

The realism of illusion on the reality of visual perception

As a design student I was often told to think with my hands. Which makes sense, since when you immediately act you establish a direct connection with your true motivations. There is no space for theoretical preconceptions or other semi-intellectual pitfalls that mislead you. This empirical outcome is the basis where you can build on to create a personal approach. It's needless to say that in this process there was no text book involved.

In my works I try to create intangible appearances with light, these effects are the result of your visual system, which includes every part your body you use to see. But some of these perceptual effects are not categorized as a real appearance but as optical illusions, abstract images that seem to differ from objective reality. They are seen as an disruption of reality, a sort of temporary error. But if optical illusions are not real, why do we see them? Is there something wrong with our eyes? Is our way of seeing optical illusions the same as how we normally see the world? And is reality then also an illusion? Through empirical and theoretical research I try to answer these questions and research the relation between reality and illusion.



(Simultaneous contrast illusion)

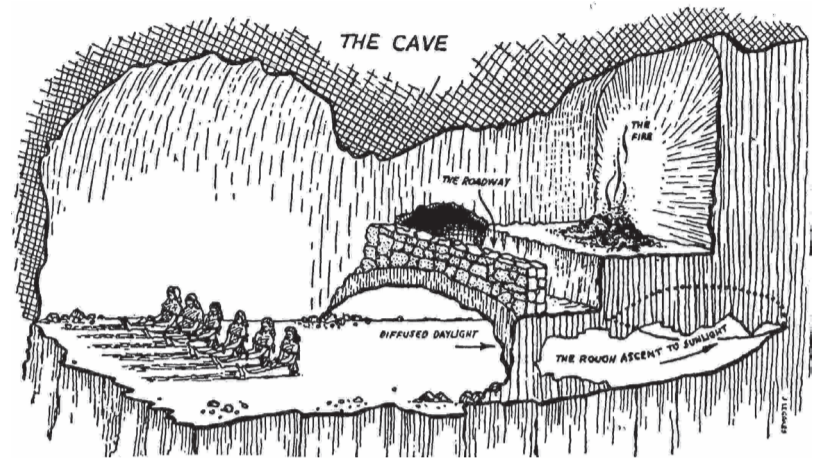
The most persuasive representation of reality is your sight. Seeing is believing. Our visual preference to define the truth is clearly expressed in our metaphorical way of speaking, we call the wisest men visionaries, the truth is in the eye of the beholder and you see the answer. You experience your visual perception as very common and equal for everybody, therefore it's the sense you rely on the most when you constitute your reality.

When you perceive an object you define as an actual physical presence you call this object real. You intuitively act on the observations of your perception, because it corresponds to expectations related to similar situations in the past. The way you have experienced your surroundings throughout your life forms your present reality. When you see for example a stone you know if you can actually pick it up or if it's just a representation of a stone. An illusion is something you know to be wrong, but which appears as true. In this case a realistic image of a stone. When you don't know you perceive an illusion you classify your perception as reality, it appears real and therefore you experience it as real. But when you are aware of the illusion, you define your perception as a representation of reality. As soon as you know that that stone is painted you don't try to pick it up anymore.

The definition of our reality is constantly shifting. We always had the urge to explain the phenomena in our surroundings. Everything we see or experience is given a temporary logic, ranging from an almighty divine presence all the way to existential nihilism. New discoveries in science and pseudoscience tell more and more about the universal truths of the world we live in, as if there is one absolute reality, which gets unravelled layer by layer. While we get more knowledge of the world, we seem to get a better understanding of what just *appears* and what really *is*. As a result of this findings we continuously adjust the definition of our generally accepted reality.

