Dedicated to
Hugo & Hilde Engels

THE POWER OF SOUND

About the underrated impact of sound and its influence on our daily lives

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FOREWORD

Lokeren, East Flanders. Sometime at the start of the 20th century. My great-grandfather is cycling to work one day, the morning mist still hanging over the fields. All is quiet. He has been taking this route for years and knows how to avoid all the bumps and potholes with his eyes closed. As he approaches the railway crossing, he does not notice the bell ringing to indicate that a train is coming. He carries on cycling. It was a very sad day for my family. My great-grandfather was deaf.

What happened that day turned my family's world upside down. My great-grandfather died far too young. It meant that my grandfather had to start working much earlier than he would have liked. He took over his father's business, and eventually handed it down to my father. My two brothers went to work there too. I chose a different path: the path of sound.

The story of my great-grandfather has always fascinated me. Specifically, how much impact sound can have on *one* life and how big the power is of both sound, and silence. I am also fascinated by how much influence sound has on our daily lives. And just as sound moves in waves, the death of my great-grandfather had such an impact that its vibrations are still felt even today: if it weren't for that unexpected event I would probably not be where I am now and this book would surely never have been written.

ABOUT SOUND AND LIFE

A DAY IN THE LIFE
12TH OF MAY 2018. 5.30AM

I wake up. My eyes start to open. Straight away, I'm alert. Normally as I'm starting to wake up, I don't notice the sounds around me. I hear them of course, but I am so used to them that I'm not really aware of them anymore, and I'm definitely not consciously listening to them. Things are different this morning. My son's bawling woke me up in the early hours – has just turned one and wants his bottle during the night. Thankfully, my wife got up and I was able to doze off again without having to pretend I was asleep. Until 5.30am when I was woken up by the mice scurrying about in the attic.

The first thing I hear as I start to properly wake up is the birds chirping. A sparrow cheerfully sings his morning song, accompanied by a crow calling, a woodpecker hammering and a pigeon cooing, one of my favourite bird sounds. I am not a die-hard birdwatcher with a pair of binoculars always around my neck or anything, but I do like to hear the birds singing now and again. It's the birdsong that intrigues me the most: the idea that people feel safe when the birds are tweeting, because it must mean they are not about to be attacked by a T-Rex or get swept away in a tsunami. It is only when they stop chirping that we need to worry. Whenever I hear the birdsong, it's not long before I think of the reassuring voice of natural scientist Sir David Attenborough. My eyes are barely open now and I can hardly see anything in the darkness of the room. My ears are already registering a lot,

though. I continue to concentrate, hear the bed creaking as I turn over, the soft sound of the duvet, and the gentle breathing of my wife. She is sleeping, silently. The regularity of her breathing makes me feel calm and safe. It is early spring. The wind rustles in the trees and, in the distance – we live right by the Lys river – I hear the gentle sloshing of water. A seagull flies overhead. It squawks. I hear an engine running. The neighbour is getting ready to drive to work, all suited and booted. He pulls out of the gravel driveway, the stones crunching under the tyres of his car. And off he zooms. The horses neigh. I have only been awake five minutes when the radio alarm goes off. There is a flurry of the day's headlines. Too early, I think, and push the snooze button. I lie a little while, listening 'in silence'. I hear my own breathing, and – as is often the case – a sudden ringing noise in my ear, which disappears just as quickly as it arrived. Time to get out of bed.

It is still relatively quiet in the house. I go into the bathroom, turn on the shower and use the toilet. The warm water from in the shower splashes against the tiles, and after flushing the toilet I hear the cistern fill up again. Something that I don't normally pay much attention to, but now it makes me think of Yoko Ono's art experiment. In the early 1970s, she released a piece of music, 'Toilet Piece', which was just the sound of the toilet flushing and the cistern filling up again. Inspired by the Fluxus art movement, she wanted to offer an answer to the question about what defines music and how we determine exactly what music is. 'Toilet piece' was a statement. Anyway, the shower is waiting. It's invigorating and all I can hear is the water streaming down. Did you know you can hear the difference between hot and cold water? Try it some time. After my rejuvenating shower I dry myself down. I hear the towel running over my body. The shower is still dripping a bit. In the distance I hear the boiler starting up. It might be May already but it is a chilly morning.

