



Learning through the ear

What does listening to Mozart's music have in common with concentration, higher self-esteem and foreign language learning? It turns out that owing to auditory training developed by Alfred Tomatis, a French otolaryngologist, it is possible to influence the quality of learning in even the youngest children. Within the EU programme "Attention! The Way to Success", which was implemented in the years 2010-2013, this method was introduced into the curriculum in 87 Polish elementary education classes.

Early-school education is a big challenge. Small students already have their first duties and homework which are assessed and compared in the group of peers, and that induces considerable stress in children. Therefore, small children become ill often, infections recur frequently, which may be the reason for concentration disorders, difficulties in speaking, reading, writing or learning problems. If we add other possible conditions, such as autism, ADHD as well as speech, sight or hearing disorders, the learning difficulties become even greater

The latest research shows that problems with auditory attention play an enormous role in communication disorders. The reasons for this situation should be looked for in past diseases and in experience brought by young students from early childhood. The method developed by Alfred Tomatis, which is the key element of the curriculum in the project under discussion, focuses on improving the function of auditory attention.

About the project

The "Attention! Method for success" project is implemented by Young Digital Planet in partnership with the Institute of Physiology and Pathology of Hearing, and it was co-financed by the European Social Fund. Its assumption involves the improvement in the quality of teaching and learning of children with special educational needs, due to a pilot implementation of an innovative teaching programme based on the Tomatis Method supported by auditory exercises and logorhythmic classes¹. The main objective, on the other hand, involves assistance in the creation of appropriate conditions for more effective teaching and learning for children with special educational needs as well as for actions stimulating and supporting the development of auditory attention, also in children following a standard curriculum.

Training was provided to teachers, guidance counsellors, psychologists and speech therapists, which allows for therapeutic work using the Tomatis Method on the pedagogical level. Public schools, integration schools, schools with integration classes and special schools took part in the project. At the very beginning, in 2010, teachers conducted a procedure qualifying for the therapy. 770 first graders whose development diverged from the norm were involved. They were subjected to a few series of ear stimulation using an appropriately transformed audio signal. Therapeutic sessions were divided by breaks of a specific length (four-six weeks). At the end, the therapists administered the attention and auditory lateralization² test again to assess the children's progress.

Alfred Tomatis

Alfred Tomatis (1920-2001) was a French otolaryngologist, neurologist and phoniatrician, the author of 14 books and numerous scientific articles, he conducted research on the connection between hearing, voice and speech. His work resulted in the introduction of sound therapy into clinical practice (voice, speech) and the construction of an electronic ear — a special device which allows for increasing sound intensity at defined frequencies in a selective manner³. Tomatis introduced a distinction between the notions of hearing and listening, and his in-depth research and own experiments led him to formulate three principles called the Tomatis Laws:

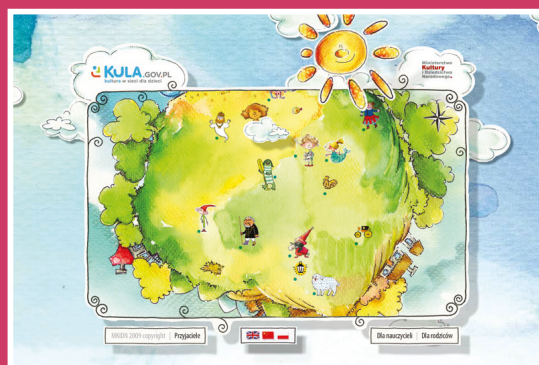
1. The voice contains only

those frequencies which can be heard by the ear.

2. The modification of the way of hearing causes an automatic unconscious change in the voice.

3. A permanent change of the voice is possible by the application of an appropriate auditory stimulation continued for a certain period of time (Thompson, Andrews, 2000, pp. 174-188).

His discoveries were officially confirmed by

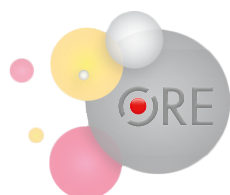


KULA – KULTurA w sieci dla dzieci

The website for children created by the Ministry of Culture and National Heritage gives the youngest children a possibility of becoming familiar with history, culture and Polish traditions. The portal was created to make a child's first contact with the Internet intelligent and inspiring entertainment with teaching and development values. This project is aimed at making parents sensitive to the necessity of including art and culture in the process of upbringing.

