

# Sound and transcendence

## – a neuropsychological, physical and spiritual perspective

by Prof. Dr. Thilo Hinterberger, translated from German

### Introduction

We all know the experience in which, when listening to a sound, a voice or a piece of music, we suddenly get into a mood that connects us deeply emotionally with our memories or even aspirations? Sounds can also evoke associations with previous experiences in which we have heard similar things, and these experiences are then remembered less in a factual way, but rather we are led into a feeling that would not be possible for us by mere memory. This phenomenon shows that it is possible to gain access to the emotional layers of experience through sounds, which might not be possible in this way through images. Music can lead us to deep joy and happiness, but also to sadness and pain, to qualities of experience that make up our being and thus also touch the essential. And since everyday life is usually adorned with thoughts and ideas behind which our deeper feelings are hidden and veiled, one could claim that listening offers us a special possibility of perception, a perception enabling to „look behind the surface“ and thus perceive something that exceeds obviousness. This is exactly what the term transcendence refers to. Experiences of transcendence thus have the quality of an expanded perception, the experience of a greater connectedness, the recognition of larger relations and, linked with this, feelings of freedom, lightness and affection. In the following we want to illuminate this a little more closely.

### About hearing and seeing

Let us first turn to the differences between seeing and hearing. From a neuropsychological point of view, it can be shown why acoustic stimuli are perceived in a different way than visual stimuli. Looking at the pathways and connections of the auditory organ, we find that the processing of signals from the auditory system occurs mainly sub-cortically around areas of the limbic system and the brain stem. These areas also contain the nuclei and centres that are largely responsible for our sensation, feelings and basic awareness. Since these deep-seated nuclei around the brain stem are very closely connected to the body via the spinal cord, the entire body can easily be involved in this

emotionality. Who does not know the goose bumps effect, an intense emotional body sensation that can be created especially by sounds? This demonstrates the potential of sound. Also, in the rhythmic experience of music the whole body gets easily involved.

In contrast, the visual pathways cross this deep-seated area of the brain only on the way to the primary visual areas in the back of the head. And so, we find the tendency that visual images are perceived more in terms of their objective qualities and signification, as well as their spatial localization, whereas acoustic sounds are perceived more abstractly with emotional qualities. These qualities of perception, the so called qualia, are also well-known in the visual modality from the perception of colours. In the visual sense we speak of colours and in the acoustic sense of timbres. In both sensory modalities this term refers to a mixture of frequencies, i.e. oscillation states of light or sound waves. And yet these qualities have completely different meanings for seeing and hearing: While we can cope very well with black-and-white images and thus colour vision can be regarded as additional information, in sound, music and speech the pitch, its overtone spectrum, timbre and emphasis are of essential importance.

Another difference between the modalities of perception is that the eye offers a high spatial resolution and can therefore perceive structures very precisely. In contrast, hearing has only a limited spatial resolution due to the relatively large wavelengths of sound waves, but it has a high temporal resolution. This makes it sensitive to waves in space and enables it to detect their temporal dynamics and the associated phenomena such as resonance and harmony very well. Here, physics already presents a fundamental law that has far-reaching consequences in quantum theory: The two sensory organs eye and ear obviously have their strengths in complementary aspects of physics: structure (eye) and dynamics (ear) are complementary aspects just like particle and wave, with the particle aspect being related to seeing and the wave aspect to hearing. With the eyes we look at the world and see the surfaces of things. What appears



visible is either the light source itself or the reflection of the light on the surface. Thus, we recognize things as objects, as something that is opposed to us, separated from us. We know about the surrounding space from the positions of the objects located in space. For the eyes, however, space itself remains invisible. And yet space is the medium through which we enter the relationship with the world. This connection is accomplished visually and acoustically by waves in space. The object properties as a visible part of reality are thus countered by the complementary property of space as a medium for communication through waves. In other words, the individuality of the object properties is complemented by the connectedness through their mutual relationship and interaction. Thus, while the eye perceives the what and where of things, the ear is the organ of how and when. The information we obtain from listening is thus not that of the surface, but rather that of the entire space, including the interior of things. Here is an example: When listening to the sound of a piano, we do not hear its evident shape. We rather perceive properties of its interior, the strings that vibrate, all the wood of the box that is set in vibration and finally the space in which the piano is played. All this cannot be perceived just by looking at a piano.

