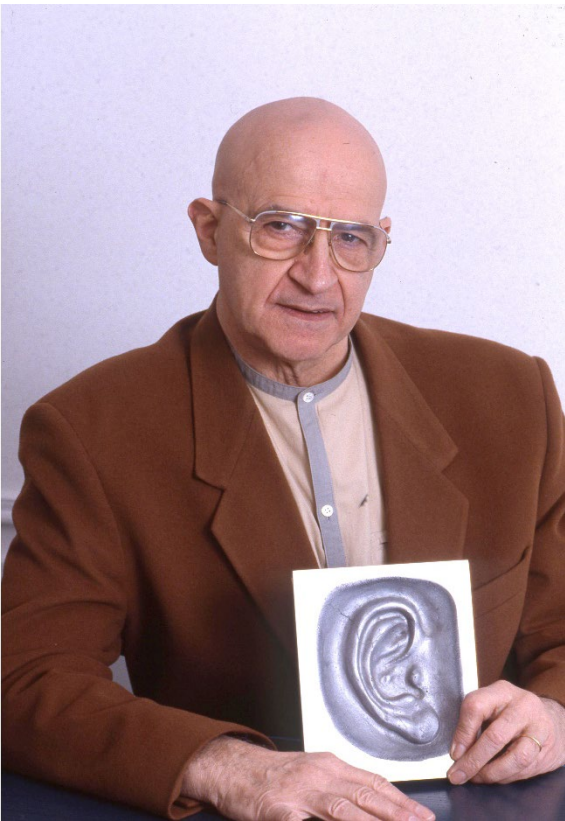




# The Tomatis® Method

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- ENT surgeon and phoniatician
- Founder of the Tomatis® Method
- Presented the founding principles of his Method to the Académie des Sciences de Paris in 1957
- He published 14 books and numerous articles



# The ear and the voice



- It was at the end of the 1940s, while working with laborers who were continuously exposed to high intensity noise, that Tomatis was led to discover the fundamental relationship between the ear and the voice.
- Thanks to numerous observations and ENT tests carried out on those workmen, Tomatis came to the conclusion that the more the ear is altered, the more the quality of the voice is degraded.
- These observations gradually led him to realize that impaired auditory perception directly degrades the auditory feedback that it provides. This results in poor voice production: in other words, when auditory feedback is altered, the voice is directly affected.
- It was following these initial observations that Tomatis formulated 3 fundamental principles called the "Tomatis laws" which form the basis of the entire method he created.



# Founding principles of the Tomatis® Method



## The Tomatis Laws

1

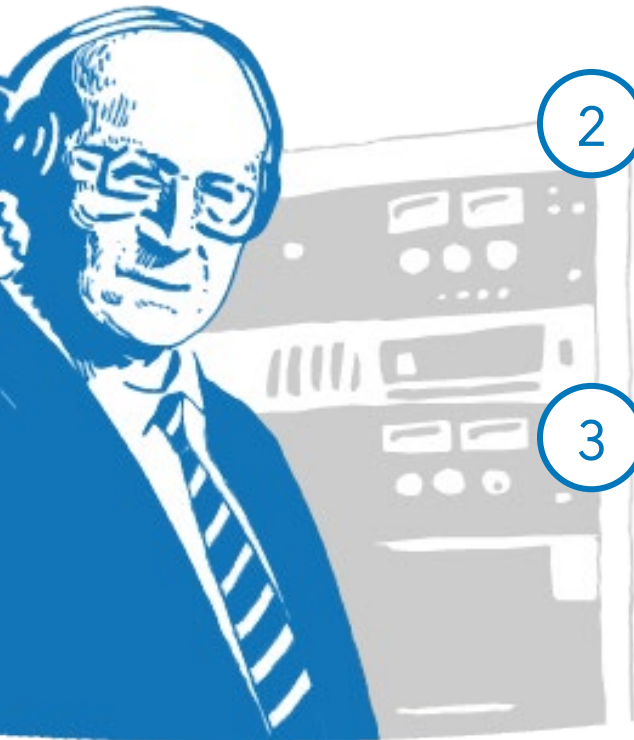
The voice contains only those harmonics that the ear can hear: a person can only produce those harmonics that the ear can sufficiently perceive and analyze.

2

If a person is given the opportunity to perceive the compromised sound frequencies in their speech production, they are automatically and instantly restored in their speech output.

3

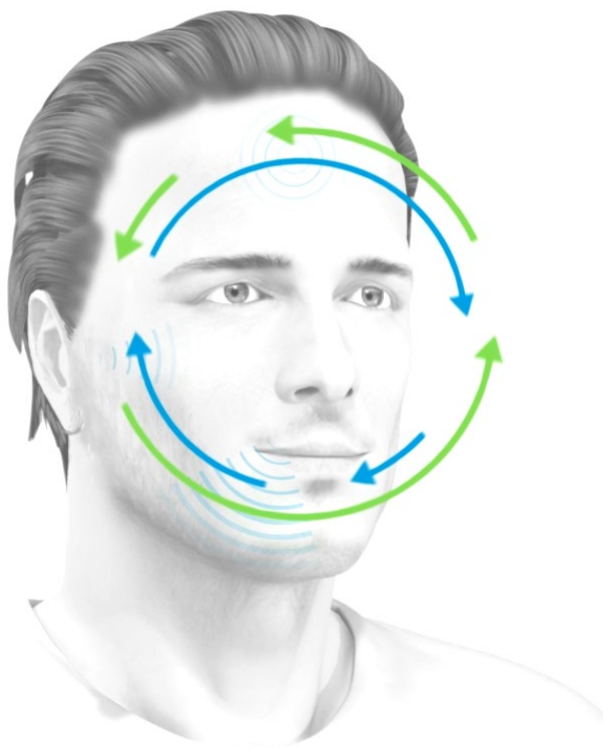
When maintained over a sustained period, a Tomatis® course allows for long-term improvement in the perception of problematic frequencies in speech emission and therefore improvement in their production (This third principle is called the "Law of Remanence")