Heritage, this is the first such initiative in the world. Information on the website is presented in a light and funny way. This website is also aimed at shaping the cultural awareness of young Internet users and ordering their knowledge about Polish identity and cultural heritage. On this website, we will also find educational games for children as well as aids for parents and teachers, which can be used in class at kindergartens and pre-school classes.

Źródło



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the French Academy of Sciences and in 1951 Alfred Tomatis was named Knight of Public Health of France.

About the method

To understand the auditory training, one needs to distinguish between hearing and listening first. Hearing is a passive process which depends only on the efficiency of the organ of hearing; it is the reception of surrounding sounds. It can be impaired if the ear becomes damaged. Listening, on the other hand, i.e. auditory attention, is an active

process – the perception of sound and using information received from it. Important messages are extracted from the stream of all sounds which reach the human ear and less important messages are rejected. Thus, auditory attention can be compared to a filter, which cleans the information flow from redundant information. The decision of what is important or not is very individual and it depends on the life experience of a given person and his/her emotional state. It is an easy guess that the lack of a properly functioning filter may be manifested by various symptoms. Auditory perception may be distorted by difficult events which left an emotional mark on a young person's psyche. As the process of listening and communicating is shaped already in the childhood, difficult experiences from this period may considerably distort one's development. According to Tomatis, listening is a willingness to communicate with those around and when this process is disrupted, the child may not feel like establishing contacts with the external world. Such an attitude may inhibit the development of the listening ability and lead to various disorders disturbing the child's functioning in his/her adult life.

Thus, the ability to listen affects how we receive and perceive the surrounding world. It also plays a fundamental role in speech perception and in the learning process. Auditory attention disorders may contribute to the development of speech problems (articulation disorders, delay in the development of speech, stuttering), learning problems (dyslexia, difficulties at school) and attention problems. Even if the process of acquiring the ability to listen is disrupted, it is possible to overcome this problem through re-education. This is what the therapy developed by the French scientist is used for.

Diagnosis and listening training

Children participating in the project were subjected to a

diagnostic procedure — i.e. a test of auditory attention and lateralization, which is similar to auditory testing. It combines elements of audiology⁴ (definition of auditory sensitivity) and psychology (attention directed to sounds with various frequencies and the ability to differentiate between them).

The results showed different auditory attention disorders. These included, amongst other things: problems with auditory analysis and synthesis of speech, problems with reading and writing, dyslalia⁵, expressive alalia⁶, stuttering, voice disorders (dull and stumbling voice), various attention disorders, psychomotor hyperactivity, low level of motor activity, spatial orientation disorders, lowered coordination within gross motor skills, no sense of rhythm, fatigability, immaturity, emotional instability, low motivation and low self-esteem with a tendency to withdraw or to manifest a negative or aggressive attitude. A majority of children included in the therapy are children without any special educational needs (63%) and with mild mental impairment, including the Down syndrome (1%), autism (6%), cerebral palsy (2%), speech impairment (10%), behavioural disorders (5%) and other diseases (13%).

The method, which children associate with play and is, therefore, very well received by them, is aimed at improving the ability to communicate and it also changes the students' attitude towards others and themselves. They become more open, are able to focus better, they calm themselves down or increase their own activity, they are more creative. First of all, as therapists emphasize, they are bolder and have more self-confidence, which influences their whole development.

Auditory training took place using appropriately selected sound materials and audiovocal exercises which increased control of the voice and speech. While playing, the children were listening to appropriately processed music by Mozart, Gregorian chant and for some children — depending to the results of diagnoses — also a specially processed voice of their own mother was prepared.

Why Mozart? His music is characterized by high dynamics and a high content of harmonics (aliquots)⁷ with high frequencies, thus strong stimulating effects. Gregorian chant, on the other hand, has a calming, soothing and physically consolidating effect. These two types of works of music are often used alternately, adjusting the listening programme to the child's needs. Waltzes, children's songs and read-out texts are also used.

What is the value of the Tomatis Method?

The Tomatis Method is a non-invasive listening therapy which is aimed at correcting auditory attention and auditory lateralization disorders. Due to the versatility of applications, it can be a very useful measure supporting the work of a speech therapist, psychologist, guidance counsellor and even a doctor.

