

Changing mindsets, changing results

A neuropsychological perspective

1. Introduction

We live in the century of knowledge. Our society prospers because it can rely on strong knowledge intensive organizations. We owe this position due to the fact that we have the ability to think. Reasoning and problem solving have become critical success factors in our society. This letter focuses on the statement Einstein once formulated: "You cannot solve a problem within the mental framework that was used to define it." Both the problem and the solution are created out of building blocks from our frame of reference, our mental models. When we learn to play with these models, we can discover new possibilities to solve problems more easily. Besides that, if we acknowledge that people create their own reality, communication and cooperation with others will improve. The more knowledge intensive our work is, the more beneficial changing mindsets can be.

2. Sensory perception

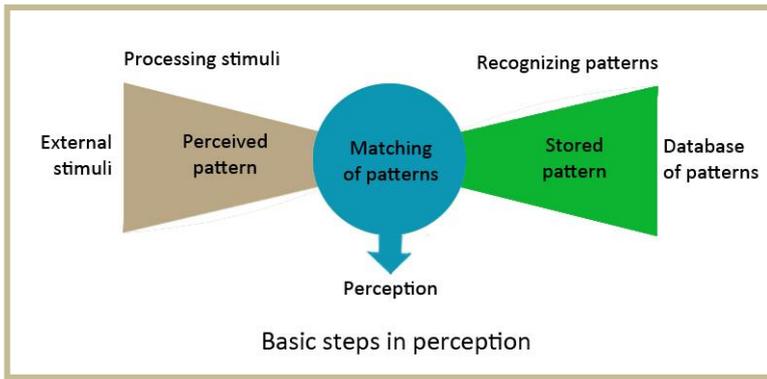
If we look out of the window it is difficult to imagine that the perception of the garden is different for everybody. What we see is our reality and we seldom challenge our way of perceiving. During our life our perception has gone through enormous learning processes, without which we would not be able to perceive anything. It is difficult to realize that our own way of seeing probably also differs from what other people see. In order to explain this, a short guided tour through the perception process follows.

If we disentangle perception, we can distinguish two main processes: processing of stimuli and recognition. In the processing of stimuli external stimuli are registered and

transformed into a neural representation of the outside world somewhere in the brain.

Recognition is the subsequent process that gives meaning to this internal representation. The processing of stimuli is characterized by an enormous reduction of stimuli, by a factor of ten million. This process ends with the detection of sensory building blocks which assembled create patterns. This process is mostly inherent and probably leads in different people to similar results.

There are people who have not been able to see anything for the first forty years of their life because they suffered from a serious form of innate cataract. Thanks to recent breakthroughs in the medical field, their eyes could be lasered. Once cured, these people have enormous problems in digesting all signals that are sent by the eyes to the brain. Their image is nothing more than a blur of colors. After some time they perceive the world like a Vincent van Gogh painting and slowly they start to recognize faces.

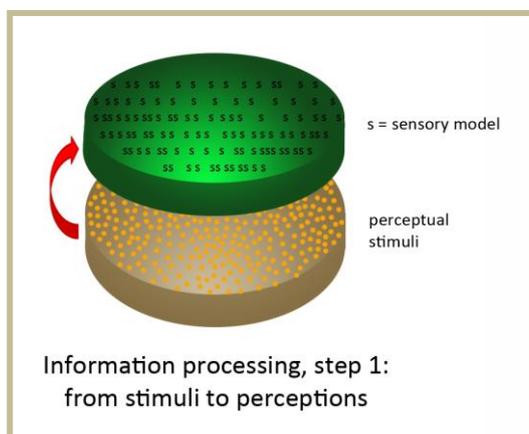


After neural representation, the brain has created a neural copy of the external world. This copy has no meaning yet, we still do not know what we are perceiving. In order to get meaning, the patterns are offered to a sort of virtual market in the brain. On this market, the recognition process starts, working according to the principles of association. One