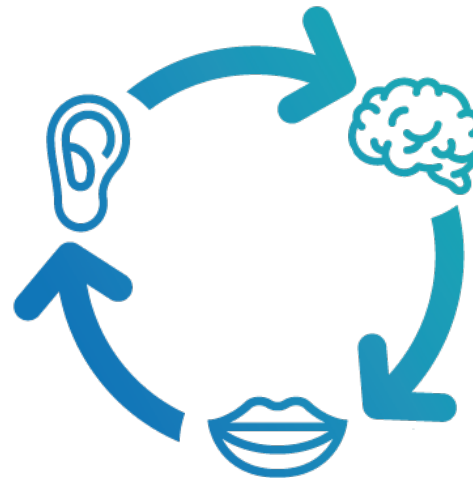
# Audio voice work



When we produce a sound, we naturally hear our own voice thanks to our hearing...this experiment simply illustrates the implementation of auditory feedback, or audio-vocal circuit, the circuit that links the ear to the voice and vice versa

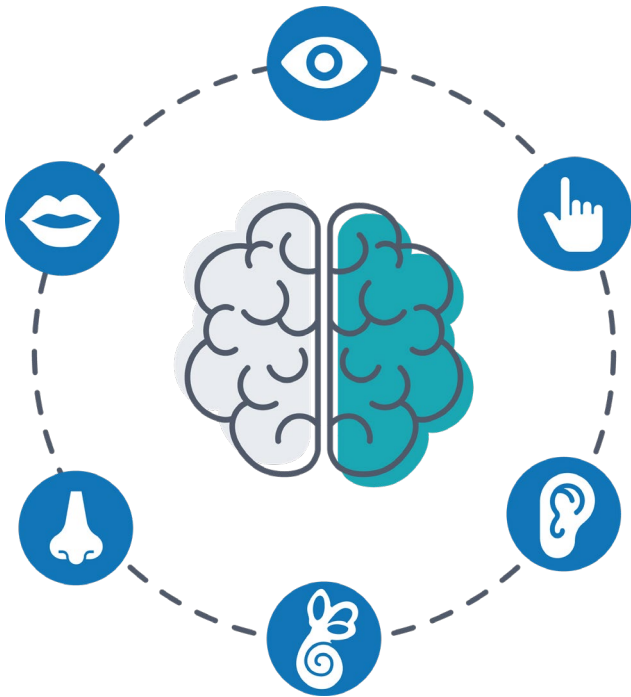
This seemingly trivial phenomenon is more important than it seems because not only does the audio-vocal circuit allow us to control our own voice when speaking or singing, but it also plays a major role in terms of learning and communication.

For more than 70 years, the notion of the audio-vocal circuit has been at the heart of the Tomatis® Method. Since its creation at the end of the 1940s, this method has emphasized the existence of a constant interaction between the auditory system that allows individuals to perceive the sound of their own voice, and the motor programs that come into play in the production of any vocal gesture.

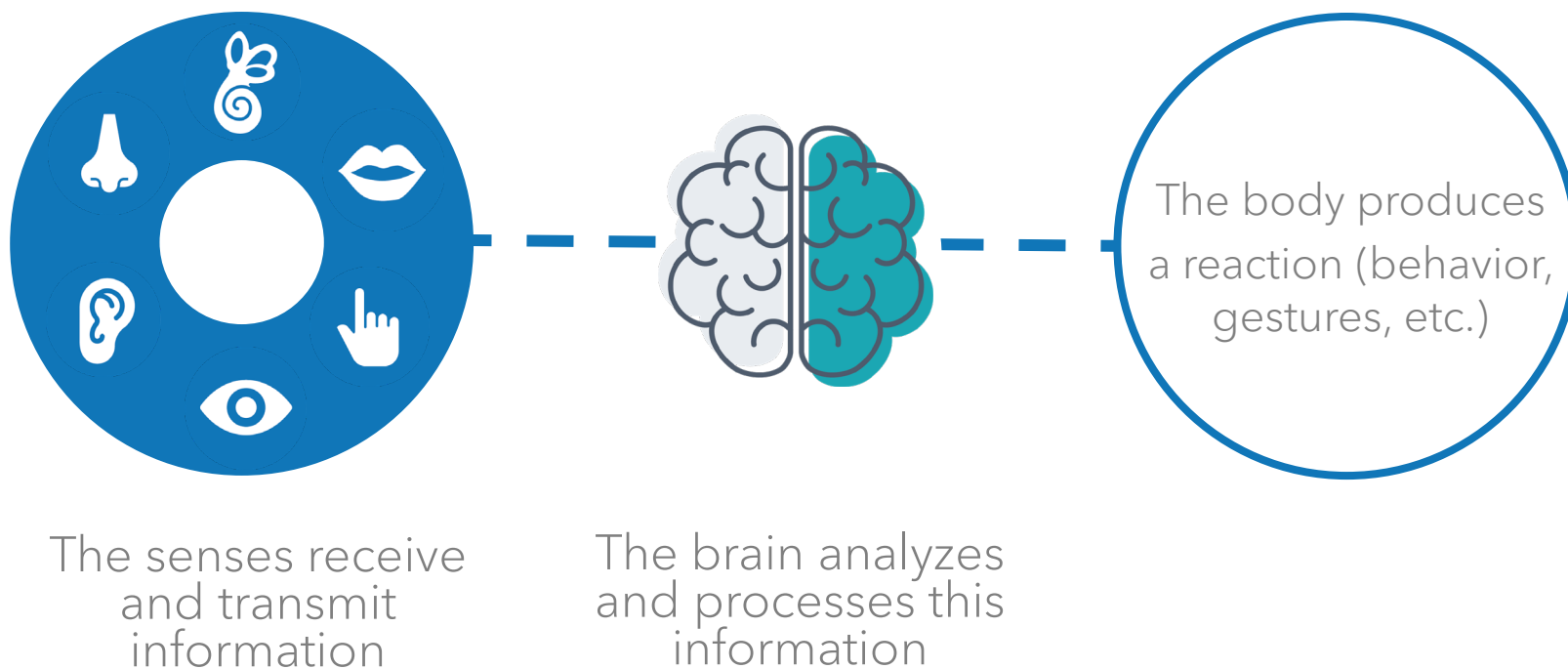


The auditory system is crucially involved in the perception and control of one's own voice.