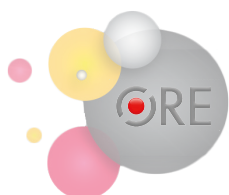
From the therapist's point of view, its enormous advantage lies in the fact that at least in the initial stage of the therapy, no active cooperation with the child is required. Children can be difficult patients who do not want to or cannot cooperate with the specialist. This mostly applies to autistic children, children suffering from ADHD and developmental retardation, who respond positively to auditory training and — despite expected difficulties — tolerate it well. The therapy can help to open such a child to further cooperation with the therapist.

The Tomatis method should not be confused with music therapy. The sound which is listened to here can be changed in such a way that it is difficult to recognize. The aim of such a treatment involves auditory system training and somehow forcing it to an increased effort, owing to which particular auditory abilities are practised.

Parents sometimes ask if it would not be enough to listen to Mozart's music at home,. It needs to be emphasized again that the electronic ear is of fundamental importance in the Tomatis Method, which processes the sound in a way that it has therapeutic effect and exercises the auditory system. The administration of sound using both the air and bone conduction is a unique element of this therapy. It allows for exercising external attention, i.e. the ability to listen to other people and internal attention, i.e. controlling one's own utterances.

With time, the patient's active cooperation becomes necessary as the patient learns how to use the properly formed auditory attention to perceive one's own and other people's speech. This is another unique element of this method.

Tomatis' listening training can be used for both children and adults. This method does not only support people with partial speech, voice and linguistic communication disorders but also those without clear difficulties, e.g. owing to an improvement in the ability to concentrate. Thus, such a therapy is a versatile, non-intrusive and safe method for patients who have problems and those who just want to increase their personal potential.



At a subsequent stage, the children read and sang to the microphone. In this way, they learned to listen to their own utterances and to control them using their improved ability to listen. Both during the listening stage and the exercise stage, sounds transformed by the electronic ear are used, which changes sounds in such a way that they do not resemble the original tones — the stimulation is the most intensive then. This special device allows for listening to sounds through the air and bone conduction, which makes it possible to stimulate the auditory attention — both internal and external. It mostly has a therapeutic effect, it processes sounds and music is only material for its work.

Kacper's case

Kacper is 10 years old and has symptoms of Asperger syndrome, autism and ADHD. When he joined the project, the symptoms of these disorders were very severe. He lost his temper quickly and had aggressive outbursts caused by trifles: his mother told him to wear clothes that were too tight and a friend from school made a better cardboard collage. He was hypersensitive to touch — because of an ordinary stitch in a sock he wanted to escape through a window. He often made scenes. He had learning and concentration problems; he could not read or count. After the Tomatis therapy and other treatments (biofeedback and dog therapy), Kacper calmed down, he already wears normal clothes, he cooperates during activities which require being touched — cutting his hair, clipping his nails. The aggressive outbursts stopped. He learned how to read using the syllabic approach; he is able to concentrate better. His artistic and musical talents were revealed. He has good contacts with his peers. He did not like the first Tomatis sessions, he could not sit still. Later, he asked himself when the next class will be. Kacper's mother says that if she had not known him before, she would not believe that this was the same boy.

The caregivers emphasize a particularly significant change in the children's openness to peers and other people, greater boldness and self-confidence, better concentration, willingness to participate in classes and games, increased activities during classes. After the completion of the therapy the children are better learners, they are more willing to talk about topics discussed in class, begin to read with comprehension, they communicate more easily and articulate tasks, develop artistic talents, they are more willing to take part in school celebrations.

In the first and third year of the project, each teacher had 198 hours at their disposal each year using the Tomatis Method (logorhythmics classes took place during the second year). To examine its results, a key competence sheet was developed, by means of which all children taking part in the project were examined, both ones unqualified and qualified for the therapy. Selected indices were examined within the individual competences:

- learning ability: memory, attention, the use of knowledge in practice, motivation and faith in one's own possibilities;
- social competences: the ability to work in a group, understanding and respecting rules and principles, expressing and understanding various points of view;
- linguistic competences: perception (understanding of speech, non-verbal reactions), expression (active speech, verbal reaction), sensitivity to spoken language;

Training cycle

Students participated in the Tomatis Method training in the first and third year of learning at school — each time three sessions were held consisting of 30, 15 and 15 hours of exercises, separated by breaks lasting from four to eight weeks. Such breaks are necessary for children to get used to changes and integrate them. Before each therapeutic session and after its completion, an auditory attention test was administered to the children.