The thermostat clicks and the radiators fill up with water. I hear a gentle ticking that I cannot place immediately but conclude it must be the metal of the radiators expanding because of the warm water.

Whilst I make coffee, I hear a noise upstairs. My wife is getting up. The baby is crying. I hear her walking from our bedroom to his. Her light tread on the carpet and then her gentle, muffled voice. The baby stops crying. I hear her gently singing to him. 'Leo, you were drunk again last night, you were partying like an animal all right...' The words of Dutch singer Ria Valk. I can't hear what is happening now, but I know she is changing his nappy. Before long she will be downstairs with our son. The coffee machine gurgles, slurps. The smell of a fresh cup wafts towards me. I get bread out of the bag – which rustles – and put it in the toaster. While I wait, I step into the conservatory and put a 12 inch on, 'Beautiful Freak' by Eels. Authentic crackling and a warm noise fill the room. Three minutes later the toaster releases and launches the bread with up with a mechanical, metallic click. At the same time I hear my wife comes into the kitchen. The door opens, the baby laughs out loud. It is 7am. The day is full of reassuring sounds. The postman passes by on his Honda Camino and I hear a cow in the field. I spread some butter on my toast, which makes a scraping sound.

I start to chew. Ever listened to yourself chew before? I pay extra attention to it this morning. I hear the toast crust snap, the grinding in my head and my teeth are clanking together. I swallow my mouthful and drink a sip of coffee. Even though it is a completely banal sound, I start to listen to it as if is heard it for the first time. I hear myself swallow and notice how the coffee runs down my *oesophagus*. Even that makes a sound which is just about audible. I suddenly remember a moment when I was sixteen years old and travelled in America, on a day out to a desolate, extremely

quiet place. There wasn't any wind, and it was swelteringly hot. I didn't hear anything except the silent murmur in my own head. I discovered later that it was indeed my own body, and the blood pumping around it, that I was hearing. There is no such thing as complete silence.

Back in the present day, my wife scrapes her chair back and makes fruit purée, for me and the baby, filling the kitchen with the sound of an apple being peeled followed, and then a banana. Leo is lying a bit further away, babbling in his playpen while a mobile turns above his head. The melody fills the room and clashes with the Eels' record.

Time to get going. There's a lot to do today. I check my phone, hear a quiet buzzing. It's a notification. I have all notifications turned-off, well the sounds at least – there is enough sound in my days as it is. I prefer silence over short beeps or pings that my phone likes to send out into the world. It's a matter of spatial sound planning.

Reeboks on, laptop in the backpack. I say goodbye to my wife and child, unlock the door – another kind of noise again – pull it open (hmm, it drags a bit) and step outside. As well as the morning chill, what hits me straight away are the environmental sounds. In the distance I hear old farmer Joe's tractor in the field, beyond that one big zoom from the motorway, and much closer, my own footsteps towards the car. Click. The car alarm is quickly deactivated, the doors unlock. I open the door, get in and shut it behind me. Barely two minutes further into the morning and the sounds keep on racking up: I stick the key in the ignition, turn it and hear a small click. The dashboard lights up. The engine starts and makes a gentle humming sound. It is 7.30am and I hear the same news bulletin for the second time today. A man's voice. I listen a while, but then decide to choose

my own music, via bluetooth. Jóhann Jóhannsson fills the car. I spend a little bit of time in my cocoon and then get going.

Cars are silent cages. Well insulated against all the sounds outside. I hear the gentle hum of the engine, but otherwise just music. The ten minutes from home to the studio are a chance for me to order my thoughts. Until the phone rings, of course. Even though it's on silent – I don't even have a ringtone – I hear it vibrating. When I answer, the car fills with Mounir's voice and the background noise of wherever he might be is. In the recording studio, appears it sounds like. I hear music and the voices of Steven and Phile. The conversation ends and the car is silent again. Jóhannsson's virtuoso piano playing swells to a crescendo.

