

health

You can develop a musical ear, sing in tune, learn languages... Alix Kirsta gives a controversial new therapy **A WIDER HEARING**

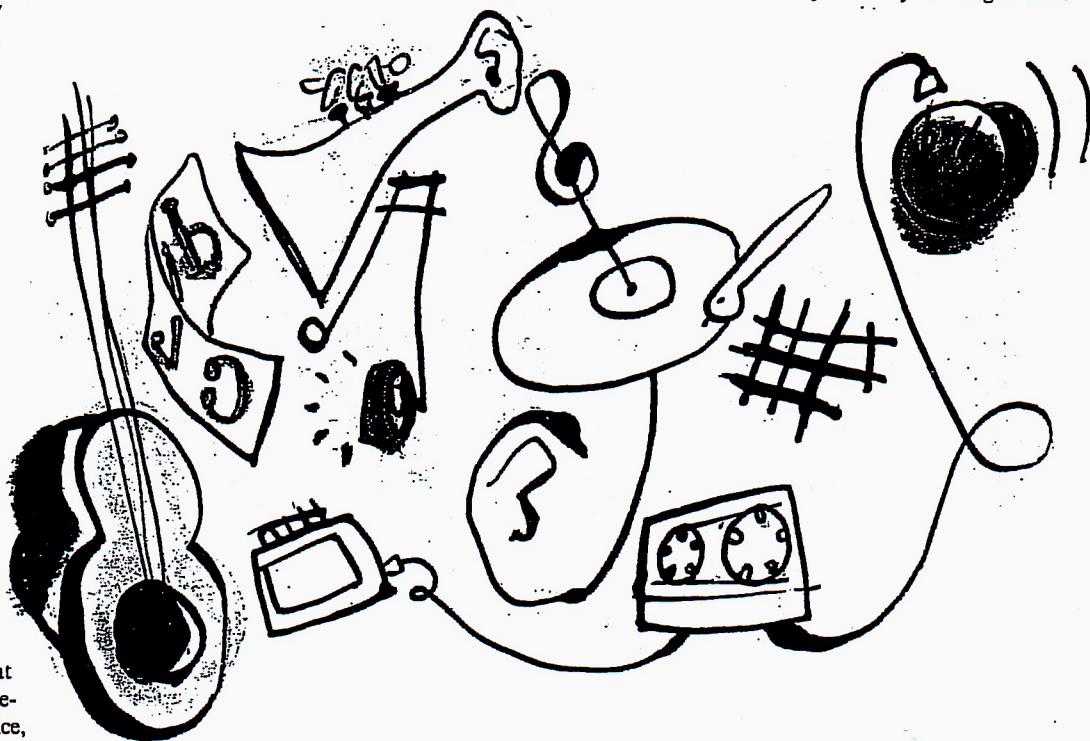
How seriously should we take the modern menace of noise pollution? Last year environmental health officers in Britain received over 100,000 complaints about noise, while the US National Institute of Health estimates that more than ten million Americans are regularly exposed to noise levels that could cause hearing loss, with discos and personal stereo systems the chief causes for concern. Potentially most harmful, therefore, are the "recreation" sounds we purposely seek and depend on for pleasure and escape, or the everyday urban cacophony to which we eventually become impervious. As Professor Chris Rice, director of the Institute of Sound and Vibration Research in Southampton, points out, the real danger is that "you don't become accustomed to noise, you become deaf to it."

And if not deaf, then functionally impaired in other subtle, less obvious ways. According to Europe's leading pioneer in the field of Audio-Psycho Phonology (APP) – the study of the relationship between ear, voice and psyche – although hearing is probably the first of our senses to develop, it remains the least researched and understood and is taken largely for granted by all except those with diagnosed hearing problems. Yet having devoted a lifetime to analysing and improving the function of the human ear, Professor Alfred Tomatis concludes that the most powerfully far-reaching of all the senses generally remains the most defective.

The eponymous Tomatis "method" seems at first to be informed as much by New Age philosophy as medical science. The apparent unorthodoxy of some of Tomatis's views – for instance that from four-and-a-half months the foetus begins listening to its mother's voice, distinguishing it from the background of visceral rumblings, and becomes dependent on an intra-uterine "dialogue" which then develops throughout infancy – belies his background as a practising ear, nose and throat specialist with forty-five years' experience of successful treatment of learning, audio-vocal and behavioural problems. In the 150 centres around the world – but not in the UK – where Professor Tomatis's "listening cure", pioneered in his Paris clinic, is now available, teachers, musicians, psychologists and speech, music and occupational therapists are successfully applying it to a variety of learning and communication disorders. Tomatis's thesis, which is that all communication or learning disorders have their origins in impaired or under-developed listening skills, is gaining credibility among others working in the field of speech and hearing. Such disorders as illiteracy, stuttering, dyslexia, inability to learn languages, impaired concentration and memory, lack of verbal fluency or coherence, as well as more generalised problems including depression, fatigue and shyness are, according to Tomatis, linked to an impairment in auditory skills which causes us to become disconnected from our environment and so unable to communicate as well as we might with the outside world. The crucial distinction between hearing, essentially a passive sensory process of absorbing sound, and listening, the voluntary focusing on specific sounds, is integral, says Tomatis, to the understanding