party offers patterns, the other party searches in the archives whether that combination of patterns has been detected and archived before. The purpose is to create a match which will lead to the awareness that something is being perceived. A 90% correct match (e.g. an unfamiliar face) also leads to a recognition and this new pattern might be archived as an addition to the stored material. In this way, the archive slowly expands. A perception can be defined as a recognition of a stored pattern. Without stored patterns, there can be no match. In fact we can never perceive more than is stored in our archives. So we only perceive what we know. If the pattern does not lead to a match, it will disappear without being noticed. The marketplace needs attention to process new patterns. Unrecognized patterns will not be noticed nor stored. They are gone forever.

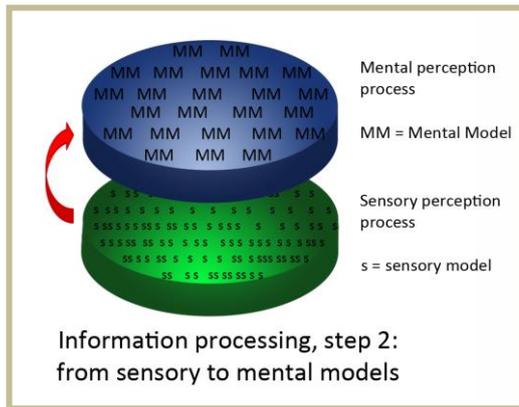
Apple iPhoto has integrated the two perception processes. All steps from making a picture with the digital camera until the projection of the picture on screen, can be seen as processing stimuli. Until recent, computers stopped here. iPhoto adds some elementary aspects of the second process, giving meaning to stimuli. It extracts faces out of a stored photographs. It also asks to give a name to a certain portrait. Next, the complete database is analyzed and all photos which contain that face are selected in a special map. This is clearly a process of adding meaning to a collection of stimuli.

Perception is literary "re-cognition", the "renewed cognition" of an existing pattern. Due to the fact that everybody has had different experiences, the archives of different people are filled with different patterns and perception will differ between people.



Summarizing, sensory perception consists out of processing external stimuli which, after filtering, are compared to stored patterns. A match leads to recognition: the actual perception. Without a properly filled database, there can be no recognition and no perception. All perception is the result of a learning process. Without previous learning, internal signals will fade out without a match and without perception. In layman's terms we call this: "he did not get it!"

3. Mental perception

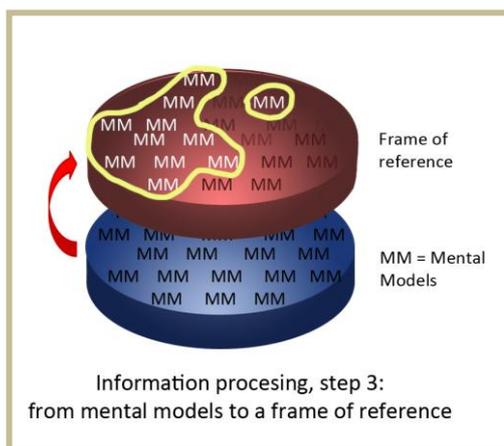


Sensory perception generates images about what is happening around us. Mental perception tries to understand these images and puts them in perspective. There are several parallels between sensory and mental perception. First, both are organized around building blocks. In mental perception these are called mental models. Second, both processes are based on matches with archived information. A match in mental perception can be seen as an interpretation (aha, this means ...). These interpretations together create "reality", which is a mental construct of what we think is

true. "To realize" literary means "to make real". Finally, both processes are a result of a learning process, which implies that the way we perceive reality is personal and unique. Everybody realizes that there is a reality, but strictly speaking, it is not the reality but his or her reality. Reality always belongs to somebody.

A picture of a group of people can be interpreted as a party or as a meeting at work, depending on other mental models perceived while looking at that picture.