What must it have been like before, when there were fewer cars? Or when people travelled by horse and cart? What did people hear then? More nature, more grinding and peeping of mechanical parts that urgently needed a drop of oil. The horses' hooves on cobblestones, the turning of the wheel, the occasional greeting of a passerby. More of the outdoors than in the confinement of a car.

I reach the studio, park the car, hear the parking sensors beeping furiously as I reverse, and turn off the engine. The moment I open the door, the sound of a busy road hits me. Cars, lorries, motorbikes whiz by. I notice that every vehicle appears to have its proper own sound identity. Lorries sound bulky and heavy, cars are more elegant. Hybrid cars glide by in silence, which is also dangerous. I stand quietly for a moment, hear the popping cylinders of a heavy motorbike and the irritating dinging of a bicycle bell. A bit further up, a car door slams and I hear the hydraulic crane of a supplier outside the company my brothers Didier and Christophe run. It is 8am. Good morning!

ABOUT SOUND AND EMOTION

IN THE BEGINNING

If I think back to my very first memory (of sound), I picture myself sitting on a cushion in front of the TV. I am mesmerised by the strange shapes and psychedelic colours dancing in front of my retinas. Playful music, a snotty-nosed toddler eating a banana, a guinea pig puzzle, kaleidoscope pictures... These kinds of images occupy the collective memory of so many Belgians of my generation. I am talking about *Tik Tak*, the Belgian TV programme for toddlers that was on every day at 6pm, much to the satisfaction of thousands of toddlers *and* their parents who knew this meant they could leave their child to their own devices for a good five minutes. *Tik Tak* (*1/11/1981) apparently wasn't just a successful TV programme, but it was also revolutionary in its simplicity: what you see, feel and hear is what you get. Whenever I hear the theme tune to *Tik Tak* today, another world opens up again: me, as a little sprog, in the TV room, while my mother makes dinner in the kitchen. I already have my pyjamas on, and know that I have to go to bed straight after I'm done eating. I was only little, but when I hear *Tik Tak* now, I immediately feel like I did back then.

Your heartbeat is around eighty beats per minute when at rest. You hear it. You feel it. But as an unborn baby you are not yet that interested in it. Your eyes are still closed. 'Hearing', – that is something you are already doing. And as well as the heartbeat, other sounds slip in, a bit more muffled. I sometimes wonder if my fascination with sound and music started there. Could the records my father played when my mother was pregnant – the

Rolling Stones, The Velvet Underground, Elvis and co. – have influenced my love of all things relating to sound?

I already see some parallels with my own son. When my wife was pregnant, we made a soundtrack full of appropriate music. Convinced that early exposure to music could have an influence on the well-being of the baby, we would often put a speaker next to my wife's tummy. Guess what? Whenever our son is irritable now, we play him a record by Dutch singer-songwriter Eefje de Visser and he calms down straight away. That might not be a coincidence.

If you were to watch and listen to the original *Tik Tak* now, you might think that the programme is slow and dated, but put an infant or toddler in front of it and you will see that it still works wonderfully. How is that possible? It isn't just the images that fascinate the little-ones so much, but the combination of image and...sound. Because of this Tick Tock sound of a clock, *Tik Tak* is also a prime example of onomatopoeia.

