

# CONCLUSION

The best way to observe things with success is to see them follow their course from their point of origin.

—Aristotle

Dr. Tomatis was indeed a wonderful pioneer, inventor and insightful man. He has inspired the field of sound training to a degree that every program existing in the world today acknowledges him as the father of their specific type of auditory training. He was a thought-provoking man, a visionary who was not afraid to take the risk of leaving his professional training behind to venture into an unknown field that he believed in. He did his research based on scientific fact, and added to it in a way that has forever changed the way we look at the ear. His critics in the science world remain skeptical due to what is considered today to be a lack of empirical and rigorously controlled studies, and most Tomatis® consultants across the world today would like to see these studies completed as well. Part of the reason behind creating this book, and the others to come in The Listening Journey series, is to attract

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scientists to assist us in our quest to “prove” to the world of science what we clinicians see every day!

Some other research has also looked at aspects related to what we see when applying the Tomatis® Method to our work: Parbery-Clark, Skoe and Kraus looked at the effects of musical experience to limit the degradative effects of background noise on the neural processing of sound. They found that musicians have a more robust subcortical representation of the acoustic stimulus in the presence of noise. Even more than this they found that, “Musicians demonstrated faster neural timing, enhanced representation of speech harmonics and less degraded response morphology in noise ... These findings suggested that musical experience limits the effects of competing background noise.”<sup>1</sup>

One of the chief complaints we have at our center is the effect of the multisensory classroom environment on the ability of the child to maintain their attention during a teaching situation. We see over and over again how the exposure to sound training, specifically the Tomatis® Method, decreases this distorted neural adaptation to multisensory stimuli in these situations.

Granted, the Parbery-Clark, Skoe and Kraus research contained subjects with long-term exposure to music, and the study does not prove the work completed through the Tomatis® Method to any extent at all. It is simply very interesting that the study does make a clear implication that the exposure to music training over extended periods of time enhances the specific neural timing and ability to apply oneself in a “noise” situation. Dr. Tomatis did not believe in short-term listening stimulation—he believed in completing listening over extended periods of time. After many different applications he concluded that 60 to 62 hours was an initial “magic” number of listening hours—a schedule that we still use today.

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In a similar vein, Thompson, Schellenberg and Husain looked at music lessons and their effect on sensitivity to emotions and how this was conveyed through speech prosody. The authors conducted three experiments to discover whether music lessons enhanced an individual’s ability to decode emotions expressed through speech and found:

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In **Experiment 1**, adults who took music lessons in childhood were better than untrained adults at identifying the emotions conveyed by tone sequences that mimicked the prosody of spoken utterances. In **Experiment 2**, musically trained adults were better than untrained adults at identifying sadness and fear conveyed by utterances spoken in both familiar (English) and unfamiliar

(Tagalog Filipino) languages, and by prosody mimicking tone sequences. Musically trained adults were also better at identifying spoken utterances with emotionally neutral prosody. In **Experiment 3**, 7-year olds were asked to identify the emotions conveyed in speech or in tone sequences that mimicked speech. For fearful–angry comparisons, children who took keyboard lessons during the previous year performed better than children with no arts lessons and equivalently to children with drama lessons. The equivalence between keyboard and drama lessons is particularly noteworthy because the drama lessons focused specifically on training the speaking voice and the use of prosody.<sup>2</sup>

Once again the effect of training the ear to music was instrumental in improving one’s ability to attach emotion to the speaking voice, and was perhaps also case in point when thinking of Tomatis’s first principle: “the voice can only reproduce what the ear hears.” We frequently observe the changes in voices of the children we treat, and we see how they are more able to follow non-verbal social cues as they are more attuned to listen with their internal ear. In one case that I presented in Dublin at the international conference in 2009, we clearly “heard” on video the beautiful change in laughter across the full spectrum of sound in a girl, who was considered mentally deficient and could only make one shrill, piercing sound before commencing her Tomatis® training.

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In *Awakening Ashley*, Sharon Ruben wrote the remarkable story of her child on the autism spectrum, which sent the critics soaring as this was again but one account of remarkable recovery. Much research was completed on the Mozart effect alone, without the Electronic Ear that we use in the Tomatis® Method. Most research does not support findings beyond a short-term effect, but we must also remember that most research was completed under conditions where subjects were exposed to the music of

Mozart for maximum periods of only ten to 20 minutes.

A small research study of the Tomatis® Method was submitted by Neysmith-Roy and published in the *South African Journal of Psychology*. It involved six severely autistic boys ranging in age from four to 11. The author found:

Three (50%) of the boys demonstrated positive behavioral changes by the end of the treatment. One boy was no longer considered to be autistic; two boys showed mild symptoms of autism and three boys remained within the severely autistic range. Of particular interest were the changes that occurred in pre-linguistic areas for five of the six boys. These included Adaptation to Change, Listening Response, Non Verbal Communication, Emotional Response and Activity Level. These behaviors are considered prerequisites for successful verbal communication. The children who demonstrated behavioral change were 6 years of age or younger at the beginning of treatment. The author suggested that the Tomatis® Method might be helpful in making pre-linguistic behaviors manageable and thus help prepare the child to learn basic skills necessary for the development of language and learning.<sup>3</sup>

Very frequently during application of the Tomatis® Method in our work, families become concerned about their children “regressing” as they seemingly go “back” in their development and start to investigate pre-verbal language again. Children who had started to use one- or two-word phrases may start to speak nonsensically again and appear not to make any sense to their listeners. As Tomatis® consultants, we rejoice in this seeming “regression,” as we know this is in fact a phase of restructuring what the ear is hearing in their own voices—similar to the babble we hear in babies as they start to stroke their own ears with sensory stimulation from their own voices when they prepare their ears for the use of language. We would like to see more research in this area, as many children diagnosed with autism demonstrate this very interesting

and important process. The outcome of this period of “restructuring” results is observed in an improved use of language.