4. Frame of reference



For mankind it is very important to know how the world is organized. During the evolution, control of the environment has been a critical success factor in surviving. On a mental level, people create control by developing a theory about reality. Such a theory exists on the level of mental models (did I understand that well?) and on the level of a broader interaction between mental models (what conclusion can I draw?). Such a broader interaction between mental models is called a frame of reference.

In the illustration you can see that a frame of reference consists out of a set of mental models. You can see that this

set is a selection of possible models. Some are included, some excluded. A frame of reference is always a selection of actual mental models (e.g. some aspects of an organization are included when thinking about innovation, others not). In the illustration, one mental model is involved but isolated, symbolizing a "problem".

Thinking in terms of models is powerful. It helps us think about things which are not here and even never have existed. In our imagination we can create virtual simulations of situations which might happen and we can safely experiment what to do in which situation. The disadvantage is that there are also problems involved using this frame of reference. The first one, an

An example of a high level frame of reference is the innovative ability of an organization. The concept Innovation can be defined in many ways. Does the definition limit itself to developing new products, using new expertise or finding new markets, or does it also involve a new way of organizing internal processes like marketing, logistics or finance? If an executive board makes a statement that they want to increase the level of innovation, probably there are as many definitions of the word innovation as there are board members.

intrapersonal topic, arises when the used frame of reference seems to be unsuitable to solve a particular problem. It is difficult for someone to free himself from his own mental models. The second one, an interpersonal topic, arises when e.g. a colleague sees brilliant opportunities, but is not able to sell these ideas to his direct environment. I want to elaborate on both these topics.

5. The frame of reference encloses the problem and blocks a solution.

The free work memory in the prefrontal cortex has limited capacity and allows only a minor amount of entities (referring to perceptions, memories, associations and thoughts) to be involved. Dominant models have strong influence on which models are selected in a frame of reference. Police officers are sometimes blamed for having tunnel vision while doing an investigation. In fact, everybody can be blamed for having tunnel vision.

A frame of reference helps us understand the world, but in this process many mental models have to be neglected. Selection is needed and often is very effective. However, crucial mental models can be blocked because they do not fit in the actual frame of reference. Due to this blockage people will not recognize several options that could make them understand the situation or take appropriate action. If this is the case, the result is a lack of options and specific problems cannot be solved. Other people, who have a different frame of reference, make different selections and might see a solution for a particular problem immediately, because their selection of mental models does contain a solution which might work.

President Bush was obsessed by the idea that Saddam Hussein did have mass destruction weapons, although the UN investigators stated very clearly that this was not possible. Due to his obsession, Bush interpreted the not finding of weapons as a sign that Saddam was very good in hiding them. A conflicting mental model, like "Iraq is so weakened by to UN sanctions, that it cannot develop or buy weapons" did not make a chance in his frame of reference. His mindset saw only one solution: to destroy Saddam Hussein.

Usually a wish (e.g. to change something), can be handled within the frame of reference. If this is not the case, we call it a "problem". A problem can be seen as a direct result of the used frame of reference. A frame is a great help in defining and understanding the situation, but at the same time blocks solutions, because they were not included in the personal selection of mental models. This is the reason why Einstein states that a problem cannot be solved within the frame of reference that has created it. The problem is a result of the frame of reference. Changing this frame can either lead to a new perspective in which the problem no longer exists or can lead to new options in which the problem can be solved.

Einstein discovered the famous $E=MC^2$ at the moment he opened his frame of reference for the model that energy can transform into mass and vice versa.

6. Changing the frame of reference

The philosopher Cornelis (De logica van het gevoel, 1997) defined a frame of reference as a solidified image of reality. Because it is solid, it helps to get a grip on reality, but at the same time it lags behind the changing facts. For Cornelis, learning means melting a frame of reference, changing it and solidifying it again in a new form. Learning always involves a change of a mindset. If you are stuck into a problem, such a changes can be very difficult. At other

moments, a change of a frame of reference can be very easy. An eye-opener is e.g. an insight that suddenly changes a series of incomprehensible facts into something very comprehensible. An eye-opener shows that if all mental models are present, a shift in perspective can lead to a completely new insight, just by rearranging the models or adding one. The new image of reality can look so logical, that we wonder why we have not seen it before.