The driving force behind *Tik Tak* was Mil Lenssens, a graphic artist and director working for the Flemish Radio and Television Broadcasting Organisation (referred to then as BRT). During a dinner party with friends he saw how their children were fascinated as they watched a lottery draw. He knew that BRT was looking for a new programme for their youngest viewers, and combined his findings from that evening with his own ideas: he wanted to make a programme that focussed on music, colour, rhythm and movement. He also added a dash of interactivity, which was still a new concept in the early 1980s. Interactivity, what's that? Nobody knew exactly what it meant, but Mil noticed how children from BRT's target group reacted when they saw other children of the same age on the TV: they were excited. *Tik Tak* not only became a staple for children, but it also instantly

became part of the daily routine. In many families, it took on a ritual significance: watch *Tik Tak*, then bedtime. It immediately ensured regularity. And each night, *Tik Tak* invariably followed the same format: frequently repeated scenes always accompanied by the same music by Al Van Dam. The musical works of Van Dam are considered timeless now. Consciously or not, he successfully managed to give *Tik Tak* an audio face and identity. Van Dam wasn't just a one-hit wonder: he had long been the regular pianist for legendary Antwerp singer La Esterella, had composed lots of songs for De Strangers and wrote not only the soundtrack for *Tik Tak* but also for the magnificent teen crime drama 'Merlina'. He is also the man behind the hit 'De werkmens' ('The Working Man') by Ivan Heylen. The fact that *Tik Tak* knew how to inspire generation after generation became even more apparent when the German electro duo Digitalism used images from a number of *Tik Tak* episodes for a track ('Falling') from the DJ-Kicks mix album they compiled.

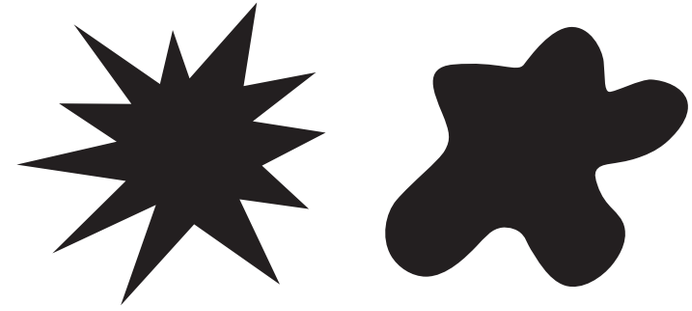
When I enthusiastically asked Isi, one half of Digitalism, why they did this, he replied rather dryly: 'It was the director's idea.' The connection with *Tik Tak*, to me, is very personal and probably does not hold the same memories for a Turkish-German friend living in Hamburg who did not grow up in Belgium, even though *Tik Tak* was broadcasted in around thirty countries, back in the day. My respect for Al Van Dam grows every time I watch it with my son Leo now. The way he successfully uses instruments and synthesisers as a tool for sound design is really quite impressive. It is not just the bizarre sounds, the wonderful noises and the 'unforgettable' melodies which make it so strong, but above all everything is synchronised and matches what you see and are compelled to feel.

While writing this book, VRT (the former BRT) contacted me to ask if I would be interested in acting as an adviser for the

soundtrack of the new *Tik Tak*. How could I say no? It was a nice little coincidence, and means that the programme will take on an even greater significance in my life.

DAS EXPERIMENT

Image and sound go hand in hand on *Tik Tak*. This brings us to Kiki and Bouba, not characters from the series but still important for explaining the link between shapes and sounds. The associative power of sound goes even further than the links with our past. Kiki and Bouba – originally Takete and Baluba – refer to a particularly interesting sound experiment that shows the extent to which we link sound with vision. It suggests that the shape of a word and its meaning are not random. The experiment was first conducted by German psychologist Wolfgang Köhler on the Spanish island of Tenerife. The experiment was later repeated many times. Two American researchers, the neuro-psychologists Ramachandran and Hubbard, showed their students the Kiki and Bouba shapes, and asked them: which one is Kiki and which one is Bouba? Over 95% of the students recognised Kiki as the pointy shape and saw Bouba as the rounded shape. But why? Ramachandran and Hubbard speculated that this is down to the nature of the connections which exist between sensory and motor areas of the brain. That is to say that the visual shape of the object – round or spiky – is linked to the shape our lips make when we say the corresponding word – open and rounded or thin and wide. This is enbedded into our DNA and thus in turn linked to the way we move our tongue when we create the word ourselves: Kiki requires you to make a 'sharp' movement with your tongue against your palette, while Bouba demands a more 'rounded' movement. These associations increase the chance that Bouba is linked to the rounded object and Kiki to the spiky one.