of how and why "natural" self-expression and communication often falter or break down altogether. Even non-vocal skills such as writing, which translates sounds into graphic form, may suffer if the sounds of language are poorly integrated. In extreme cases, withdrawal from normal life and communication may be chronic, as in the case of the actor Gérard Depardieu, who, until coming to Tomatis in his late teens, had been too inhibited to talk freely to other people.

The son of an opera singer, Tomatis has an innate musical ear. It was his early experience as an ENT specialist working with hearing-impaired factory workers and, more significantly, with opera singers, including Maria Callas, which first instilled the belief that chronic vocal problems may be caused not by structural deformities in the larynx but by listening to one's



own voice – a mechanism he calls "self-listening". This convinced him that one can reproduce vocally only what one's ear can hear. By analysing his patients' hearing he discovered that not only does each person possess a unique "auditory curve", its peaks and troughs indicating which parts of the sound spectrum the ear registers more or less clearly, but that those frequencies we hear least or not at all always correspond to the range we cannot easily reproduce when speaking or singing. This discovery was formally recognised as the Tomatis Effect by the French Academy of Sciences in 1957. Because of its direct neural connection with the left hemisphere – the side of the brain that governs logical thought processes and activities including speech – the right ear is, or should be, normally the dominant or "leading" ear: the "musical" ear in the case of singers and musicians. The right ear therefore plays a crucial role in the vital feedback loop between speech or song and the act of listening. Any imbalance or interference with the function of the right ear causes the voice to become distorted and speech to lose its fluency.

By fine-tuning his electronic equipment, Tomatis was able to identify the crucial role of high-frequency sounds, from 4,000 cycles per second (Hz) upwards, in listening and speech. Lack of vocal fluency, musicality or tone becomes most noticeable when we are exposed primarily to low >

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frequencies – for example when the bass on a stereo system is turned right up – to which the left ear appears to be chiefly attuned. Such ill-effects become more pronounced when the higher frequencies, to which the right ear is most sensitive, are diminished or screened out altogether. Since the high-frequency band – typically between 2,000 and 4,000 Hz – covers the upper range of the human voice in most languages, giving it its timbre, the degree to which this is, or is not, picked up by the ear is obviously crucial to the ear-voice feedback theory.

The implications of his discovery for foreign-language students is intriguing, since it suggests that there is a sound scientific basis for the lack of a “good ear” for languages which no amount of traditional learning can alter. According to Tomatis’s findings, each nation possesses a collective ethnic “ear”, and inhabitants’ spectrum of hearing is governed by a “preferred frequency” which is also reflected in their speech. Thus the German “ear”, says Tomatis, hears between 100 and 3,000 Hz; the French between 1,000 and 2,000; the English between between 2,000 and 12,000; the American between 750 and 3,000. The apparent ease with which the Slavs master foreign languages is due to their extraordinarily broad range of hearing, from 100 to 8,000 Hz. “Their aptitude is more for hearing than for speaking,” he explains. The theory could explain why, for instance, the French experience difficulty in tuning into the English but not the American “ear”: the American band peaks at 1,500 Hz, not far removed from that of the French. The success of his method as a linguistic aid comes from teaching students to modify their hearing, and so adapt their way of talking to correspond to the frequency range of their chosen language. The fastest, most effective way of doing this, says Tomatis, is to make students listen to tapes made up of sounds, rhythms and frequencies specific to a given country. In order to become attuned to American speech sounds and rhythms prior to filming *Green Card*, Gérard Depardieu again consulted Tomatis, this time to undergo an American-style “sonic rebirth”.

Although Tomatis’s method is now increasingly applied by teachers and therapists to improve performance in language and vocal skills, and to treat children’s learning disabilities ranging from dyslexia, poor concentration and memory to disorders such as stuttering and even autism – which Tomatis interprets as the ultimate expression of a child’s refusal to listen – many of its underlying theories remain controversial. Professionals struggle, for example, with his view of the ear as not merely an instrument for hearing and maintaining balance, but as a generator which uses sound’s vibrational energy to charge the entire organism via bone, viscera and neural impulses – in particular stimulating cortical energy and brain activity, so providing the motivation for speech, communication and learning.

