Are sensation and perception two separate stages?

"I was reading a newspaper when this man came up to me and shook my hand. He went down the aisle shaking hands with all of the passengers," Alperin recalls. "I waited until he was at a safe distance and turned to the man sitting next to me and asked him who that was. The guy looked at me, horrified and said, 'That was Jimmy Carter!'" Unlike me, who wouldn't actually be able to recognise the 39th U.S. President, Alperin suffers from prosopagnosia, a cognitive disorder of face perception in which the ability to recognise familiar faces is impaired, while other aspects of visual processing remain intact. Which translates to the fact that all his senses are intact, but the specific sliver of his brain responsible for face perception is damaged.

Sensation, what I choose to define, is the process by which physical stimuli is detected by the various sensory receptors, through sensory modalities such as taste, touch, sight, and transformed into electrochemical energy enabling the physical organism to notice and be aware of objects and events in the physical world. Perception is the process of organising and interpreting these raw, unanalysed, ambiguous, pre-categorical sensations so that we experience not just size, colour, motion, and form, but an identifiable, recognisable, familiar, and meaningful object.

In order to look at the distinction of the two and see if they are separate stages, let's first examine if sensation and perception can exist independently.

Is everything that is sensed perceived?
It often happens that we don't 'hear' the noise of the air conditioner unless it is suddenly cut off or the pungent smell on entering a room which initially is extremely apparent slowly 'fades' out. Although it can be argued here that sensory receptors become less responsive to unchanging information. Or even if we assume that sensory receptors are still receiving the stimuli, the complete process of sensation (according to the definition, which also includes being aware of the physical stimuli) does not take place, some rudimentary process of sensation is still taking place but perception does not follow. As Gibson puts it 'With homogeneous ambient light, perception fails although the sensation of light remains. Such is the case in dense fog, empty sky, or in the experiment of wearing plastic diffusing eye-caps, an experiment that we repeat every year at Cornell. In homogeneous darkness, perception fails because stimulation is absent. In homogeneous light, perception fails because stimulus information is absent although stimulation is present.'

Can perception exist without sensation?
An elderly woman named Rosalie was sitting in her nursing home when her room suddenly burst to life with twirling fabrics. Through the elaborate drapings, she could make out animals, children, and costumed characters. Rosalie was alarmed, not by the intrusion, but because she knew this entourage was an extremely detailed hallucination. Her cognitive function was excellent, and she had not taken any medications that might cause hallucinations. Strangest of all, had a real-life crowd of circus performers burst into her room, she wouldn't have been able to see them because she was completely blind. Rosalie had developed a condition known as Charles Bonnet Syndrome, in which patients with either impaired vision or total blindness suddenly hallucinate whole scenes in vivid colour. These hallucinations appear suddenly, and can last for mere minutes or recur for years. We still don't fully understand what causes them to come and go, or why certain patients develop them when others don't. We do know from fMRI studies that

these hallucinations activate the same brain areas as sight, areas that are not activated by imagination. Many other hallucinations, including smells, sights, and sounds, also involve the same brain areas as real sensory experiences.

The vast majority of people who've lost a limb can still feel it, not as a memory or a vague shape but in complete lifelike detail. They can flex their phantom fingers, and sometimes even feel the chafe of a watch band, or the throb of an ingrown toenail. And astonishingly enough even people born without a limb can feel a phantom. The accuracy of these apparitions suggests that we have a map of the body in our brains and the fact that for someone who's never had a limb to feel one implies that we're born with at-least the beginnings of this map. Neural pathways carry this sensory input through the spinal cord and up to the brain. Since so much of this path lies outside the actual limb itself, most of it remains behind after an amputation. But the loss of a limb alters the way signals travel at every step of the pathway. At the site of an amputation, severed nerve endings can thicken and become more sensitive, transmitting distress signals even in response to mild pressure. Under normal circumstances, these signals would be curtailed in the dorsal horn of the spinal cord. For reasons we don't fully understand, after an amputation, there is a loss of this inhibitory control in the dorsal horn, and signals can intensify.

Perception makes memory makes perception

Perception, Concepts, and Memory, Author(s): M. G. F. Martin

Suppose Mary is a keen board-games player, and often plays a game involving unusual dice. One such game involves the use of a twelve-faced die and an eight-faced die. Now suppose that Mary's grasp of elementary geometry is rather poor and she tends to treat alike all regular shapes more complex than a cube. Although she uses both the dodecahedral die and the octahedral one, she does not think of them as distinguished, they are both just many-faced. What matters to her about them is just the different distributions of coloured spots on the faces: the one has four kinds of spot, the other three. Here we have an example of someone who fails to have a concept that she might otherwise apply to observed shapes. There is no difficulty in supposing that Mary can acquire the concept of a dodecahedron, nor that in acquiring the concept she can come to apply it to objects of a distinctive visual appearance: a regular dodecahedron has twelve faces each with five sides. Now imagine that Mary has acquired the concept but not yet gone back to playing her game. She happens to think back to the last time she played the game and recalls her best move, which involved throwing one of the dice. She suddenly realises that the die she then threw was in fact a dodecahedron. Let's look at another example. Archie, is looking for a cuff link. He looks in a drawer but fails to notice it and continues searching the room. Eventually he gives up and leaves for dinner. On the way to dinner, he agitatedly thinks back to his search of the room. Having a relatively good visual memory, he recalls how things looked as he searched. Suddenly he realises that the cuff link was in the drawer but that he had failed to notice it. In both these cases perception did not immediately follow sensation.

The below image may appear as two thick vertical lines and three thin horizontal lines. There is no context to give it a specific meaning right now.

Now, look at the same shape in two different contexts. Surrounded by sequential letters, brain expects the shape to be a letter and to complete the sequence. In that context,the lines are percieved to form the shape of the letter "B."

Surrounded by numbers, the same shape now looks like the number "13."

Conclusion

We looked at how sensation and perception can independently exist. For example, in the case of prosopagnosia, the sensation is intact while the parts of the brain responsible for face perception are damaged. We also looked at how perception need not necessarily follow sensation as in the case of sensory adaptation or unchanging stimuli. The phenomenon of phantom limbs, hallucinations indicate that perception can occur without stimulus from the external environment. Lastly we looked at how memory or context can shape perception. Hence I believe that sensation and perception are different stages and although occur in a chronology, sometimes may even exist independently. I would also like to add: As in the case of the image of '13' or 'B', for a person who is illiterate both of them might still appear to be just a bunch of lines. That's also a reason why I state that 'raw sensations' although they exist, in some sense are difficult to pinpoint. Years of evolution, experience, viewing the physical world, making sense of the information around, organizing ideas, ordering the cacophonous chaos of our environment, have trained us so well in in associating meaning, identifying patterns, using heuristics and short cuts, to make 'educated guesses' about the nature of reality to fill in the gaps reconstructing the most plausible picture.

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