Pursuing the analogy with quantum physics, one can find another characteristic that is worth to think about: Vision presents the world of things, of actual facts. In quantum physics, actuality is opposed by the realm of potentiality, of possibilities. Possibilities are transformed into reality at the moment of measurement, of observation. And this potentiality is mathematically formulated as a wave function. Relating this to the analogy of seeing and hearing, we could

therefore ask to what extent hearing leads us into the realm of potentialities? At this point, however, one should be careful not to draw any inadmissible parallels, which unfortunately happens too often when quantum physics is used for analogical comparison. Since physics does not need to treat the acoustic phenomena themselves as quantum systems, the interpretation of the quantum physical wave function cannot be transferred to acoustics. And yet there is an exciting parallel when we look inside our brain: The brain shows a behaviour that is certainly reminiscent of quantum systems as it represents a gigantic neuronal network with billions of interconnected nerve cells, which can offer an almost infinite number of possibilities for experiencing and which, through its dynamics, realizes one of them at a time. This happens when a thought arises from being. Thoughts as mental structures are like facts that are realized from the gigantic sea of possibilities in a quantum mechanical analogy. And just as matter behaves macroscopically causal according to mechanical laws, that the brain, when it processes and forms mental structures, can function conceptually, logically and rationally. Processes of perception and cognition thus serve as a simulator of physical reality that produces a mental virtual reality as a conscious experience.

On the other hand, we know the state in which the mind is maintained in a free-floating state in silent meditative dwelling. Then we find ourselves in an indeterminacy of non-judgmental attention, which gives us an inkling of the otherness of being from which it may be possible to come into various different possibilities of experience. Exactly this can happen when listening to a sound or music: The

constantly changing sound patterns, free of fixed attributions of meaning, enable a multitude of possibilities of inner experience. But how does a sound accomplish this?

### Where does the sound take us?

Looking at the envelopes of sounds, i.e. the volume progressions of the vibrations exhibited by naturally generated tones, we usually find very similar patterns: a rapid increase in volume caused by striking or plucking a vibratory object is followed by a slow decay. Depending on the attenuation of an oscillation, this decay can be faster (high attenuation) or slower (low attenuation). While woods, stones, but also drums usually only have a short decay time of a few hundred milliseconds, we often find a long decay time of several seconds with stringed instruments, singing bowls and gongs. Let us now switch from this objective level of description to subjective perception within the realm of consciousness.

Sounds with a decay time of less than about 3 seconds remain in the time window of the subjective "now" and are therefore experienced as solitary events. In this time window, the brain is able to link events with each other and tie them together to form a unit. Such events are suitable for forming rhythms in a repeated structure. On the other hand, sounds of different pitches can be perceived as a melody if they follow one another within this time window. A large part of music is formed with such sound elements. We all know the potential of musical experience and we know that music can create and amplify a wide variety of moods. It is a nice experiment for everybody, to watch a clip of a film and then underlay this clip with different kinds of music and then see how one and the same scene elicits very different emotional colours. This effect was already used in the silent movie era with high perfection.

But what is the potential of instruments with very long decay times? Sounds that last for several seconds and slowly fade away are not experienced as completed events anymore. Rather, these sounds challenge us to listen and eavesdrop constantly, increasing our sensitivity constantly in order to listen to the fading sound. The sound seems to be infinite and the time, when we no longer hear the sound, merely marks our perception threshold. De facto, however, this end does not exist if one considers that the energy of the sound is transferred to the environment in many different ways and is transformed into further, more diffuse vibrations, which finally enter the „ocean“ of thermal vibrational states of all those molecules that „heard“ or „felt“ the sound. We perceive this ocean of diffuse vibrations as heat; every sound thus becomes heat. For the ears, insensitive to thermal oscillations this means that sound has entered the unknown. Sounds of singing bowls and gongs therefore demonstrate a kind of infinity - a sound is therefore eternal, with a beginning but without an end, it is endless and therefore takes us into infinity, which is characterized by boundless vastness - an essential aspect of transcendental experiences.

With their slowly decaying envelope, these long-lasting sounds lead into silence. But a silence that does not mark stillness as a rigid nothingness, but rather a silence that is infinitely diverse subtly filled with a liveliness from which life ultimately thrives. Thus, the sounds of singing bowls have a high potential to lead into the subtle realm of transcendental reality, a reality that seems to lie in the subtle tranquillity of being. And here the metaphorical transfer of the auditory experience to the quantum physical description of reality completes: again, there is a complementarity between the materiality of sound events and the widespread connectedness