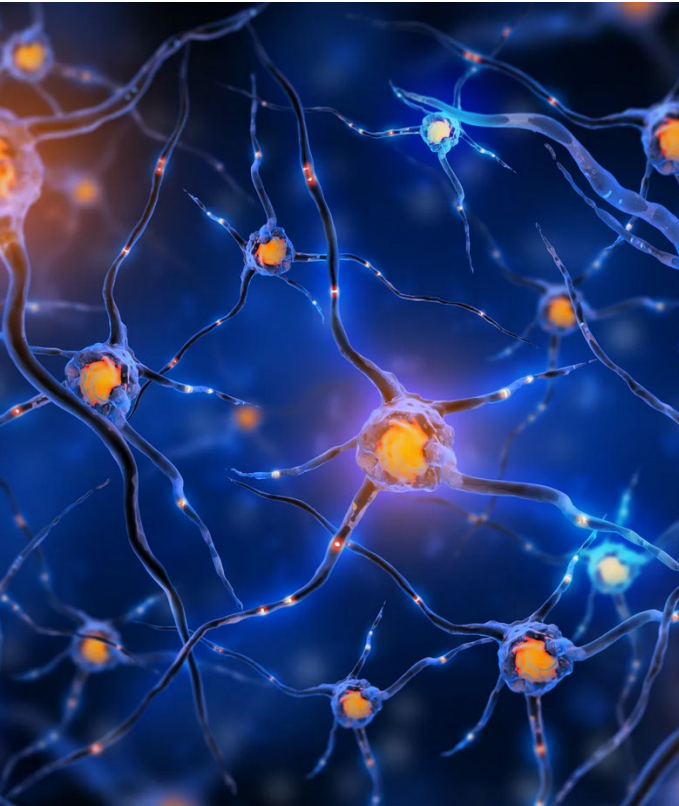
If this circuit is not functioning properly, speech cannot develop normally and cannot be preserved with the required frequency accuracy and temporal precision.



- Neurosensory integration is our ability to sense, understand and organize sensory information from our body and environment.
- This information is transmitted by sensory systems such as sight, touch, smell, taste, hearing as well as vestibular and proprioceptive systems.
- Proper integration and organization of sensory information is necessary to react appropriately to our environment by managing the messages that our sensory organs transform into sensations.







The nervous system receives a quantity of information from the outside which is estimated at a thousand million units of information per second.

This is all the information that allows us to regulate the body's functions.

**In relation to internal balance:**

- Blood pressure, oxygen level...

**In relation to our external environment:**

- Postural information, level of tension and muscle tone, visual, auditory, tactile, gustatory and olfactory stimuli...



# The nervous system



The nervous system is very well structured and organized, which allows it to process information without becoming blocked or saturated.

In order for us to develop, we need a nervous system that is open to the outside world, well-developed and capable of processing the information and energy that comes from the surrounding environment.

The latest scientific research in neuroscience shows that our brain processes 80% of external stimuli through the ear.

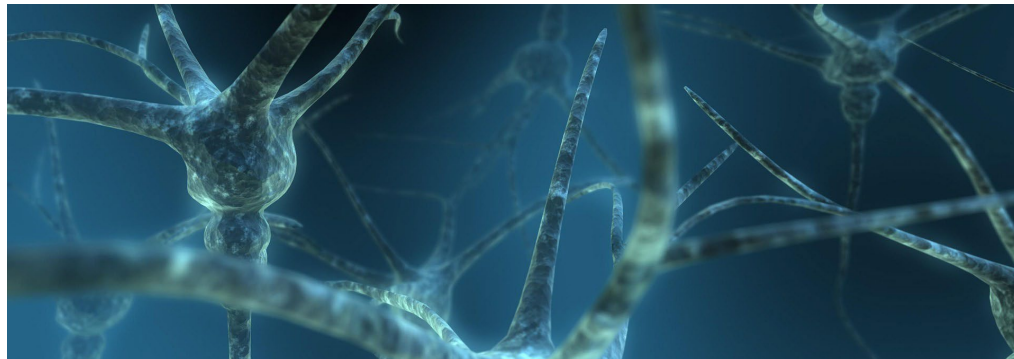


# Stimuli



Stimuli are received by our senses in the form of frequencies, waves.

They are able to stimulate a specific receptor, which transforms the stimulus into a nerve impulse that can be interpreted by the nervous system.





Stimuli reach the structures that will filter them and then the information is sent to the areas which will interpret, memorize and convert them into data in our memory.

It is at this very moment that we build a representation of reality thanks to the decoding and interpretation function.



The brain perceives a series of impulses



It recomposes and interprets these impulses



To build a virtual and holographic montage of reality



# What if it all fails to work properly?



- The senses do not work in isolation, but rather each one works with the others to form a complete picture of who we are physically, where we are, and what is happening around us.
- This complex organizational work allows us to plan our actions so that we can be efficient and adapted to our environment.
- This process in turn produces new sensations (feedback), which allows us to know the results of our action and to adjust our behavior.
- A successful action, i.e. an adapted action, provides a **feeling of mastery over the situation and self-confidence**.
- But for some people, this process is sometimes inefficient or ineffective.





# Two types of sensory integration difficulties



Sensory modulation difficulties due to poor perception of the stimulus by the brain.

Motor praxis difficulties due to poor stimulus analysis by the brain

Children who jump around because they need sensory stimulation

Adults who are unable to concentrate because there is too much noise around them

Children with good balance but who cannot dance or catch a ball



Adults who are  
unable to stay put,  
who are constantly  
in action

Children who often  
look sleepy, despite  
the noise and action  
around them

- Sensory modulation difficulties occur when responses are exaggerated and too frequent. Sensory modulation difficulties can appear in the form of hyperreactivity or hyporesponsiveness.
- In hyperreactivity, the responses are too strong. Stimuli will be perceived as aggressive or threatening. One needs to find a way to protect oneself.
- In hyporeactivity, there is a lack of stimulation. Stimuli have to be more numerous, intense and frequent for the brain to perceive them. One will respond either by apathy or, on the contrary, by sensory seeking.



# Motor praxis



For a child with motor praxis difficulties, it is hard to learn or perform new movements.

This child has difficulty using information from proprioception, touch or the vestibular system. He/she perceives their body in an incomplete way. They use their body awkwardly when learning new movements.