Application and use

Opinions of teachers conducting the therapy and the parents of students taking part in it are mostly positive or neutral.

- musical competences: perception and expression of music.

When we compared the results of both groups of students, it turned out that a greater improvement in key competences occurred in children subjected to the Tomatis Method (cf. Table 1).

Application

Listening training mostly helps children with dyslexia and difficulties in learning, suffering from ADHD and attention deficit disorder. In the majority of cases, there occurs a definite improvement in learning and behaviour and children begin to read with comprehension. In children suffering from ADHD, auditory

training may improve their ability to concentrate and auditory perception and reduce excessive activity by decreasing auditory hypersensitivity.

The French researcher's method may be effective also during the treatment of hearing disorders which are manifested by problems with source localization and differentiation of sounds, difficulties in understanding distorted speech, especially in the presence of interfering stimuli.

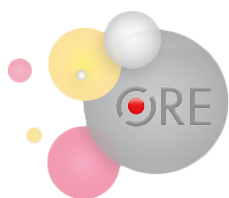
Auditory stimulation trains all functions which may become impaired.

While speaking of the listening training, also autism needs to be taken into consideration, i.e. an extreme case of cutting off communication with other people. According to Tomatis, a person suffering from this disorder listens with "their whole body" and is deprived of protection for excessive external stimuli. He/she cannot filter significant information from noise and feels attacked by external stimuli and protects himself/herself from them. The therapy may decrease the hypersensitivity symptoms and improve communication with other people.

The Tomatis Method works well also for speech disorders - its delayed development, incorrect articulation or stuttering. Its use in the treatment of speech disorders may have a stimulatory effect, improve speech perception and its control. It happens that auditory differentiation problems occur in some children with articulation disorders, then the therapy improves auditory perception, owing to which the child begins to hear his/her own mistakes and is able to correct them, restore the fluency of speech.

Treatment of voice disorders is one of the primary applications of the method under discussion. Listening training, apart from voice production exercises, physiotherapy or medical treatment, can be a valuable method complementary to rehabilitation, as it improves the ability to control one's own voice. The aim of the Tomatis Method does not involve the replacement of standard therapies, e.g. speech therapy or medical treatment. However, it can speed up progress and make it easier for the therapist to work with the child.

Tomatis thought that the ability to listen is also connected with the life energy level and creativity. He assigned a special role to sounds characterised by a high content of high frequencies — owing to which listening training can be a mild and energizing way of decreasing mental tension and improving the mood. The Tomatis Method can be used



in periods of lower energy levels, tiredness, mild mood disorders and burn-out as it influences personal development. However, it should be remembered that in the case of more severe disorders, e.g. clinical depression, auditory therapy cannot replace psychiatric care. The Tomatis Method is not recommended for people who have distinct psychiatric problems, e.g. schizophrenia.

Foreign language learning is one of flagship applications of the listening training. Upbringing in the mother tongue environment teaches our brain how to precisely differentiate occurring sounds, while it “forgets” the ability to recognize sounds which are not present in the language. When we want to learn a foreign language, we need to recall this ability. Auditory training allows to exercise the skill

of differentiating sounds occurring in the language which we want to learn. For this purpose, recordings of sounds, words or texts in a foreign languages are provided through the electronic ear and foreign pronunciation is practised with it.

In conclusion

Listening therapy has been becoming more and more popular over the years. It is currently used in nearly two hundred centres all over the world, also in Poland, and it is one of the most advanced methods for improving auditory attention in children exhibiting speech and voice disorders, dyslexia, autism, ADHD, and who have learning problems. It was used for the improvement of voice quality and foreign language learning by famous singers and actors, for example Maria Callas, Romy Schneider and Gerard Depardieu.

Contemporary research confirms numerous findings by Alfred Tomatis. The issue of central auditory processing disorder, which he described a few decades ago, has recently enjoyed a growing interest. And despite the fact that contemporary science tends to look for the sources of the problem in the central nervous system rather than in the middle ear, as the professor thought, numerous studies show that his method may be a valuable enhancement of the therapy for children with auditory attention disorders

and support their development and learning.