Because the tiny sensory hairs in the inner ear are far more dense in the area which responds to high frequency than in that reserved for the low range, Tomatis claims there can be little mystery as to which sounds possess the greater energising properties – or why. “It is well known that the auditory apparatus acts as a charging or energising dynamo,” Tomatis told me. “It furnishes the current to feed the brain.” He uses a combination of Mozart’s music and Gregorian chants throughout all stages and applications of his method since he claims that their rich harmonic structure and predominant high-frequency range possess a unique generating power.

Could the ear also act as a regulator of other bodily functions, as Tomatis believes? Given that almost all cranial nerves lead to the ear, this is perhaps not as fanciful as it sounds. Tomatis is not the only person to make the connection between listening to music, chanting or singing and feelings of improved well-being and greater energy. In England, sound therapist Jill Purce has long recognised and applied the healing benefits of sound and Tibetan overtone chanting to treat a host of physical and psychological ills. According to Tomatis, the most plausible rationale for these positive effects is that all the vital organs and processes are influenced by the ear, through their tie-in with the tenth cranial nerve, which directly and indirectly via branch lines, links the ear to every other organ in the body. Unusual as it may be, this perspective of the ear illustrates why so many “bad listeners” not only have speech and learning difficulties but also,

along with their flat, colourless voices, suffer more generalised symptoms of fatigue, depression, and faulty coordination, balance and posture. It also indicates why improvement in mood and energy levels is one of the most immediately noticeable effects of the training programme, in which Tomatis’s invention, the “electronic ear”, superimposes “perfect” hearing, allowing the patient to listen to music, speech or their own voice, which has been electronically doctored to emphasise the higher frequencies, until their own ear is sufficiently conditioned to pick these up naturally.

But how and why do so many of us become bad listeners in the first place? According to Billie Thompson, director of the Sound, Listening and Learning Center in Phoenix, Arizona, “good” listening may be impaired at any age, through accident, emotional shock, illness, lifestyle changes, or trauma suffered before, at or after birth, which weakens the audio-vocal link between mother and child that forms the foundation for the child’s later acquisition of language and communication skills. “The inability to

hear the natural mother’s voice may have a traumatic emotional impact on infants,” she asserts, “whether due to a physiological difficulty caused by developmental delay, or because the mother is not there with the child, due to some extended separation such as adoption, illness, or even death.” Such an experience may prevent the infant from responding to certain sounds ever afterwards, including speech, something APP specialists identify as an instinctive protection mechanism against sounds that are too loud or associated with experience of trauma.

Physiologically, this protection mechanism manifests itself through gradual loss of elasticity of two tiny muscles, the *stapedius* and the *tensor tympani*, which are connected to the hammer and stirrup ossicles of the middle ear, and eventually the loss of tone necessary to perceive and differentiate between sound frequencies. The principal function of the electronic ear is to condition these muscles

to respond to all frequencies more efficiently and to encourage dominant function of the right ear. As listening skills improve, students participate more actively – speaking, reciting, singing, chanting – while listening to the feedback of their own electronically “improved” voices until they spontaneously and naturally reproduce those desired sounds. As listening improves, so do the quality, modulation, fluency and articulation of their speech.

Apart from its obvious advantages for singers, musicians, linguists, actors and anyone dependent on good communication skills, the method is particularly valuable in overcoming learning difficulties. The structure, content and length of programmes varies – average is thirty days of listening sessions spread over several months – but almost all commence with a recreation of the earliest stages of auditory and language development to overcome blocks caused by early trauma. This includes simulated sounds of the womb and a sonic “birth”, based on filtered recordings, if possible, of the mother’s voice, the chief instigator of a child’s desire to communicate with the outside world. Students then progress to listening to tapes incorporating rhymes, chants, folk songs, vocal exercises, and phonemes – the building blocks of language – played at progressively higher frequencies. Finally, the student reads or sings aloud under the electronic ear to reinforce his audio-vocal control.

Underscoring all of this is the Mozartian leitmotiv, as an aid to receptivity, relaxation and motivation. But why Mozart? Decades of research show that despite their beauty, the works of other composers do not improve auditory skills, concentration and alertness. On the contrary, Chopin tends to encourage day-dreaming and absent-mindedness linked to learning disabilities; Beethoven can deepen feelings of depression and melancholic withdrawal; while Paganini, Wagner or military marches may over-arouse children to irritability, aggression and hyperactivity. Most destructive, warns Tomatis, echoing other sound researchers, are the new “sonic drugs” – loud rock music, personal stereos – which hypnotise and heighten bodily sensation by low-pitch stimulus while destroying the ear and its functions, isolating us from our environment, shattering any desire to communicate. When tempted to shut out the world in this way, we would do well to remember the possible cost of escape. ■

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