They can learn new tasks, but they need more repetition. It may also be difficult for him or her to generalize this new task. This is what causes them to be behind their peers.



# Brain plasticity knows no age limit



Brain plasticity is defined as the brain's ability to change its structure and function in response to experiences and the environment.

Researchers noticed that new nerve cells were generated in the hippocampus in adults of all ages.

Connections between nerve cells can change, even in adulthood.

# Practice makes perfect



The more you practice, the more you stimulate, and the more you strengthen neuronal connections.



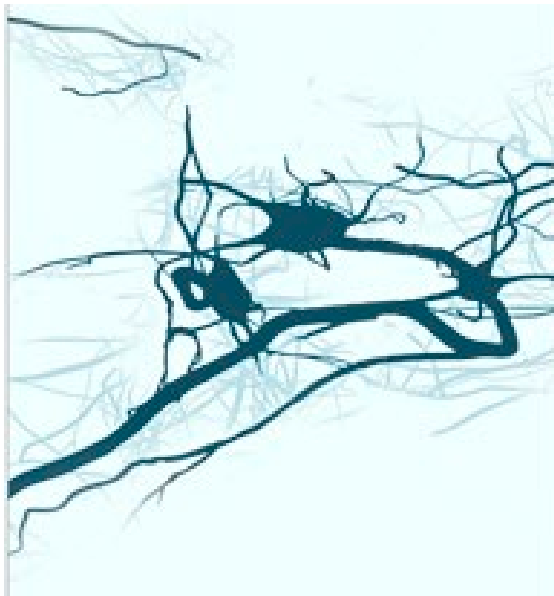
Every exercise allows for new cells to be connected and the neural network to be expanded.



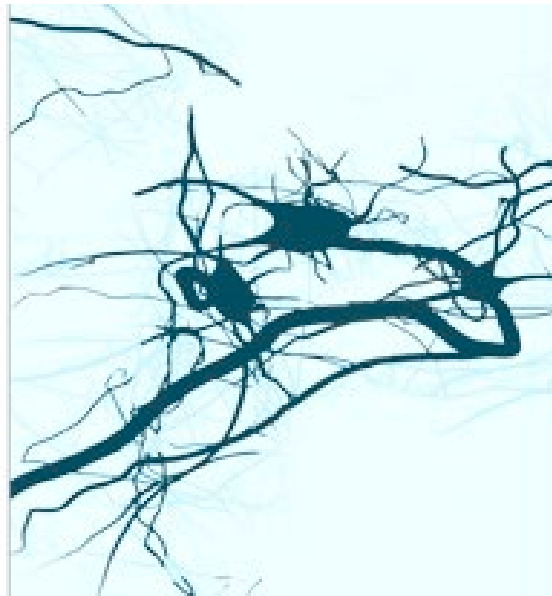
The more I practice an instrument or a sport, the more I improve and the more certain areas of my brain improve and expand the neural networks involved in the chosen activity.



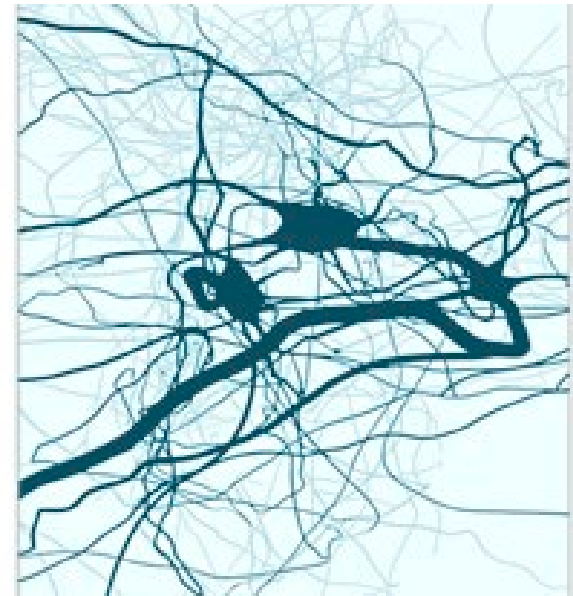
# Brain plasticity



Neural networks  
before training



Neural networks  
after 2 weeks of cognitive  
stimulation



Neural networks  
after 2 months of  
cognitive stimulation



# What about the ear in all this?



The ear receives and sends information to different structures in the brain, which are involved in **motor skills, language, memory, attention and emotions.**

# The ear, a major gateway for information processing



The ear is a sensory-motor organ composed of two parts that form a whole:



The cochlear system which is the auditory part

Cortical energy, hearing, language, musical analysis.  
corticale, audition, langage, analyse musicale.

The vestibular system which is the motor part

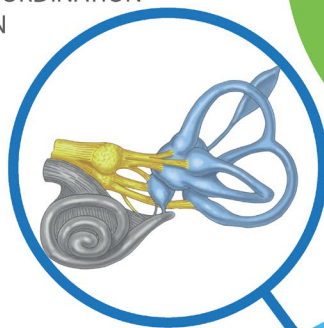
Cortical energy, posture, balance, coordination, muscle tone, body image, spatial navigation

# The auditory system's involvement in our daily lives



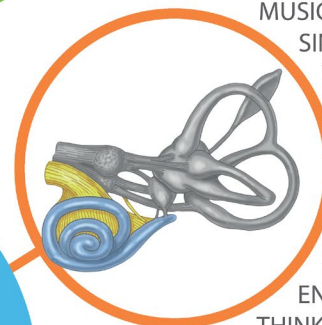
## Vestibular system

BALANCE  
POSTURE  
SENSORY INTEGRATION (TOUCH, SMELL, TASTE, VISION, AUDITORY)  
ALL MUSCLES OF THE BODY ARE CONNECTED TO THE VESTIBULAR SYSTEM  
MOVEMENT AND COORDINATION  
SENSE OF DIRECTION  
SPATIALIZATION  
MUSCLE TONE  
BODY IMAGE  
TIME  
RHYTHM  
FINE AND GROSS MOTOR SKILLS  
SEQUENCING, PLANNING, ORGANISATION SKILLS  
SPORTS  
EMOTIONAL REGULATION