In January 2009, an article appeared in *ScienceDaily* in regard to our ability to “feel” our words—in other words to “hear with our face.” The article referred to “the movement of facial skin and muscles around the mouth playing an important role not only in the way the sounds of speech are made, but also in the way they are heard.” This was in reference to research being completed by scientists at Haskins Laboratories, a Yale-affiliated research laboratory:

These effects of facial skin stretch indicate the involvement of the somatosensory system in the neural processing of speech sounds. This finding contributes in an important way to our understanding of the relationship between speech perception and production. It shows that there is a broad, non-auditory basis for “hearing” and that speech perception has important neural links to the mechanisms of speech production.<sup>4</sup>

As Tomatis® consultants, this article was of great interest to us, because we so frequently observe facial changes in children we treat using the Tomatis® Method. Dr. Tomatis wrote a great deal about audio-lingual loops in *The Ear and the Voice*. He makes clear neuro-anatomical links between the stapedius and temper tympani muscles of the middle ear and their nerve enervations connecting to our facial musculature. Many times our families hear neighbors and other acquaintances say, “But he (or she) just looks different!” This connection is so frequently overlooked in children diagnosed with apraxia, albeit apraxia of speech, or whole body apraxia. They are frequently taught in cognitive ways with a “top down” approach (cognitive centers first, to apply to more primal areas of development), whereas development occurs “bottom up” and creates the automaticity and foundation needed for cognitive and other “higher-center” skills to develop more evenly.

Another interesting study was submitted by King et al, which focused on deficits in the auditory brainstem pathway encoding of speech sounds. The

data from this study suggests that:

Certain learning deficits may originate from a disorder in auditory neural timing at the brainstem level. Measures of auditory brainstem synchrony could be used to identify which children with learning problems will likely benefit from training programs that target deficits in the neural representation of the acoustic aspects of auditory input. In addition ... one can envision identifying those children at risk for acoustic-phonetic-based learning problems before they reach school age. Thus, intervention and rehabilitation could begin at an earlier age.<sup>5</sup>

This was interesting work to follow, as we see so many children who struggle with these types of learning differences that include the auditory system and we propose that the prevalence of this type of learning-based difference is actually quite high. At our center specifically, we serve many children struggling with learning differences in their school environment—most of them based on reading difficulties. We find that even when a child learns to read later in their elementary school career and seemingly appears to read fluently, the child still does not flourish in school, because the child's struggle with hidden auditory difficulties causes the need for greater compensation in the cognitive skills area of the brain, which overtaxes the working memory. As Tomatis® consultants we would love to see more research in this early detection, as referenced above, as this could prevent an enormous amount of heartache with regard to unnecessary self-esteem issues and decreased self-identity conceptualization.

There are so many interesting studies, and we have only but touched the tip of the iceberg in this discussion! But I would like to leave this section of our discussion with one

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study on delayed auditory evoked responses in autism spectrum disorders by Roberts et al. The authors compared 25 children diagnosed with autism spectrum disorder, having a mean age of ten years, to 17 age-matched typically developing children. The children on the autism spectrum had an average delay of 11 milliseconds (about 1/100 of a second) in their brain responses to sounds, compared to the control children. Among the group with autism spectrum disorder, the delays were similar, whether or not the children had language impairments. An 11-millisecond delay is brief, but it means that a child with ASD, on hearing the word “elephant” (for instance) is still processing the “el” sound while other children have moved on. The delays may cascade as a conversation progresses, and the child may lag behind typically developing peers.

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Studies that did involve the Tomatis® Method with children did deliver some interesting preliminary findings. The Gilmore Meta-Analysis was based on a study of 225 children with learning and communication difficulties. The analysis showed that the Tomatis® listening sessions had an impact on language, cognitive and psychomotor development, and social/personal behavior, although there has been much criticism related to this analysis.

Wilson et al studied 26 children suffering from a language disorder. Eighteen children received the Tomatis® Method listening training and eight were assigned to the control group. The Tomatis® participants indicated more progress in the areas of communication, openness of hearing and ability to produce sound.

In England, Mould and Gilmore, through the Brickwall House Institute, studied 47 dyslexic children suffering from a delay in reading of four to five years. Twenty-four of these children underwent Tomatis® listening sessions, and the remaining 23 children were assigned to the control group.



The results were significantly in favor of the Tomatis® group in terms of reading ability and expression.

Yes, we need more empirical data in a world built upon science and scientific measures, and we are steadily working our way toward gaining more ground in this arena. Tomatis® consultants all over the world tell of the changes they noted after they introduced the Tomatis® Method to their own work. The results achieved are faster, and closing the developmental and learning deficiency gap takes less time, saving the child from additional anxiety, anguish and decreased self-esteem. As Tomatis® consultants, who believe in our work, we owe it to the public at large to become more actively involved in research, and we are hoping to use this first book in our series as a discussion point with researchers to obtain the necessary funding to complete the data needed. Until then, clinicians across the world will keep adding this work to their repertoire of tools, children will continue to benefit and flourish, and parents will continue to believe!

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*Maude Le Roux*

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