

# Learning enthusiastically

A conversation with Prof. Dr. Gerald Hüther\*

## *How do people learn?*

Generally speaking, we think “learning” means cognitive, formal learning. We tend to associate “learning” with studying and memorizing vocabulary, factual information of all kinds, mathematical formulae and so on. From a neurobiological point of view, however, this is only the least little bit of what we learn.

## *Every learning experience involves emotions*

The most important learning experiences come to us, essentially, by way of our bodies – which means that learning is always an experience of the whole body. At the same time, every learning experience involves emotions. We are only able to learn when the so-called emotional centres in the brain are activated. These centres release neuroplastic messenger substances enabling what has been learned to become anchored in the brain. In other words, whatever the learning experience, if it is to be successful there has to be emotional activation. The most enjoyable activation we know of is “enthusiasm”.

## *What do you mean by “enthusiasm”?*

Enthusiasm is an emotion that went missing in our contemporary functional-

ized society. Picture yourself how you felt as a small child when, after trying many times, you eventually managed to haul yourself up by the table leg – or the first time you stood upright on your 2 feet. That feeling is enthusiasm. It is a very deep sensation that seizes the whole body – unless, like most adults today, a person is completely blocked and no longer has access to his or her emotions.

## *Enthusiasm activates the emotional centres*

The state of enthusiasm goes along with activation of the emotional centres in the brain. You can think of the emotional centres as resembling a watering-can. As soon as you tip the watering-can, the neuroplastic messenger substances pour out of the spout and flow all over the brain.



Gerald Hüther in conversation

## *You mention the “power of inner images” in your publications. What are inner images?*

As a biologist I am naturally excited by the idea that there may be nothing on earth that is alive and does not possess an inner image. An inner image is a pattern or an action plan, that tells me what I must do if something new happens. At the cell level, such inner action plans are the genes and genomes. That means if anything new happens in the cell, the cell will go through the image catalogue in the genes for what it might need to deal with the new situation.

## *An inner image tells me what to do*

A similar thing happens in organisms and in human beings: We store inner images in our brain in the form of particular behaviour patterns that are based on our past experiences and have been formed over the course of our life. Inner images are anchored in the brain in the form of specific networks. If something happens to us all of a sudden, and we do not know what to do about it, we call on one of these networks to help out. That is to say, we summon up these inner images and we may perhaps find one that tells us how we might act in the given situation. Sometimes this works, the watering-can of

enthusiasm tilts forward, the messenger substances are released, and that particular inner image then becomes more and more consolidated.

*Are inner images in some cases actual pictures, or do they exist only on the level of bodily functions?*

The first inner images that are anchored are images of our own body. You could almost say the brain structures itself on the basis of these individual body experiences, both prenatally and after birth. Then other inner images come along based on experiences and reaching us via our sensory organs. Aural images, for example, are anchored listening experiences. In the same way we have visual images. We can identify an apple as an apple, and we can tell it from an orange. In the course of our lives we keep having similar experiences over and over again, and these similar experiences become condensed into an image – an image, for example, of “what preschool is like”, “what women are like”, and so on. This is called our “disposition” or “personal attitude”.

*Personal dispositions influence learning*

These personal dispositions and attitudes derived from experiences are the basis on which people evaluate their sensory input. For instance, people’s dispositions govern where they direct their attention, what they fail to notice, what they care for and what will leave them unmoved. These dispositions, once established, are what ultimately decides how people grow enthusiastic, and what about. They also determine how a person uses his or her brain, and for what purposes – and what kind of a brain one develops. This is why personal dispositions influence learning. It is very important that children’s experiences in relation to learning are good. If they are not, the attitude that develops is: “Learning is stupid!” Once a child has acquired such an attitude, everything in the whole world

that there might be to discover or create is spoiled for him or her. And it’s an attitude that we are inducing far too often these days, I believe.

*Can we humans make ourselves smarter, or dumber?*

Neuroscientists have found children are not born with too few neuronal links – meaning we would have to produce more for them through education and culture – but on the contrary with too many networks. This means: It is up to us how many of these excess networks children will actually use in life, or more specific it’s up to the life environment in which a child grows up. A rich life environment for a child poses the maximum number of problems and challenges – such as a world in which you have to climb trees, or build a house for yourself, or cook your own food.

*What is not used withers away again*

In a “pet” or “zoo animal” environment in which everything that people need in life is put in front of them, these potentials could not be developed. The excess networks would only wither away again. This is what neuroscientists call “experience-dependent plasticity”. Inside the brain, too much is provided at the outset; then comes the question: “What will the child actually need in this world that he or she grows up in?” What is used will remain in place, and what is not used will wither away.

Children living in the Amazonian rainforest learn 120 different shades of green and can name them all, using 120 different terms. Potential of that kind is either used in practice or little used. Children here can at best distinguish light green, green and dark green. How far a potential is actually used depends on how important it is. If in a given culture something is pointless and unimportant, it will not be used. The result is that what was once a possibility, this potential, this

over-provision in the brain, and is not used, will just wither away.

*What determines what will be learnt?*

The keyword we need for understanding this is “significance”. Children in the Amazon Basin learn 120 different green tones, because there the exact colours matter.

*If something matters to a child, it will be learnt*

What is significant and what is not is determined by cultural differences. If something matters to a child, it will be learnt. This poses a challenge at the moment, because anything connected with the classic idea of “learning” is insignificant to children. Young people growing up today think it is more significant and more interesting to learn how a person becomes famous. 100 years ago, what mattered was being a soldier. 200 years ago it was important to be a seafarer and an adventurer, and so on. Every culture, every society has its own idea of what matters most to it, and then invites its children to conform to this idea. As a society, and with regard to the media, we need to ask ourselves: do we really want our children’s priorities to be set for them by the media, given that the media’s interests are primarily commercial? ■

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