Research carried out in 2003 allowed Ramachandran and Hubbard to provide evidence in support of this theory. They discovered that damage to the part of the brain that is important for language leads to a person being much less likely to associate the rounded object with the word Bouba. The effect is interesting because it helps us shed light on the potential evolutionary origins of language. The fact that so many people, and even young children, consistently assign a sharp word to a spiky object suggests that the way we link sounds to objects is not necessary here done at random. Instead, there is some sort of natural limitation or system in place that helps us to make the association between image and sound. And although having this kind of framework itself is perhaps not sufficient to have brought about the development of language, it may at least be considered a stepping stone for the emergence of verbal communication.

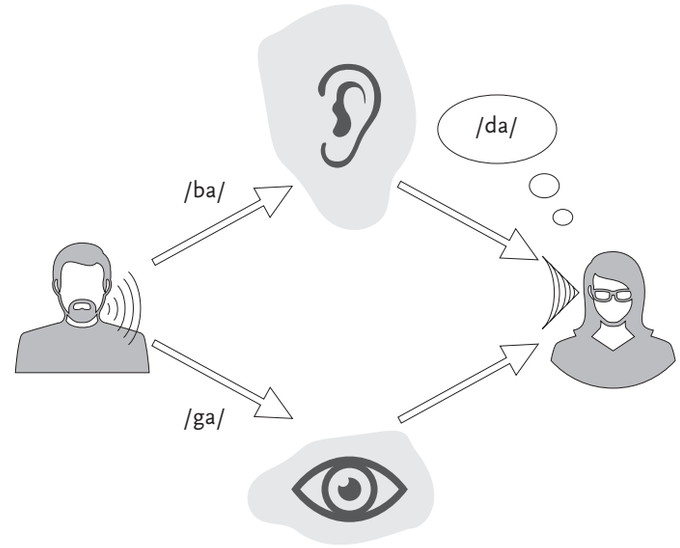
The experiment conducted does not only relate to mere abstract shapes, but also to people of flesh and bone. When New Zealand researchers Barton and Halberstadt asked various test subjects which of the six names they suggested matched best with an angular or a round face, almost all of them chose 'round, soft' names for the round faces – for example like Lou, Bob – and 'harder'-sounding names for the angular faces – like Pete or Eric.

The experiment also brought forward that the test subjects whose names fit best with their face were considered to be nicer. International experiments also bring forward that, more often than not, people resemble their first name. The suggestion is that, during the course of our lives, we develop a face that matches our first name. Whether that can be scientifically proven still remains to be seen, but feel free to test it out some time. I am already asking myself: does the sound of my name match my face, or do I look more like a Tom, Dick or Harry?

WHAAM! BAM!

Sound is not always what it seems. For example, there is something called the McGurk effect, named after the Scottish psychologist Harry McGurk, who conducted research into speech perception with children learning a language. He found out that there is a psychoacoustic effect in which is said it does not agree with the sound it makes, giving the listener the illusion that they are hearing something else. That is perhaps an overly complicated way to explain something that could be illustrated much more easily. In any case, it has certainly left lasting impression on me during my 'Sound and Audio Engineering' education in London in 2011. The most well-known example of the McGurk effect is this: a person repeats both the sound /ba/ and the sound /ga/. During the experiment, when the /ba/ is spoken, the listener sees /ga/, which means they do not hear /ba/, but because of the additional visual aspect, they hear /da/ instead.