## Cochlea

SPEECH  
LANGUAGE  
PHONEMIC AND PHONOLOGICAL AWARENESS  
COMMUNICATION  
SPEECH ARTICULATION  
AUDITORY PROCESSING  
UNDERSTANDING  
SOUND DISCRIMINATION AND/OR RECOGNITION  
LEARNING ABSTRACT CONCEPTS  
MUSIC, MUSIC ACCURACY  
SINGING  
VOICE QUALITY (TIMBRE)  
LEARNING  
FOCUS, ATTENTION  
MEMORY  
CREATIVITY  
INTUITION  
EMOTIONS  
ENERGY  
THINKING  
REASONING



## Vagus nerve

APPETITE  
SLEEP  
HEART BEAT  
BREATHING  
DIGESTION  
URINARY AND REPRODUCTIVE ORGANS  
LARYNGEAL MOTOR CONTROL  
SELF-REGULATION



## Eye

VISION  
READING  
TRACKING, VISUAL SACCADDES  
WRITING  
VISUAL PROCESSING

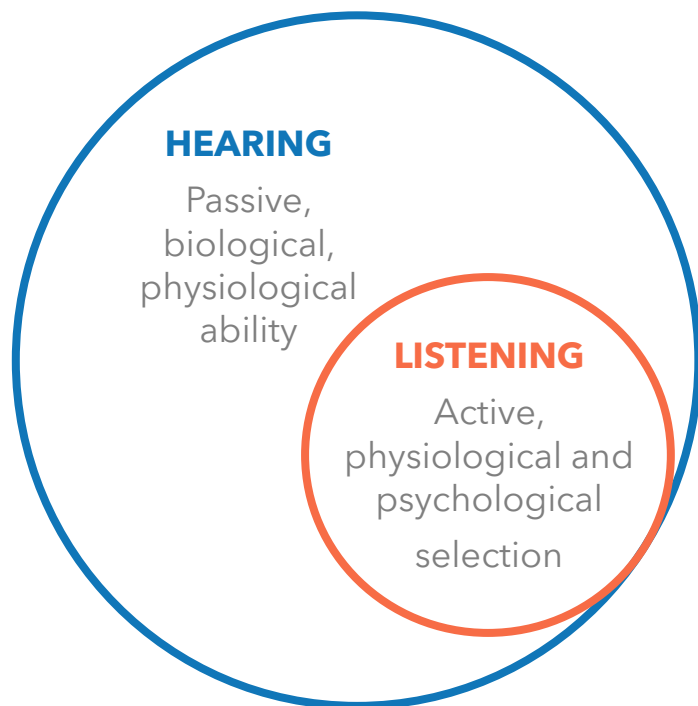




# The cochlea and the vestibule



The cochlea and vestibule are interconnected at the cerebral level and combine their auditory and motor functions into one: **listening.**



Listening involves the following skills:

- The possibility to choose, select a sound or information.
- To be able to target a sound and stay focused on the information.
- To be ready to receive the information: physically, psychically and emotionally.
- To be interested in the information.
- Have sufficient attention span.
- To be able to focus on the information.



# The concept of listening



Listening is the ability to be able to use one's ear in an attentive manner, for the purpose of learning and communicating and without it being emotionally disturbing.





# Why do we stop listening?



I am edgy

I am exhausted  
by life's hustle  
and bustle

I withdraw into  
myself and  
avoid all  
contact

I constantly feel  
attacked by  
noises, voices,  
people around  
me...

- Pathology: hearing loss, sound trauma, tumor, recurrent ear infections...
- Psychological defense mechanism: facing our body's inability to adapt and self-regulate due to stress, anxiety, fatigue or psycho-emotional tension, our perception will be altered.
- Psychological hyperacusis or hypoacusis
- As a result, there will be emotional disturbances or behavioral or motor adaptation difficulties.



# The Tomatis® Method



1 - The goal of the Tomatis® Method is to restore quality listening.



2 - We will try to harmonize the ear, the voice, the body and calm the emotional system.



3 - To do so, we will reorganize the nervous system, using music that is modified and that will allow for the listening to be re-educated so that there are no more emotional or adaptability responses by using neuronal plasticity and neurosensory integration.



4 - The auditory system is extremely interconnected to the thalamus, the limbic system, the vagus nerve and the parasympathetic system, which govern our emotional system and our responses.

