

## Arie Bos – Use your brains!

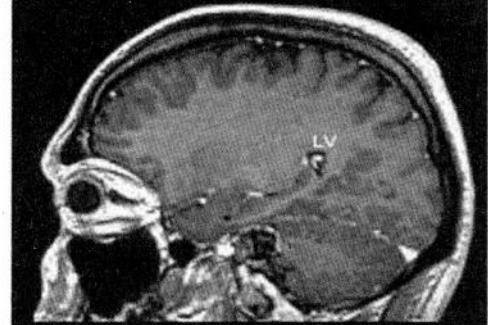
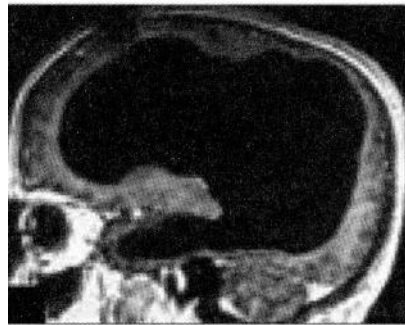
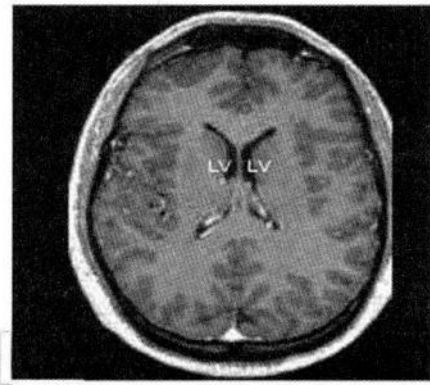
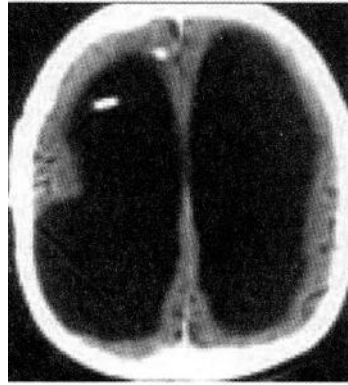
### Chapter 13 - Do you actually need your brains?

A stroke, meaning a brain haemorrhage or a cerebral infarct due to a clot just closing a blood vessel is horrible of course, but it makes quite a difference where this occurs in the brains. Some forms are even more horrible than others. When due to a stroke or a brain disease like for instance MS, an accident or a tumour, the cerebral cortex starts to malfunction, the result may be that you are not able anymore to move, not even to speak, or just may be able to blink your eyes. And that while you are fully conscious. So you can by no means let know that you still are there, because you can't react to your surroundings and people thus think that you don't know anything more. Try to realise that for yourself. You are locked. You are, if you like, locked in your own body. That's why such situation is called a 'locked-in-syndrome'. Fortunately it happens that there still is someone, often a loved one, who understands, for instance from your look, that you certainly still are mentally present. Then it can be agreed that you are able to 'say' *yes* or *no* by blinking with your eyes. One time would be for instance *yes* and twice *no*. This happened with the French journalist Jean Dominique Bauby who accomplished to write a book by blinking with his eyes by which he indicated characters on a board with characters. The book is titled *The Diving Bell and the Butterfly*.

Presently you can see with a brain scan where the problem is at someone who doesn't respond anymore at all, and is there some more chance that such situation is recognized. But how is it with other people who don't respond anymore at all, and who due to an accident or disease, ended up into some form of coma and where it is unclear which part of the brain is still functioning? There are forms of 'coma' in which people have their eyes open when they are 'awake' and sometimes do respond to incitements. That is called 'minimal consciousness'. And people who have their eyes open when they are awake, but don't respond to anything. That is called 'vegetative consciousness' (something like 'consciousness of plants'). How do you discover whether those people still experience anything? Neuroscientists in Belgium and in England got the idea to make a brain scan with these people while they were asked: 'Imagine that you are looking around at home.' With a healthy conscious person that would activate the back part of the brain (especially around the hippocampus, which forms amongst others kind of a navigation system). They were also asked: 'Imagine you are playing tennis.' That would just create activity in the premotor cortex. It turned out that some patients with such minimal consciousness responded to those questions with the same activity in their brains as healthy people. That suggests a form of consciousness, that they understood the question. But how clear is that consciousness? The ingenuity is that these neuroscientists used both these questions as blinking of the eyes of locked-in-patients. Looking around in the house then meant *yes* and tennis meant *no*. So, when the hippocampus region turned out to be active in the scan, meaning *yes* and *no* when the premotor cortex became active. By asking questions in which just *yes* or *no* sufficed, it became clear that even some people with an assumed 'vegetative consciousness', or a consciousness that was even less than minimal, showed a normal reaction and thus understood quite well what was asked. Just like the locked-in-patients. Subsequently, those patients were intensively treated and accompanied and were later on able to communicate with a character board. One of those patients told in a BBC TV-programme that, before it was discovered that he certainly was consciousness, he had the feeling of screaming against a wall, while nobody listened.