– Auditive (listening only): **ba ba ba ba ba ba**
– Visual (seeing only, without sound): **ga ga ga ga ga ga**
– Illusionary (combination of seeing and listening): **da da da da da da**



The effect shows that what people hear is largely influenced by what they see, which in this case is the movement of the mouth. This might be linked with simulation or *onomatopoeia*. I am briefly straying into the field of linguistics here, but I find it such an interesting topic that I would like to touch on it a bit more. Why? Because our language is peppered with *onomatopoeia*. What exactly is this stylistic device? It means a word that phonetically mimics or suggests the sound that it describes, like meow, woof woof or cock-a-doodle-doo, but it also appears in verbs like squeak, hiss, hiccup, crack, blow etc. Or...achoo! (Bless you.) And what do we do when we teach children a language? A car is not yet a car, but a 'vroom-vroom', a dog is a 'woof' and a cat is a 'meow'. In Chinese, a cat really is a '*mao*'. Every language has onomatopoeias, and in every language they are different: for us, the sound a cockerel makes is 'cock-a-doodle-doo', in France it is '*cocorico*'; the English beep is '*piepen*' in Dutch, and the Romans' *Onomatopoeia* has found its way into our everyday language, in almost all areas, and of course into mine: the Hi-Fi

terms ‘wah’ and ‘flutter’ refer to sounds a speaker makes. But it is predominantly in comics that we find a lot of onomatopoeia: Tom and Jerry bumping into each other? CLANG! A car driving off? Vroooooom! Batman striking Robin: SLAP. Or the POW of Roy Lichtenstein! And of course, there is always plenty of: WHAAM! BAM!

CATAPULT

Tik Tak might be my very first memory, but it is not my most intense association: this I get when I hear Jerry Lee Lewis. That’s when I immediately think of my father playing the piano in our bar and dancing around the living room. I still remember as clear as day what he was wearing, how our eyes met and the feeling I got from it. And how captivated I was by the stories of Jerry Lee Lewis setting his piano on fire. Amazing how music can trigger such emotions. Even just a fraction of the intro to ‘Great Balls of Fire’ is enough to transport me back to that time.

Just as for countless other people, there are moments from my childhood that I will always cherish. And they are inextricably linked to music. Like for example the radio programme De Pré Historie, presented by Guy De Pré.
We listened to it every Sunday morning. The programme always started with its famous intro by Eddy Duane or Duane Eddy (I can never remember which is correct). My brother Didier was already making music then – planting the seeds for Hermanos Inglesos – and Christophe would often sit in the kitchen talking to my father. Between reading the newspaper and devouring freshly made sandwiches, they had some fascinating conversations. My mother stood in the kitchen,

she always made boiled eggs and soldiers on Sundays. Meanwhile music from a bygone era would play, interspersed with the dulcet tones of Guy De Pré.

For me, De Pré Historie radiated calm. There is something about the programme that means I instantly recognise it; just like *Tik Tak*, it has its own identity. Play me ten excerpts from different radio programmes and I will be able to pick it out straight away. The programme is still running in Belgium today and now and again I tune in. Whenever I happen to hear Guy De Pré, immediately I am back sitting in my parents’ house, a feeling that I cherish because it takes me back to the past and amplifies the present, making me appreciate it even more.

I have a similar experience with the music from the film *Amélie* by Yann Tiersen. But instead of a happy feeling, it triggers a sense of loss and sadness. My brothers, mother and I played the piece ‘Comptine d’un autre été’ at my father Hugo’s funeral. Since then, the music has taken on a different meaning for me. Now I no longer think about the film, but instead about the moment my father was buried. About that drizzly day. And then loss and sadness start to well up. But it was also the moment where the rich world of film music and soundtracks opened up for me, and I was able to find solace as I listened to them.

When you hear a song from your childhood, you are catapulted back to that period, back to where you were when you first heard it. Feelings included. It is a structural part of us. For some people it even gives them a homely feeling or helps them feel less out of place. Sound triggers emotion: the spontaneous goose bumps you get when you hear your favourite tune? It is a dopamine rush that causes that feeling of pleasure. The ‘Charlie bit me’ video that went viral? It is the children’s voices that tug at your heart strings. A well-known melody can speak to the whole

world: listen to the 'Coca-Cola Christmas Song' and you get an instantly heart-warming festive feeling.