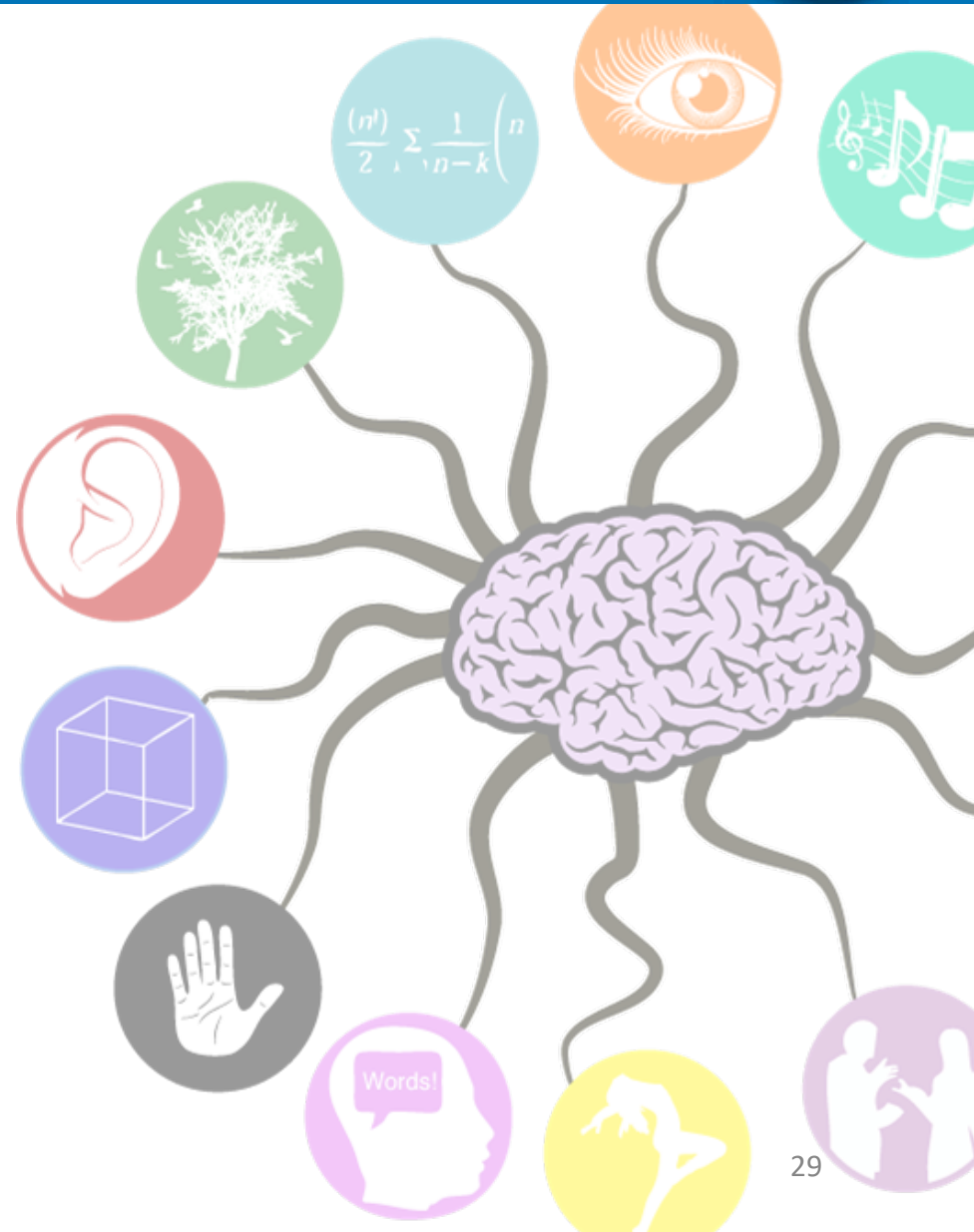


# The Tomatis® Method



When there are immaturity problems in the nervous system, neurosensory stimulation will allow for the strengthening of existing neuronal circuits or the creation of new ones by acting on brain plasticity.

Music is a rich and complex stimulus that can stimulate the whole brain, thereby inducing important neuronal changes.





There is a lot of research that has been done on the use of music and its effect on modulating brain activity.



These effects have been observed in professional musicians as well as in non-musicians who practice and listen to music for pleasure.

In 1996, Thaut et al. suggested that rhythmic auditory stimulation could be used to mitigate the motor deficits of Parkinson's disease. After three weeks, patients who exercised with rhythmic auditory stimulation had significantly improved their gait speed, stride length and step rate compared to the control group.



# Research and music



Another area of clinical research concerns stroke rehabilitation, during which three weeks of music-supported therapy with a MIDI piano or electronic drum set produced significant improvements in fine global skills in conjunction with specific neural changes that indicate improved cortical connectivity and enhanced motor cortex activation (Altenmüller et al., 2009).

On the website [www.tomatis.com](http://www.tomatis.com), you can also read about one research project (**and many others**) done on patients who followed the Tomatis® method after a stroke:

*Effect of Tomatis® Audio Training on executive dysfunction in patients with stroke.*

Zhang Jingjing, Chen Changxiang. College of Nursing and Rehabilitation, North China University of Science and Technology; Tangshan Rehabilitation Medical Center, Hebei Province Tangshan 063000, China.

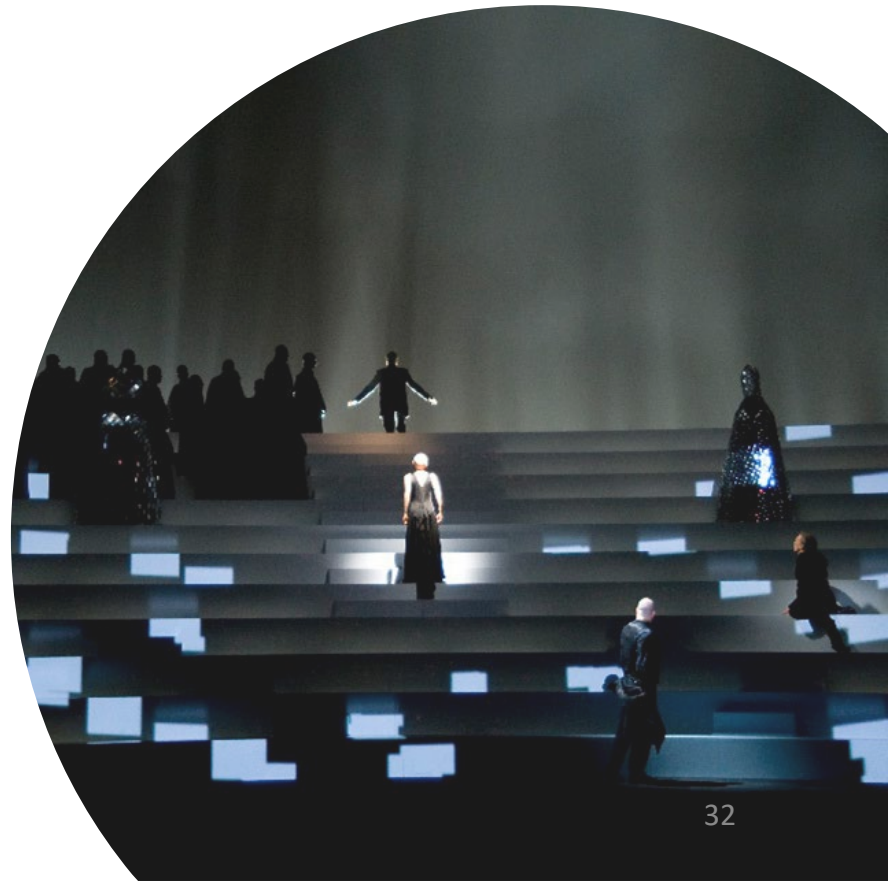


# Music in the Tomatis® method



Tomatis® professionals are trained to create individualized programs to meet their clients' goals.  
For that, they have at their disposal different music and settings to precisely adjust the effect of the music.

- Mozart, Waltzes, Gregorian songs and marches are the main musical supports used.
- The music is then modified by using filters that allow for listening in a very specific frequency zone.
- It's like lighting a stage to highlight an actor. Here the actors are specific frequency zones.