In this case it turned out that there still was consciousness, despite the fact that the brain damage made consciousness impossible. There are, however, still more extreme samples of this phenomenon. There is a famous case of a mathematics student with an IQ of 126 (and a verbal IQ of 136), thus rather high (on average 100), and with a normal social life, for whom it was discovered that he had 'internal hydrocephalus'. That means that the discharge of brain liquid is constipated causing an increased pressure of the liquid in the lateral ventricles due to which the cerebral tissue is pushed aside. Usually there is at least 4,5 cm cerebral tissue between the wall of the lateral ventricles and the surface of the cerebral cortex, but with him that had shrunk to just some millimetres and the estimated weight of his brains was 50 to 150 grams. Normally that is 1.5 kilogram or more, so for him there was at its best one tenth left. And nevertheless he had an above normal IQ and his behaviour was also normal. There are many more cases known of people where internal hydrocephalus compressed their brains to a minimum and with whom little to nothing can be perceived (see image 23). A similar situation may, however, just as well cause serious problems concerning intelligence and consciousness. But that is not necessarily always.

*Image 23. Brain scan of a French official (left) who, despite internal hydrocephalus, is functioning almost normal (with an IQ of 75, low indeed), who only felt a weakness in his left leg. For comparison's sake to the right a picture of normal brains with normal lateral ventricles.*



### **Savants**

When you visit an institution for mentally handicapped you will usually find some calendar calculators. These are people, without exception with a very low IQ, who can right away give the correct answer to the question 'which day was September 23<sup>rd</sup> 1938?'. I am thus not able to write down such answer now, since I don't know it and I am too lazy to find out. We call such person a 'savant'. The blind and mentally handicapped American Leslie Lemke happened to be able, after having heard a piano concerto one time, to perfectly play it again, without having had any piano lessons worth mentioning. Likewise there are more savants who, just after one view in a cathedral or at a city, can make a flawless picture of it with at home all details. The movie Rain Man is based on Kim Peek, who knew all telephone directories of America by head after one time reading. With him it is interesting that he, as inborn impairment, had no corpus callosum between both cerebral hemispheres. That enabled him to read the left page with his left eye and with his right eye the right page, and thus to remember. He could not take care of himself, since he was mentally handicapped. It turns out that savants often have a underdeveloped left cerebral hemisphere, especially the temporal lobe (at the side of the brain). Their ingenuity consists of photographically seeing or hearing everything in front of them. They often describe numbers and arithmetical problems as landscapes they immediately overlook. They never had to learn it, they just knew it by themselves. Australian investigators temporarily halted the left cerebral hemisphere at normal test persons with the same magnetic stimulation that was mentioned in chapter 12 in order to suppress voices at schizophrenic patients. As long as this continued some test persons also turned out to exhibit savant characteristics. It seems that healthy brains not only enable us to learn and become smart, but also that they prevent certain things.

### **Terminal lucidity**

At least as puzzling is the phenomenon of 'terminal lucidity'. That means: a clear consciousness just before dying of someone who already had no clear consciousness anymore for a long time. That may be a heavy psychiatric patient, or someone with a serious brain disease like severe meningitis or encephalitis, dementia or brain tumours. People who sometimes didn't even know their own name anymore, turn out all of a sudden to clearly awake, close before their passing, and want to discuss their past life and coming burial with their loved ones or their nurses. In some of these cases the skull was opened for a post-mortem examination of their brains and was something found which still hardly looked like normal brain tissue. Then you start to question what exactly is the relation between brains and consciousness. In such cases consciousness can in anyway not have been produced by the brains.