So I am far from being the only one to make such strong emotional associations when I hear different sounds. And the more pleasant your experience, the more you will like the music. Even if we are talking about a guilty pleasure, like Toto's 'Africa', it will always more or less give you that same feeling. You get a different feeling with the music in horror films: if there is one genre, let it be one where sound dictates the atmosphere and emotion, then it is horror. Swelling violins, a slight scratching on the wall, Oldfield's 'Tubular Bells', the birds of Hitchcock…We have seen it all before. Or have we? Because usually during the bits that are too grizzly or the scenes that are too tense, we hide behind a cushion – or our nearest and dearest – so we don't have to see what we do actually want to see. But it doesn't help us one bit because we still hear the sounds and feel our adrenaline levels getting dangerously high. Is there anything you can do to stop the shivering feeling? Yes, cover your ears. Or turn the sound off because that reduces the impact of the stress-inducing images immediately. Some scenes become a bit banal even.

LYNCH

It is mainly the right combination of music and image that strengthens emotion. It is not one or the other. This is clearly explained in a video by film maker David Lynch. In it he shows war images – a helicopter in distress, machine guns, hand grenades – and instead of the real sounds he plays everyday sounds over the top: an alarm going off, a pneumatic drill, thunder… The video illustrates perfectly how, for example, soldiers returning home from war-torn areas can still suffer from PTSD (post-traumatic stress disorder) for years afterwards. Any sound

that reminds them of war can make them completely tense, angry or depressed. You can find the project online if you search for: 'David Lynch Foundation – Sounds of Trauma'.

The neurological mechanism behind these associations was discovered not that long ago. The Perelman School of Medicine (University of Pennsylvania) recently published a study (in *Nature Neuroscience*) that provides a first explanation for that associative process. It suggests that emotions are closely linked to our perception and that our emotional response helps us to deal with reality. This means a stress response to a situation will put us in a position to run away or escape from the danger. We hear something, link it to 'Danger!', and make a run for it. This is a complete gut reaction. But it can happen that the stress response continues to develop further, such as in panic attacks and PTSD: the emotional response to life-threatening situations – a bomb exploding – is quickly linked to a variety of other stimuli that have nothing to do with the initial sound but still provoke the same reaction. In other words: the process through which our perception of sound adapts to the auditive pattern we hear can be influenced by strong emotions, to the extent that noises that 'sound like danger' are interpreted as dangerous. An example? PTSD patients who lose it when they hear thunder or interpret the slamming of a door as a gunshot.

If there is one group of people which knows how powerful music can be, then it is the musicians themselves, and of course the listeners. The expression 'music soothes the soul' is not just something someone dreamt up a few decades ago. It is absolutely true. We will come back to this topic in the chapter about sound and body. Music has always touched and moved people, made them angry, cheered them up, brought them sadness or joy, and much much more. Over the last century numerous studies and books have been published that dissect the subject

of 'music' completely. One will talk about the healing power of music, another about how music triggers emotions, and another again about the associations that music can evoke. One book that I greatly enjoyed (and learnt a lot from) is 'The Power of Music' by Elena Mannes. A comprehensive work in which she completely dissects music and where every page has you going 'huh, I never knew that'. We do not often stop to think about it, but music and sound have a direct physical impact on our body. When we look at something, we see an image. When we listen to something, we feel a vibration: the ripple of moving air that gets converted into sound via our ear. When someone says: 'That piece of music touched me', no then you can take that quite literally. Music and sound are invasive, they penetrate our body. Listening to music is something very intimate because music can often 'strike a chord' and activate an emotion. Even people who are just talking, touch each other with their voice. The reason we prefer to hear soft voices and why for example radio presenters are chosen because of the timbre of their voice, is not hard to work out: we like soft voices more than harsh ones. The physical sensation we get from it is more appealing.