But how can we change a frame of reference consciously when we have a problem? In general, the biggest problem in changing frames is that we are hardly aware of the fact that we have them. Frames are an integral and unconscious part of our perception and reasoning. If you do not know that you have something, it is difficult to change it. Change requires a mirror, a distant reflection in order to recognize and name the frames. The easiest way to recognize them is to start with analyzing the problem, which by definition contains the full frame of reference. If you can make a list of all assumptions that lie beneath the problem definition and the way the problem originated, you can create an opportunity to become aware and change some of them. By challenging each of the assumptions separately, or in combination with each other, you can experience the effects of how a new light can shine on the same topic. Some changes might feel as comfortable, others as unrealistic. New options arise and new solutions can become possible. These solutions have always been possible, but were not recognized before. Some problems suddenly do not feel like problems anymore, just by having a fresh look at them. This brings us back to the title of this topic letter: changing mindsets, changing results. If you are able to perceive the same facts in a different way, you create new perspectives in which new models are involved and which enable different options to act, which can lead to different results.

An executive board wrestles with the idea that the organization is not innovative enough. They have the assumption that there is too little innovation power in the organization. This assumption leads to the conclusion that more innovative initiatives are needed.

Challenging this assumption might lead to an opposite conclusion: there are many initiatives, but it is hard to choose between them. Besides that, many innovative projects never reach a state of maturity. They are started but stopped because other projects suddenly seem more promising.

A redefinition of the problem leads to the conclusion there is not a lack of innovative power, but a lack of long term vision and management power to foster the started projects to a successful end. This redefinition changes the perspective. Instead of a shortage of innovation, there might be an abundance and a disability to choose and manage.

The old solution is encouraging new ideas (more of the same), the new one defines a long term vision and develop stronger project management.

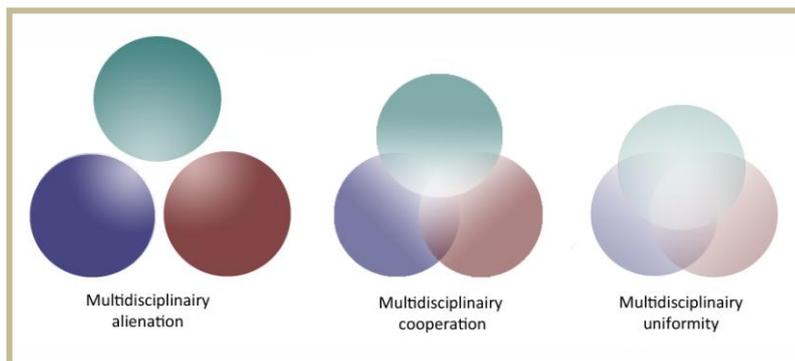
7. Frame of reference and mutual understanding

So far I have focused on the intrapersonal aspects of frames of reference. The interpersonal aspects are connected to communication between people. Because frames of reference are always a result of a personal learning history, two people will never have identical ones. They can be more identical if people studied the same subject, worked in the same profession, done the same job, or lived together. Managers sometimes say that they want to align "all noses in the same direction", referring to the fact that they like to see more identical mindsets in the organization. The bigger the overlap between frames of reference, the easier it is to understand each other. The Mirror system that is discussed in Topic Letter 12 (Can

Organizations Learn?) can be regarded as a strong motor in creating overlap between frames of reference.

A problem connected to strongly overlapping mindsets is collective blindness. The more noses are aligned, the less diversity in thinking. This can be killing for innovative companies. IBM lost its world market leadership in selling computers suddenly and abruptly, because it was the last company to realize the possibilities and attractiveness of PC's. The alignment of mindsets was very strong but unfortunately in a wrong direction.