### **Near-death experiences**

You will certainly wonder that too due to the stories about near-death experiences (NDE). Those stories date back since writing. Greeks and Romans, but also authors from previous cultures wrote about it. About people who seemed to be dead, but returned to life and had had miraculous experiences. So

they hadn't really died, say many people who don't believe that. That couldn't be true. Nowadays it is possible to bring back dying people with new medical technologies to the land of the living. Sometimes this concerned people where no brain activity could be measured anymore with an EEG via electrodes on their skull. Or people with a cardiac arrest of longer than five minutes – sometimes even much and much longer –, who were brought back and also told the same stories already reported by the classical writers. And that is strange, because after five minutes without oxygen the brains are supposed not anymore and even never to function normally. There is a famous case of a surgical operation at a woman, a singer-songwriter with the stage name Pam Reynolds, who was cooled down during the surgery on a blood vessel in the brain to 16 (!) degrees, while all blood was drained from her brains in order to prevent a haemorrhage. Certainly, blood is poisonous for brain tissue. She was under-cooled since it is known that drowned bodies that were longer than five minutes under water still could be brought back without brain damage. This revealed that hypothermia prevents damage to living cells, also of the brain, which don't get oxygen anymore. Her breathing was halted and also the heart beat, after she was connected to a heart-lung machine. Of course her EEG showed no activity anymore of the cerebral cortex. As we already discussed more often, conscious experiences are supposed by most neuroscientists to originate in the cerebral cortex. Her eyes were taped and she had tailored ear telephones giving clicks to detect reactions of the brain. Once returned after the successful operation she turned out to be able to report a detailed description of what she had 'seen' of the operation. When her heart stopped, she felt going through a tunnel after which she met passed relatives 'in another world' who held her back to go on because she, as they said, had to return in order to continue with her life. She experienced this whole experience, and that is crucial for all those near-death experiences which all are similar to her account, as much more 'real' and clearer than the usual daily experiences, let alone dreams. Also hallucinations are never described as lucid and real. Another thing belonging to this is that the memory of a near-death experience never fades away.

There are still ever people who don't believe this type of stories. Especially (neuro)scientists. But an American neurosurgeon, Eben Alexander, who also never believed this, experienced it himself. He had a meningitis which was that severe that his whole cerebral cortex was all over pus and he entered into a seven days long coma. He too had a near-death experience. The written accounts of these experiences have many very similar elements. Often one returns with notions of what is the meaning of life. That turns out to be, like everybody most probably will sense, not focus on becoming as rich and famous as possible, but on love, for the people around you, but also for the world and everything in it. And secondly, on acquiring knowledge and insight in humans and the world. Of course, these are not separate from each other: love can't do without attention and interest. It is curious wahta happens with pain. As soon as someone experiencing an NDE 'leaves its body' and looks at it from a distance, one doesn't feel pain anymore. That is felt again once he or she has returned.

The resuscitation-physician Sam Parnia is able to bring back some people after a cardiac arrest, after a traffic accident, after violence or an overdose, thanks to hypothermia and prolonged respiration, heart massage and medication. Sometimes after more than six hours! Many of them leave the hospital walking and normally conscious. These people, he says, were not different from people we called deceased. They were really dead. Many of them had a near-death experience. Therefor he leaves out the word 'near' and calls it a 'death experience'.

What is dead actually? With these people their bodies apparently were able to take up again their 'spirit' and had thus not yet died. There is apparently a difference between passing away and the death of the body. Dying means, as it seems, that the spirit, or 'the person', (also called 'the self' or 'the I') leaves the body behind, after which the body slowly but surely quits too and slowly dies. That last thing, the slowly dying of the bodily tissues, is scientific fact. It may serve as an illustration that not the brain needs the spirit to develop and function, but that the whole body is in need of it. We thus *are* not our body, but we *have* brains and a body. As an instrument to be able to live here on earth, to consciously do things and to develop ourselves.

However painful the cause of the death may be - disease, violence or an accident -, the passing away itself is thus not painful. I consider that a consoling thought. I finished the previous chapter with the conclusion that we use the brains as a musical instrument. That we are also able to program the instrument to make music by ourselves. And that we, even when the instrument is out of tune or defective, could make a kind of music with it, though it might then sound not that great anymore. The near-death experiences even go further however, situations seem to exist in which we still can make music even though the instrument is broken down. We apparently just continue to sing on. The conclusion should be that we are not our brain, also not our body, and not even our feelings and thoughts. We do *have* all that. What, however, *are* we then? That is maybe the most important question there is.