.

The *vowel chain* is the resulting sequence of vowels in a word, a sentence or a phrase when removing the consonants from the syllables. The main version applied is the spoken vowel chain (abbreviated SVC) which involves uttering the linked vowels while respecting the word's syllabic pulsion and tonic accent, thus speaking the words from which we removed the consonants.

This versatile tool has the following benefits:

- *Simultaneous processes of the two hemispheres are activated by accessing emotionally competent stimuli along with reprocessing the text.* The full text has a semantic level supported by consonants. Repeating the text leads to *blurring* the emotional support of the idea. The brain has built-in subconscious energy-saving mechanisms that minimize consumption and deactivate energy-consuming processes after several repetitions of the same task (Eagleman, 2017, p. 93). Unconsciously, when we

repeat the same idea over and over again, the brain progressively reduces emotional engagement (which, as seen, involves more consuming energy processes) relying increasingly on the semantic level of communication. By eliminating consonants, we eliminate the semantic level of communication, so the brain is forced to further mobilize emotional communication and attach sensory images to language.

- *The speed of speech is correlated with the speed of processing ideas.* When longer ideas are learned by heart, inconsistencies often appear between the speed of utterance (which refers mainly to the duration of vowels) and the speed of processing meaning/ thought. These inconsistencies are the result of a mismatch between the slower speed of the process involving the remembrance and reprocessing an idea (Wernicke and other areas) and the faster speed of the motor control and speech production process (Broca area). There are certain “threats” to long ideas:

- **Scylla:** speaking too fast (vowel duration too short). Assuming the rapid tempo of current speech is natural on minor topics of daily life. It is appropriate to communicate short ideas using an accessible and limited vocabulary that is typical of everyday life: *Did you pay the phone bill? Why didn't you pay it? I cannot count on you.* When we use a fast tempo, the fluency of a long idea is fragmented. Fragments of related words appear – *mega-words* hastily uttered, followed by sudden stops. The speaker loses the thread of the idea because he delivered it too fast relative to the real speed of thought processing.

- **Charybdis:** excessive prolongation of vowels, especially at the end of the word. This happens mainly in narrative texts that have long descriptions and numerous details. The same monotonous, sleepy rhythm is installed, creating illogical idea fragmentations and an excess of enumerative commas. By working in vowel chains, the student modulates the duration of the vowels and learns to give himself enough time to remember and process the idea while speaking it.

- *Tuning and resonating optimization* because the use of the pharyngo-oral resonator is made more efficient by correctly directing the voiced air flow and by placing the voice energy into the vowels, thus developing the audibility and penetrance of the voice.

C. Eliminating the harmful effects of fight-or-flight reaction. Breathing, relaxation and the right to make mistakes

The pedagogical approach must pursue two objectives, in Acting class as well as in Voice& Speech class:

- Decreasing and, over time, eliminating the triggering cause: the fear of making mistakes.

During both acting and speaking exercises, the student must be given the right to make mistakes. To work creatively means to experience new concepts, behaviours, situations, actions. The error is an integral part of the experimentation process. A lower fear of making mistakes determines a lower chance to activate the *fight-or-flight* reaction and, implicitly, the cascade of unwanted effects it produces.

- An efficient method of calming the body if the reaction has been activated.

Since the reaction is unconsciously activated, the trigger deactivation (various types of fear) cannot occur by simple willpower. Conscious breathing can have a comforting effect given the action of the diaphragm on the vagus nerve through stimulating the sensory neurons of the parasympathetic system, hence restoring calm and harmony in the body. Conscious breathing also re-establishes blood gas balance and prevents the destructive cycle of respiratory alkalosis. Breathing and relaxation exercises have a beneficial calming effect on the body, especially if completed in the warm-up routine before the Acting class.

Conclusions

Recent discoveries and theories in the fields of neuroscience, psycholinguistics and applied psychology can contribute to the development of new approaches and pedagogical tools, both in Voice & Speech and Acting and lead to an articulated scientific foundation for the organic and integrated approach of stage speech in the process of authentic creation, thus opening new research horizons for the future.

Documentation in the field of neuroscience has allowed me to adapt a method of applied psychology in order to create and experiment exercises that facilitate the assimilation of new habits of voice production in everyday speech. These new exercises increase students' work autonomy, encouraging them to create tiny personal habits, individualized according to their own needs and lifestyle. The direct involvement makes students responsible for their own artistic development and offers them a coherent method of gradual embodiment of new skills, ensuring the premises for an efficient, fulfilling and deeply organic stage speech.

Re-evaluating a well-known pedagogical tool (*the vowel chain*) through the neurological processes of speech allowed me to develop a working method that enables the integration of text memorisation into emotional competent stimuli activation while correlating the speeds of speech and reprocessing ideas.

Last but not least, the in-depth understanding of fight-or-flight phenomenon can improve the general pedagogical approach and show new benefits of breathing and relaxation exercises.

As neuroscientific fields are constantly developing, opening new perspectives on the body-mind problem, I will continue my research, aiming to better understand and apply this new scientific knowledge to the pedagogical methods of voice & speech.

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