But how different should mindsets be? Learning from each other starts with understanding each other and this requires an overlap in frames of references. But learning starts when



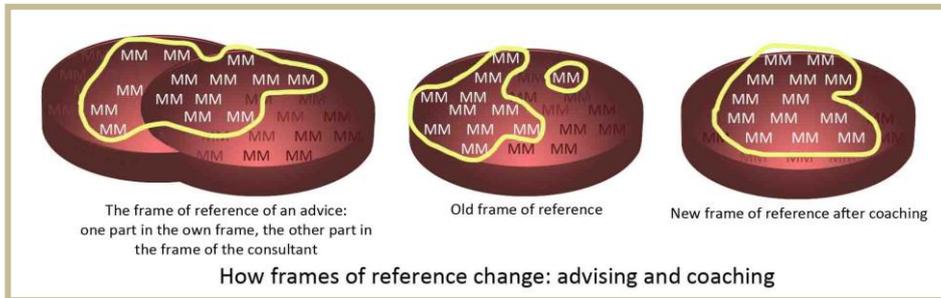
frames from different people are compared with each other. So too small differences (on the right side of the illustration) create too little learning possibilities or mutual challenges of ideas. The three participants do not introduce enough difference to make the group challenge each other's ideas.

Too big differences (left in the illustration) create mutual misunderstanding, because there is not enough common ground. Multidisciplinary teams that agree on the targets and have the same basic values and a certain amount of shared expertise, but at the same time can deliver a frame of reference from their different professions, probably have the best opportunity to create the highest results together.

8. Learning from each other

If we want to analyze the principles behind learning from each other, we can best discuss the difference between coaching and consultancy. Suppose somebody hires a consultant for solving a problem he cannot solve himself and suppose the problem is due to a blockade in the frame of reference and not a result of a lack of competences. An advice is a product that originates from the mindset of the advisor. Such an advice will work well if the advisor can implement the advice. But what happens if the client has to execute the advice? The advice can be regarded as an organ donation having a big chance of rejection. As long as the advice can be fully executed according to the original plan, it might be a successful operation. But as soon as the implementation has to be adjusted, because things develop in an unexpected way, the client will fall back on his own frame of reference in order to adjust the advice to the new circumstances. In this case the project is implemented with a mix of mindsets which usually does not work well. Probably the adjusted approach will include parts of both mindsets and confusion will be the biggest result. The project plan is not embedded in one coherent frame of reference. In many cases such projects are cancelled somewhere in an undefined way. You might question yourself whether this theory states that advice should not be asked? No, there are successful ways to implement advice from external consultants, as long as there is a strong overlap between the frame of reference of the consultant and the one who asks the advice.

Coaching differs from advising in the sense that a good coach helps the coachee to become aware of his implicit mental models. By doing this, the coachee can gain a deeper insight in why he defined the problem in such a way and which possible solutions were blocked by doing that. This creates opportunities for the coachee to adjust his own mindset and to enlarge the



repertoire of possible solutions. These solutions are products of the personal mindset and have high chances that they can be implemented successfully. The

added value of a good coach is not to solve the problem of the coachee, but to create a dialogue in which the coachee can develop different perspectives on reality and by doing that create opportunities for different results. The changed frame of reference of the coachee will take care that new options to solve the problem will arise. These options are fully integrated into the changed frame of reference and a high chance of being successful.

9. Summary different mindsets, different results.

The analysis of perception learns us that we can digest a lot of information by being very selective. We give meaning to distilled patterns through the process of recognition. In our thinking and our way of understanding the world, we give meaning based on a selection of models which we have in mind. What we call the reality is in fact our personal reality. The way this reality is defined helps us to understand the world and to solve complex problems. When we do not manage to solve them, it might be due to a shortage of competences, but more likely it is due to our specific selection of mental models. If we can challenge our own assumptions, with or without an external party, and can change the way we define the world, we can free blocked opportunities and create results which used to be out of reach.

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