# TalksUp®



Once the program has been set up by the professional, it will be transferred to a device called the TalksUp® which allows for listening sessions at home or in a Tomatis® center.



All the music processing is done by the TalksUp® according to the program set up by the professional.

One of the most important settings in the TalksUp® is what is called the electronic gating. Depending on the piece of music used, the electronic gating allows for changes in the timbre and intensity of the music, thus stimulating different frequency zones.



# Electronic gating



The electronic gating allows for the mobilization of the auditory muscles in the middle ear.



This action will energize and awaken the cortex, which enables the mechanisms of alertness and sustained and selective attention to be fostered.



This is one of the reasons why Tomatis® listening sessions can be tiring, as the brain is kept in a state of attention during the entire listening session.



The brain becomes interested in what is happening, and this will trigger the attention mechanisms and in turn improve perception.



# Electronic gating



## **Top-down Modulation**

(internally-driven attention)



## **Perception**



(externally-driven attention)

## **Bottom-up Processing**

The gating action is twofold:

A bottom-up action

Ear stimulation =

Ear gymnastics

A top-down action

Improved perception

and attention

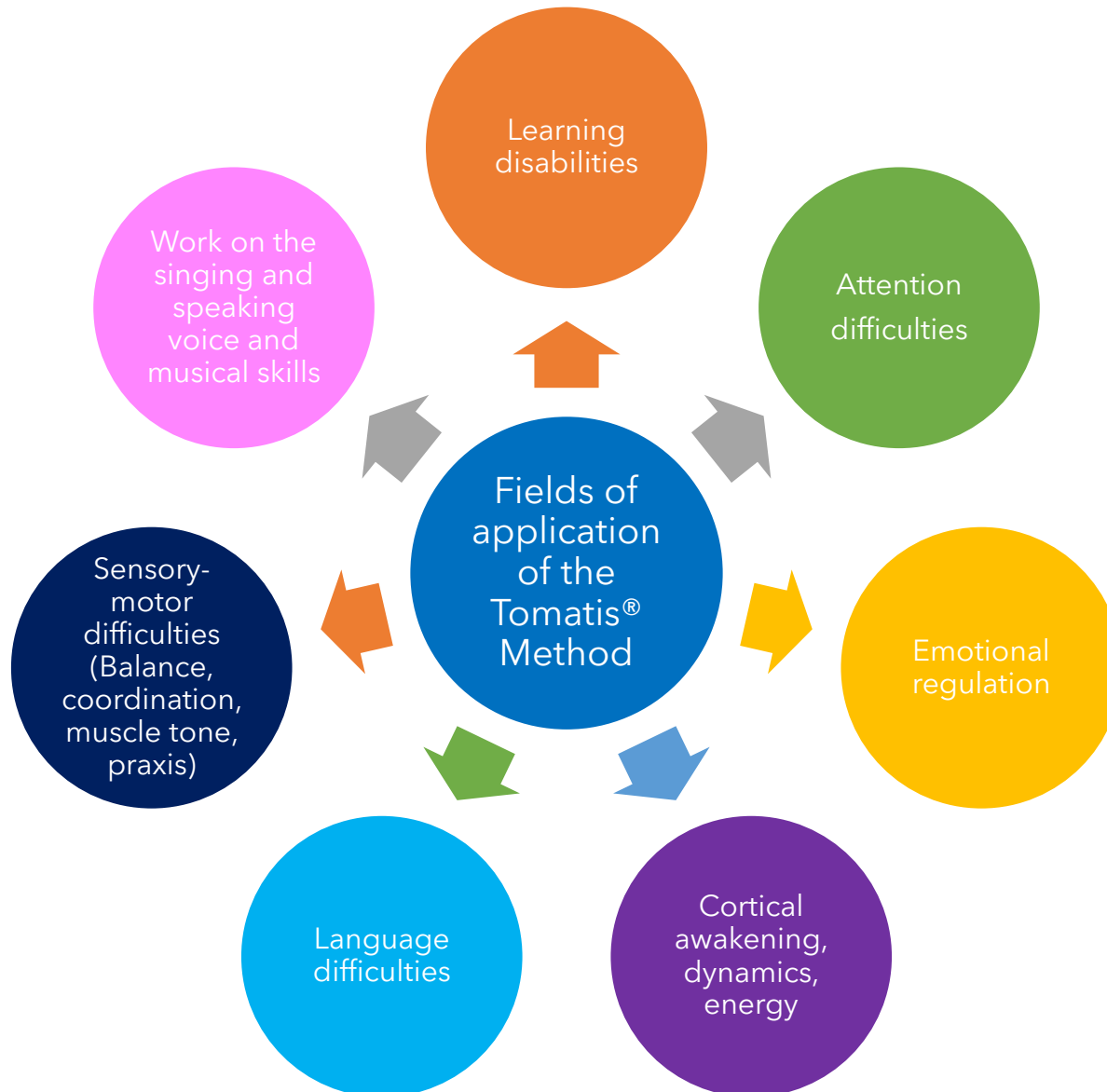


# Listening to music in the Tomatis method



Listening to music is done through specific Tomatis® Infinite headphones. The headphones transmit music by air conduction (AC) through the earphones and also by bone conduction (BC), through a vibrator that is embedded in the headphones.







# The Tomatis® assessment



Before starting a Tomatis® training program, the professional evaluates the client's difficulties by starting with an assessment.

Depending on the professional's training, he or she can use all the measurement tools at their disposal to best evaluate their client's difficulties (psychotechnical tests, projective tests, questionnaires, language and writing tests, psychomotor evaluation, etc.).

If the client is concerned about hearing difficulties, the professional may ask the client to have an audiogram done by an ENT specialist prior to the assessment.



# The Tomatis® assessment



Professionals also have the TLT (Tomatis Listening Test) at their disposal. This test is specific to the Tomatis® method and is used to determine the client's listening profile.

During the assessment, the professional will interpret the listening test and explain to the client the listening difficulties that may appear on the test and how they can lead to integration and information comprehension issues.

The test is also used to create an individualized program to best meet the client's objectives.

It is sometimes impossible for some children to take a listening test. This does not prevent the professional from providing an individualized program based on the information gathered during the assessment with the parents and the child.