This idea is explored further by musician and rocker-turned-neuroscientist Daniel J. Levitin in his book *This Is Your Brain on Music*, highly recommended for a better understanding of the link between music and the brain. Among other things, he clarifies how music can be compared to a drug, given that it releases different hormones which provoke a specific feeling. Think about the neurotransmitter dopamine which we already learnt makes us happy, or about prolactin which makes us worried. If you listen to the right piece of sad music when you are down, in many cases it will help: you get the feeling that the songwriter understands your situation, which creates a sense of reassurance. Prolactin is also the hormone that is released when a mother takes care of her baby. Hence the healing effect that I experience

when I hear 'Comptine d´un autre été' by Yann Tiersen. Some more recommended reading on this topic: Singing in the brain by neuro-psychologist Erik Scherder, which is about how music and the brain work together.

CLOSE YOUR EARS

Seeing and hearing. You might assume that our sight is better developed than our hearing. We live in a very visual society and on a daily basis are overwhelmed by visual impulses that evoke emotions. But we forget that in the womb our ears develop quicker than our eyes. Newborns are able to hear, but they cannot see very much yet, except for spots. Our ears, on the other hand, are almost fully formed when we are born. Another difference is that we can close our eyes much more easily than our ears. A certain John Currie once said: ''Cinema overall is 70% sound. Because your ears are far more developed than your eyes. You cannot stop yourself hearing, even if you put your finger in your ears, you still hear. Because it goes through the cheek bones and everything. But eyes are... you can shut your eyes and that's it.'' Sound penetrates your body and as a human there is little you can do about it.

The relationship between sound and the body starts very early on in our development. Hearing starts to develop in a foetus between the seventeenth and nineteenth week of pregnancy. Even at this point we are able to perceive the heartbeat, breathing, rhythm and vibrations.

But how do we know a foetus can hear? Scientific research tells us so. It goes without saying that scientists have had to exercise extreme caution here. Until the mid-1990s science assumed that a foetus could indeed hear something, but that the sound was

limited to high-pitched tones. Whether a foetus reacted to music was a complete unknown. Until a passionate young researcher – Sheila Woodward – started research into 'foetuses and sound'. She was pregnant herself when she started the research and wanted to find out which music her unborn baby was being exposed to. She adapted an underwater microphone so that it would fit in her womb. As part of the research she also placed the tiny microphone in the womb of a mother who was about to give birth, next to the unborn baby's neck. The microphone recorded everything the baby was hearing in the womb. Woodward sung, played music, had the mother sing, and asked herself the questions: 'Does music exist in the womb? And if so, to what extent does it differ from the music we hear outside the body?'

Woodward repeated the experiment with different women who were close to their due date. If you now listen to the recordings, you first hear the blood pumping through the arteries of the womb. That alone already has a certain rhythm to it. So a foetus is already exposed to the rhythm of blood pumping. The other recordings reveal that a foetus grows (literally) in a bath of sound. As well as the natural sounds of the womb, in the recordings you can also hear a Bach concerto or the melody 'Mary had a little lamb', sung by Woodward herself. Sharp sounds with high frequencies sound duller. And actually, noises in the womb sound like you are listening to music under water. One of the biggest surprises was that you can still distinguish a male from a female voice.

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I am constantly amazed by how sound influences us and how strong the associative power of sound is. Everybody has heard of Pavlov's dog, but not everybody knows what the research entailed: the Russian physiologist Ivan Pavlov wanted to investigate digestion in dogs, and more specifically saliva production when giving a dog different types of food. He discovered that a dog would already start to produce saliva even before he gave it food, and what's more: it even happened when he pretended to give it food. But what has this got to do with sound? Pavlov wanted to investigate the phenomenon further. So, five seconds before giving some dogs food, he played them a sound. After he had repeated this a few times, he realised that it was enough just to hear the sound for saliva production to kick in. And with it, classic conditioning was born. Sound triggers a response, in humans too. A little-known fact: contrary to popular belief, Pavlov never used a bell to get the dogs drooling. Instead he used buzzers, metronomes and harmoniums.