One of the assumptions of the “Attention! The Way to Success” project was a 50-percent improvement in students’ results in the area of auditory attention. The research which we conducted during the project shows that this result has been achieved. However, it is not only these effects that show the value of actions performed. Towards the end of the third year of project work, the teachers claim that the proposed curricula using logorhythmics classes and the Tomatis therapy have brought very good effects. A few schools, due to the effectiveness and very good results of the methods used, not only in children with special educational needs, have decided to implement the proposed method of teaching into their own curricula and to continue it also after the completion of the project, which has enriched their educational offer. Head teachers took into account the opinions of teachers, parents and children who were the most interested in classes and are looking forward to the next ones.

**Magdalena Brozio
Marzena Mularzuk
Joanna Ratyńska**

Józio’s

Józio had been a healthy and well developing child since birth. He grew fast, crawled, learned to eat by himself and spoke single words, he was ahead of his peers in development. Alarming symptoms began to appear when he turned one. First of all, he stopped communicating. The diagnosis was quite quick: autism. The whole family had to switch to living with an autistic child who communicated his needs only with shouting. The breakthrough came after Józio’s fifth birthday — he had the first Tomatis session and began to speak. Then, he took part in the project “Attention! The Way to Success,” he participated in subsequent sessions and made further progress: he spoke more grammatically, his vocabulary grew on a regular basis. He began to sing because he always liked it but previously he was ashamed of his voice. He has artistic talents - he learned how to use the Paint software in which he creates his own paintings. He is creative, curious of the world and is becoming more and more open to it.

1. Logorhythmics — one of logopaedic techniques, based on musical rhythm together with the use of words included as accompaniment (programmed or improvised) to the motion

of the entire body rhythmically harmonized by music (Skorek, 2010, s. 94).

2. Just like there exist preferences for using one hand (usually the right one), there is also a preference for the leg, the eye and the ear. Tomatis, while examining auditory control in professional singers, discovered that in a situation when they controlled their voice using both ears or only with the right ear, they sang in tune and they fully controlled their voices. When the right ear was blocked and they could hear only with the left ear they began to sing out of tune. On the basis of this experiment, he concluded that the optimal method of controlling the voice is the right-ear control. This results from the physiological asymmetry of the human brain: the auditory cortex receives the majority of stimulation from the opposite side, i.e. the information from the right ear gets mostly to the left hemisphere and the other way round, although there exist also neural pathways which stimulate the same hemisphere. The right hemisphere is the non-verbal hemisphere engaged in emotional processes while the left one is verbal and logical. Therefore, Tomatis thought that a left-eared person first reads the emotional load of an utterance and only later its contents. In such a person, strong emotions may significantly affect his/her communication process.

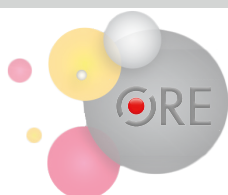
3. In 1958 the first electronic ear was presented at EXPO in Brussels where Tomatis won a gold medal for scientific research.

4. Audiology — science of hearing, a branch of otolaryngology connected with the physiology of hearing and diagnosis, treatment and rehabilitation of disorders occurring within the organ of hearing; a science of properties and operation of the sense of hearing and its disorders, preventive treatment and rehabilitation of persons with hearing impairment (Surowaniec, 2008, p. 144).

5. Dyslalia — a speech impairment, involving, amongst other things, the incorrect pronunciation of phonemes and articulatory disorders (Surowaniec, 2008, s. 240).

6. Expressive alalia — a systemic underdevelopment of expressive speech, failure to form linguistic functions connected with the process of building verbal utterances with retained sensomotoric functions; utterances are unintelligible for others, difficulties in communication make it necessary to use extralinguistic means, i.e. gestures and signs (Surowaniec, 2008,

