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RESEARCH ARTICLE

Cognitive Science: The Dependence of Sensory Perception

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Abstract

Decades before the Fodor-Churchland controversy, Gibson (1947) had pointed out that perception is not a passive recipient of external processes with an instantaneous onset but an active process of exploration of the organism that seeks and obtains information from the environment in a flow of continuous interaction (Sensation, Perception, Experience, Representation). How we go from one step to the next is not clear. Eysenck [1] believes that perception is influenced mainly by information that comes from top-down (top-down) processing and is influenced by individual factors (individual experiences, knowledge, beliefs) [1]. Bullier [2] believes that it is not only the degree to which brain neurons are stimulated by an external stimulus that changes, but also the type of stimulus to which the neuron selectively responds. As a result of a review of the relevant bibliography and the conflicting positions and opinions that have been expressed, we conclude with the general thesis that the theoretical permeation of perception constitutes at the same time a philosophical and scientific position which, from the perspective of cognitive science, must be further compared with the findings of empirical research.

Keywords

Cognitive processes, Perception, Sensory perception

The Cognitive Processes of Information Processing

In Cognitive Psychology, two models are used to describe the cognitive functions that occur during the processing of information stimuli: The “bottom-up” (Bottom-up) processing process, in which perception is formed and depends on the information stimuli that stimulate the sensory organs, and the “top-down” (Top-down) processing process, in which perception is formed and depends on the knowledge that we have registered in our memory (Matlin 1998) [2]. During the “bottom-up” process, the information stimuli that stimulate the sensory organs are analyzed into their basic characteristics and then synthesized. That is, in the initial phase of information processing, the characteristics are examined separately and independently of the context in which they belong. After their satisfactory and clear decoding, the characteristics are restructured to result in a more complex form to which meaning is attributed. During this processing, the result of a lower step is never affected by the action of the higher step [3]. Gibson [4], adopting the “bottom-up” model, formulated the theory of direct perception or the ecological approach. The basic principles of his theory are: a) The stable relationships of the characteristics of objects, and b) the principle of availability. According to the first principle, the arrangement and correlation of the individual elements of an object in its physical space directly causes perception without requiring higher cognitive functions, such as previous knowledge or internal representations, so that the person synthesizes the individual elements, in order to perceive the size, color, or brightness of the object. According to the second principle, things and objects of the natural world involve potential uses of the things themselves, and signal the activity of the individual [5]. In the "top-down" process, the analysis of informational stimuli is based on their comparison and identification with the already existing internal representations that exist in memory as cognitive schemas. The perception of an object is achieved when there is the greatest possible agreement

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or identification of the informational stimulus with the already existing internal representation in memory.

The Dependence of Sensory Perception

The investigation of the mental process of interpreting information and the mechanisms involved in it is still a very interesting scientific problem. Does what someone sees affect what they believe, but to what extent is the opposite true? What someone believes - and thinks - can indirectly or directly influence what they see? A basic position of philosophy and psychology is that cognitive abilities are closely linked to perceptual experience and perception affects cognitive abilities [1]. What we see, hear or touch affects what we believe, desire or think. Hypothetically, this is not a two-way relationship since we have a view of the world that is generally independent of what we believe or know [6]. For cognitive science, sensory perception is an ability that allows the mind to access the immediate environment. The question that arose very early is whether sensory perception is a capacity completely independent of the intellect and simply feeds the intellect with data from the external world, or does it depend on the intellect. If perception is cognitively determined, the basic question that arises is formulated as follows: does perception provide us with access to an objective world - common to all - or is it a mental construction? If perceptual experience depends on theoretical knowledge, then there is no independent ground and we are led to a kind of perceptual relativism [7]. On the contrary, if perceptual experience does not depend on theoretical knowledge, then it has non-conceptual content. But non-conceptual content does not have the appropriate logical structure to serve in the justification of beliefs and therefore cannot function as a foundation for theoretical knowledge (Myth of Data) [7]. The discussion about the theoretical charge of perception began mainly within the framework of the philosophy of science. Over the past 30 years, it has continued with new arguments within the philosophy of mind and cognitive science. The new framework examines the basic questions:

- Is perceptual experience conceptual and cognitively permeable?
- Are the representations and the perception that creates them -- or not -- cognitively permeable?
- Is the final product of perception a result of the characteristics of the physical stimulus and the properties of the perceptual system, or is it influenced by higher cognitive functions?

These questions have occupied theorists of perception and the philosophy of mind quite a bit [8,9].