# The listening sessions



- They can be done in a Tomatis center or at home.
- The sessions last for a total of 14 days.
- The listening time will depend on the subject's age and the problem. The professional decides on the listening time for each client.
- It can vary from 40 minutes per day to up to 1h20 per day.
- The listening sessions last 14 days and it is recommended to listen 5 to 7 times a week.



# The listening sessions



The work is therefore intensive, since as we have seen previously, it is the sustained stimulation that will make it possible to obtain the modifications.

The listening time recommended by the professional must be followed. It is necessary to avoid phenomena that saturate the nervous system and that is why, even if the work is intensive, it is possible to skip one or two days in the listening program.

# What do I do after the listening sessions?



After the 14-day listening session, you must take a minimum 1-month break.

During this break, the client will continue the stimulation by using the microphone of the Tomatis® *Infinite* headphones.

He or she will use their own voice to self-stimulate and train the audio-vocal loop. You can read aloud, sing, make sounds, talk and parents can read a story to children who do not yet have access to language.

The exercise time may vary depending on the client's difficulties. The professional will indicate the most appropriate time for your problem.



During the break, you can also use the consolidation programs that are included in your Tomatis® *Infinite* headphones.

There are two consolidation programs:

- [Follow-Up Program 1](#) (Relaxation)
- [Follow-Up Program 2](#) (Dynamization)

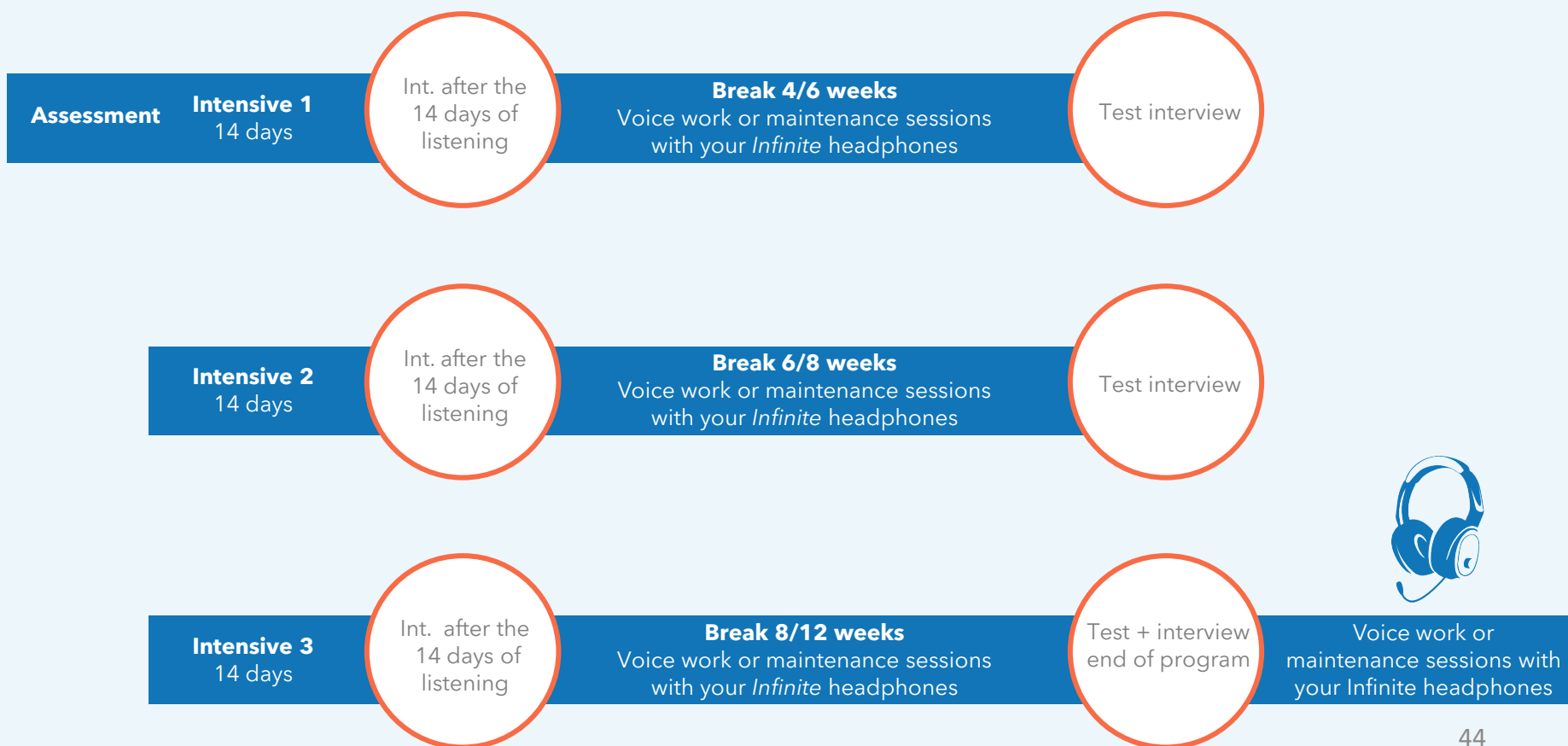
The Tomatis® professional will advise you on the most suitable program for you.

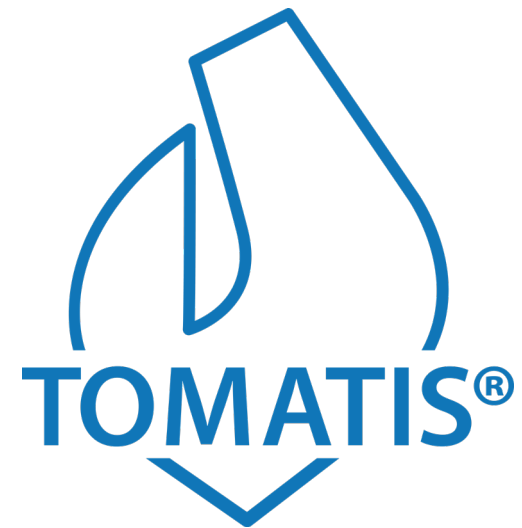


# General organization of a Tomatis® program



This is merely a suggested outline, which can vary depending on the issues and objectives. The professional is the only one who can change the organization of the listening sessions.





[www.tomatis.com](http://www.tomatis.com)