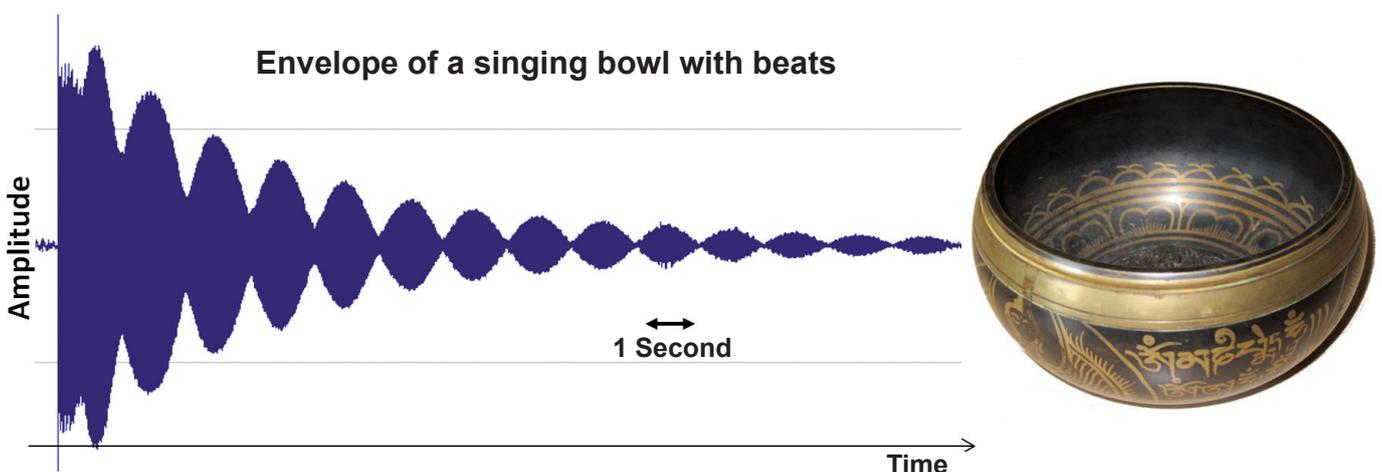


Figure 1. Envelope of a decay of a singing bowl sound in which a beat frequency of about 1 Hz is visible.

of spherical sound spaces with long-lasting envelopes. The latter act like the quantum mechanical wave function as a spatially and temporally endlessly spread field of possible interpretations. The major point however is, that a sound leads us into silence and brings us into a wide open, indefinite state of suspense from which the unexpected can happen.

### Change of consciousness

Listening to a sound changes our state of consciousness, our self-perception and our mood. After consciously listening to a sound, we are no longer the one who we were immediately before. Depending on the intensity and nature of a sound, it can dissolve and reassemble even normally very stable states of mind and consciousness. The transcending properties of sound can lead us into a new experience. This was already expressed in the Greek legend about Ulysses when he tries to escape the enchanting song of the sirens, those sea nymphs who wanted to cast a spell on him and his companions with their voices and he only escaped their temptation by gluing wax over his companions' ears and tying himself to the mast. One can hardly escape the power of sounds, because one cannot simply close ourselves off or turn away from them. Rather, sounds like the sirens' song have the power to snatch us from reality and to carry us off into another world. This is another aspect of the transcending power of sound. Thus, in listening to a sound event there is a special power that can hardly or only in special cases be elicited by words or images.

But just as visual contents have a highly specific effect on people (art is, as is well known, a „matter of taste“) and just as words must be spoken in „wisdom“ in order to be able to touch people, sound should also be produced in a certain attitude in order to lead people into another inner world. So, the musician has an essential role by transferring his feeling and mood to the sound. Vice versa, the sound produced by the musician reversely supports her/him by

evoking a mood that might be amplified, or perhaps just preserved. It is like a dialogue, except that communication is not achieved through („dia“) the word („logos“) but rather through sound.

This process has similarities to Bohm's dialogue process. In this process, the listener tries to grasp the message conveyed by the word by considering the layer behind the word itself as the essential information. To do this, it is important to give the spoken word time to reveal its meaning and to decelerate the response to it. In a discussion group, this attitude can create a mindful and deeply touching form of communication. Transferring this principle to sound, it is also important to give a sound the time to unfold, to allow enough pauses between the sounds to provide free spaces so that an atmosphere can unfold, and finally to regard sound as a medium that leads us into a level of experience that goes far beyond what sound is purely from a physical, acoustic, musical, but also purely subjective point of view. To this end, it makes sense to first leave aside all interpretations of the sound event. For musicians this can be rather more difficult, since this requires a form of listening beyond tonal and musical structures. Rather, it demands the unbiased admission of what a sound can make resonate in our soul. The sensation triggered in hearing a sound ultimately points to a level of being that is usually hidden from our everyday consciousness but can be of essential existential importance. If this experience is granted to us in silent listening, then we will have witnessed the transcendent power of sound. I think the creators of sacred music were sometimes very conscious of this power. And yet it is important to know that for a sonic transcendental experience no complex composition is necessary, but that even simple sounds of instruments like singing bowl or gong are already capable of this, each in its own way. What is needed from our side is openness, the ability to listen into inner silence and the readiness for an extended feeling.

See also:

Hinterberger, T., (2018). „Klang und Transzendenz – eine neuropsychologische, physikalische und spirituelle Betrachtung.“ Zeitschrift für Bewusstseinswissenschaften, Transpersonale Psychologie und Psychotherapie, Heft 1/2018 S. 18-29.

Hinterberger, T. (2019). Sound induced and sound accompanied processes of consciousness („Klanginduzierte und klangbegleitete Bewusstseinsprozesse“, Fachzeitschrift für Klang – Massage – Therapie, 14/2019, S. 16-23)



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