Even though we can comprehend that reality also exists outside our own viewpoint, our personal perception is our biggest limitation when it comes to understanding the world around us. Arthur Schopenhauer stated in his 'Studies in Pessimism'; *"Every man takes the limits of his own field of vision for the limits of the world. This is an error of the intellect as inevitable as that error of the eye which lets you fancy that on the horizon heaven and earth meet"*. It appears to be difficult to see our perception, sensorial and intellectual, as a small piece of an absolute and universal reality. You see a clear example of the relation between our viewpoint and our idea of reality, in the conception of our planet. When we gazed at the horizon we saw the edge of the world and concluded that the world must be flat. When science proved that

the world is a sphere, we looked at the sky rotating around us and we saw our sphere as the centre of the whole universe. Later it turned out that the earth was spinning around the sun, the centre of gravity of our solar system. But now we know that our solar system is one of billions in the galaxy, expanding continuously several light years a second. Because we now have a (more) complete picture, we think that our predecessors had a limited understanding of the absolute reality, it turns out they lived in an illusion. And there is probably no doubt that our successors will think the same about us. The present defines what generally is understood as real and what was just an illusionary misconception.



(Plato - Allegory of the Cave)

Our common reality is the way of seeing which is most widespread and accepted. Since most people see the world normally (two eyes, focussed and in colour), a limited eyesight is seen as a limited view on reality. When you are for example colour blind you see the world in less or no colours at all. It's seen as a simulation of reality but where the actual colours are translated into an inferior reproduction. You are merely deceived by the limited capability of processing visual stimuli in your eye. Seeing a fragment of the absolute reality is therefore seen as an illusion.

But there are also species who can perceive more than we as humans can. Certain snakes have the capability to detect infrared radiation, these are light waves not visible for humans, that are emitted by objects in the form of heat. Where we see just a plain white mouse, these snakes can sense a gradual temperature difference. Even though this type of light is not sensed by their eyes it is in some cases directly connected with their visual system. This way of perception is not something we can reproduce as humans ourselves, but we still accept this view as real, since we can reproduce this visual phenomenon with the use of infrared goggles, and then see it with our own eyes. You can conclude that the heat is actually there, therefore it's perceived as part of reality.

There are other animals who can see things we as humans will never see. Bees for example see a wider colour range than humans can to distinguish certain different types of flowers. We humans are trichromats, species that have three type's of colour receptors in their eye, when we see a certain colour, like orange, we actually mix the values of these three receptors together. But bees are tetrachromats, they have not three but four type's of colour receptors in the eye to define the tint of colour they see. The curious thing is that this is a characteristic that can be found by certain humans as well, there is a small percentage of women who have the ability to see a richer pallet of colours. When they would see a checker board of greenish blue squares and reddish blue squares an average person would just see a blue surface. This extension of normal vision is not possible to experience by reproduction, as with the infrared goggles, but only by simulation, which creates not a truly sensory experience but rather an educative lesson. The result is that tetrachromacy, just as synesthesia, is seen as unreal, a hallucinatory condition. Visual perception which isn't reproducible is stated as an illusion as well.

You could conclude that the more external visual stimuli you receive the more complete picture you can make of reality, but on the other hand you can also have too much visual sensorial experiences, you see things which are not perceivable. The dominant way of seeing defines what is the reality and what is an illusion, we all agree on this standard, while the common reality is not absolute and for everybody the same. We interpret perception not only as it appears but also as we know it.

We understand how the physiological processes of our eyes define our vision and therefore we have the idea we understand how

and what we see. We know that the rod cells define the lightness and brightness, the cone cells define the colour you experience, the persistence of vision effect simulates movement and your binocular vision tells you the distance and depth of your surroundings. Optical illusions are seen as tricks that deceive the visual system.

But when you look closer, the phenomenology of visual perception is not only defined by external sensorial stimuli, but mainly by an internal cognitive circuit. You read your surroundings by continuously adjusting to different external data and you conclude out of previous successful experiences what works well and what doesn't. Instead of completely processing your surroundings over and over again you rely on conclusions drawn out of this empirical behavior. The visual system is even serving this empirical way of seeing the 'reality', a clear example is made in the blindspot tests below. You close your right eye and watch the dot with your left eye while you move your head back and forth. At a certain distance the line becomes solid, the gap falls precisely in the blindspot of your eye. But instead of seeing a blank spot, your brain fills in the image with something which makes sense in that context; a continuous line. What we see is thus mostly a representation of previous conclusions instead of a direct analysis of visual data.