7. Aliquots – component tones of a sound (Surowaniec, 2008, p. 97)



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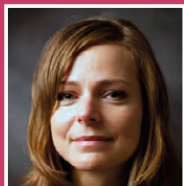
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COMPETENCE	The percentage of students subjected to the Tomatis therapy who achieved a higher result as compared to the base year [September 2010]	The percentage of students not subjected to the Tomatis therapy who achieved a higher result as compared to the base year [September 2010]
Learning skills	63%	58%
attention	33%	23%
memory	35%	29%
using knowledge in practice	39%	36%
motivation and self-confidence	47%	39%
Social competences	67%	58%
ability to work in a group	55%	44%
understanding and respecting rules and principles	33%	23%
expressing and understanding various points of view	51%	43%
Linguistic competences	75%	66%
perception (understanding speech, non-verbal reactions)	44%	34%
expression (active speech, verbal reactions)	59%	49%
sensitivity to spoken language	58%	45%
Musical competences	75%	68%
perception of music	63%	58%
expression of music	62%	53%



The TOMATIS Method is a technique of sound sensory stimulation. Sound is transmitted, on the one hand, by bone conduction caused by a vibration in the upper part of the cranium, and on the other hand, by aerial conduction passing through the ear's auricle. The sounds we use in our devices have been preliminary treated with the TOMATIS effect in our laboratory, and thus stimulate the entire inner ear, including the parts that affect both auditory and motor functions. The sound propagates first in the tympan, and then by bone conduction, triggering a reflex that contracts and relaxes the two muscles known as the stirrup and hammer muscles. This effect is obtained by means of a perceptual sound contrast (a two-fold alternance of timbre and intensity) intended to "surprise" the ear.

for more informations : www.tomatis.com



Magdalena Brozio : A graduate of Journalism and Social Communication and the School of Business Coaching, used to work as a journalist. In the "Attention! The Way to Success!" project, she runs the website, amongst other things. She is responsible for contacts with parents of children taking part in the project. An indefatigable tracker of positive effects of the Tomatis therapy.

Apart from her project work, she also writes articles for companies and websites and works in the social media sector. In her private life, she is an enthusiast of sport activities and a healthy lifestyle.



Marzena Mularzuk : A graduate of a pedagogy faculty and post-graduate speech therapy and surdologopedics (speech and language therapy for the hearing impaired). Since 2000, an employee of the Institute of Physiology and Pathology of Hearing in Warsaw, initially employed at the Clinic of Voice and Speech Disorders and currently at the Clinic of Audiology and Phoniatics. She participates in the implementation of science and research projects in the area of speech therapy, pedagogy, pathophysiology of the communication process and stuttering therapy. The author and co-author of publications with a national and international reach. She is a certified Tomatis Method therapist (Tomatis Development).

She is an optimist curious of people and the world, she looks at the world, celebrating moments. She values personal development and is fascinated with getting to know other people and herself. In her free time, she likes wandering into the unknown, doing yoga, dancing, watching good films and reading books.



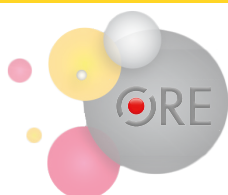
Joanna Ratyńska: She holds a doctoral degree in medical sciences; she is an otolaryngologist, audiologist and phoniatician.

A graduate of the Medical Academy in Warsaw. She completed the first degree specialization in otolaryngology in teaching hospitals of the Medical Academy in Warsaw, obtaining it in 1999. In 2007, she completed the second degree specialization in audiology and phoniatics. Since 1996, she has been an employee of the Institute of Physiology and Pathology of Hearing, she was initially employed at the Department of Preventive Treatment and Early Detection of Hearing Impairment, and next at the Audiology and Phoniatics Clinics. In 2008, she defended her doctoral dissertation entitled Assessment of the usefulness of the digital speech corrector in stuttering patients. She participates in the implementation of science and research projects in the area of pathophysiology of the communicative process and in educational work.

The author and co-author of 60 studies with a national and international reach. She is a certified consultant of the Tomatis Method, a member of the International Association of Registered Certified Tomatis Consultants (IARCTC).

References

Skorek E.M., (2010), Z logopedią na ty. Podręczny słownik logopedyczny, Kraków: Impuls. | Surowaniec J., (2008), Logopedyczne kompendium, Kraków-Pysznica: Imprint. | Thompson BM, Andrews SR, (2000), An historical commentary on the physiological effects of music: Tomatis, Mozart and neuropsychology, „Integrative Physiological and Behavioral Science”, nr 35(3). | Tomatis A., (1991), The Conscious Ear: My Life of Transformation through Listening, Paryż: Station Hill Press. | Tomatis A., (1996), The era an language, Norval: Moulin.



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