(Blindspot experiment)

Numerous factors can change the physical qualities of the light you perceive. Translucency, reflection and refraction change the luminance, color and location of the light. The visual system mainly connects these visual stimuli with experience in the past instead of encoding and analyzing every property of the perceived light step by step. Because there is simply too much data to process, your visual system has to short circuit and draw quick conclusions. You actually see what you expect to see. Visual perception can not only be explained by the physical characteristics of your surrounding but it's mainly defined by internal processes which are so dominant that they define your actual vision. The odd effects called optical illusions are not exceptions but they are isolated strategies of visual perception.

Illusionary influences are embedded in our visual perception, there is no clear distinction between reality and illusion. Even though for a human there is no absolute reality, you could say that it's possible to define what is real and what is false when we take the distorting aspects in consideration, since the physical properties of the world around us are measurable by other means than our eyes.

Reality is not only perceived directly by the human visual system. With the use of mechanical perception we can extend our visual senses. The human eye can see from a centimeter all the way up to several light years away, but the focus range of the eyes lens doesn't always give a sharp image. With the use of a telescope you can 'see' a clear image thousands of kilometers away. This mechanical perception is part of our visual reality, since we can travel this distance and determine that the machine vision corresponds to our actual vision.

But while the developments in optical technology increased, so did our acceptance of this mechanical reality. Nowadays we accept most mechanical perception as absolute actual reality as well, even though it is not possible to actually check this view. When you perceive for example movement, the frequency of processing individual images from the eye to the brain limits the capability to see something on very high speed, you would simply just miss it. With the use of photography a moving object can be frozen and movement can be shown as a sequence of images. By using this extension of our eye, we understood, thanks to Eadweard Muybridge, that a horse is floating in mid-air when in gallop. Even though nobody ever saw this in reality, we accept this to be real. Machine vision can help us get a better understanding of the world around us.

But photography is an ambiguous medium that depicts and constructs an image at the same time. By representation it simulates and thus shows a limited version of the real. This doesn't mean images are untrue, on the contrary, as stated above images can dissect small fractions of perception and they can show in this way a more complete

picture of reality. But at the same time photography simulates this reality. For example the cut out or colour sensor of a photo(camera) change the actual appearance of the subject in the image. Just as eye-vision, machine-vision represents the surrounding world by combining external stimuli and internal processes. It presents reality to us, but at all times as a processed representation of the actual.



(David Hockney - Merced River, Yosemite Valley, Sept. 1982)

Almost every aspect of our biological visual system is exceeded by a mechanical counterpart. Machine vision extends the knowledge of our surrounding and extends the conception of our reality. But at the same time it constructs a representation of our reality. Even though we know that for example a photo is not an exact copy of reality, they appear so. We're not all the time aware of the manipulating qualities mechanical reproductions have on us and unconsciously accept them as reality. Your reality is therefore not only constructed from what you directly see with your own eyes and process in your brain, but as well from the mechanical reproductions that you accept to be real.

Both biological and mechanical perception are constructed from external sensorial information that is processed and interpreted by an internal visual system. The perceptive characteristics of a human body or a photo camera construct a representation of the actual perceived subject. Reality is not absolute and universal but it's perceived by every person or every medium in a different way. Illusions are embedded in our actual view on the world, at all times we're influenced by the persuasive deceiving qualities of our visual system. It turns out that optical illusions are not just temporary exceptions, but that precisely these illusionary qualities of our visual senses shape reality as we see it.

text: Arnout Meijer, Amsterdam 2015

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- Het witte gevaar* - Roel van Duyn