The Theoretical Permeation of Perception

Among the positions formulated by philosophers of science in the late 1950s was the theoretical permeation of observation, that is, the position that what an observer sees depends not only on the visual stimulus he receives, but also on his theoretical background. Two observers with different theoretical starting points see different things when exposed to the same visual stimulus. The focus on the cognitive permeation or permeability of observation has its starting point in the works of Ludwik Flek [10] and Michael Polanyi (1958), who argued that observation is not a passive process but involves the active participation of the observer. Visual experience depends on the skills of the individual, which are improved with practice. A novice observer is often confronted with a chaotic field. With practice, an order emerges from chaos where specific objects are distinguished. The ability to observe depends on the accumulated knowledge of the observer, and not simply on his beliefs or the theories he accepts [11,12]. What a person sees depends on what he looks at and on what his prior perspective -- conceptual experience has taught him to see [8,9,13].

In Marr's (1982) object recognition model, the 3D model provides the representation inferred from the image and which is compared with stored structural descriptions of objects (perceptual classification). Individuals unconsciously use semantic information to form the 3D representation of an object, i.e., they have cognitive access to this information. Cognitive information allows for the formation of hypotheses about the nature of objects in a visual scene. Cognitive information allows for the formation of hypotheses about the nature of objects in a visual scene. These hypotheses are tested by the information available in early visual areas that have greater spatial and metric resolution (higher spatial and metric resolution [8,9,14,15].

Hanson [16] in his book Patterns Discovery explicitly refers to Wittgenstein's (1953) observations on the concept of seeing and seeing as. as. He argues that observation is theoretically saturated. According to He argues that observation is theoretically saturated. According to Kuhn (1962), the sensory perception of scientists is always shaped by the scientific tradition in which scientists participate, and by the theoretical model with which they have been trained. Both the model with which they have been trained. Both McDowell (1998), and Alva Noe (2004), argue that the perceptual content depends on practical knowledge. The first believes that conceptual abilities are passively activated in perceptual content and that beliefs influence and are influenced by perception, which is conceptually shaped from beginning to end (McDowell, 1994) [17], while the second believes that perception is based on the skillful physical activity of the perceptual subject (Noe, 2004).

Bruner (1957) considers that perception is a process of categorization that is carried out through unconscious inferences with premises that are carried out through unconscious inferences with premises that are derived

from the senses, beliefs, needs or expectations. According to Bruner, perception is basically a problem-solving process and as such is no different from thinking. On the contrary, ecological problem-solving and as such is no different from thinking. In contrast, Gibson's ecological theory [4] argues that neither internal representations nor any inference process for the co-extraction of representations are required, because these are provided directly by the environment (direct perception). The problem with Gibson's theory is that it views perceptual experience exclusively as experience, a strange/unknown object about which we have no knowledge, and we cannot perceive it as something meaningful. Among all these views, there is the position of Fodor (1983), who considers perception to be an autonomous cognitive ability that mediates between sensation and thought. A critic of Fodor's theory of perception is Churchland (1989), who criticized the position that the mechanisms of perception do not have access to general knowledge and indirectly supports the position that perception is theoretically saturated. He claims that if perception were not permeable to knowledge then we would not be able to see the sketch of the rabbit as a duck and vice versa at will. From the examination of several ambiguous shapes, he concluded that there is a wide range of elements that are cognitively permeable, such as: outline, color, brightness, orientation, distance, shape, size and shape/ground discrimination. The Fodor Churchland controversy generally revolved around the cognitive permeability or cognitive perfusion of perception. Fodor (1983) argued that perceptual mechanisms are functionally compartmentalized and articulated. This means that they are not cognitively or conceptually imbued or permeable and that empirical observation is theoretically neutral. Churchland (1989) argued, on the contrary, that perception is theoretically imbued from the outset. The Müller-Lyer optical illusion in which we perceive two lines as unequal even when we know they are equal is used by Fodor to support the impermeability of perception. While Churchland mentions the ambiguous image of a duck and a hare, the perception of which either way seems to require conceptual interpretation, hence cognitive permeability. Churchland argued for the Müller-Lyer optical illusion that the final illusion is due to cognitive processing and is the result of experiential learning. This position is supported by the fact that children with less experience with edges and angles are less prone to this illusion, that is, they see the lines as straight. Decades before the controversy between Fodor and Churchland, Gibson (1947) had pointed out that perception is not a passive recipient of external processes with an instantaneous onset but an active process of exploration of the organism that seeks and obtains information from the environment in a flow of continuous interaction (Sensation Perception Experience Representation). How we get from one step to the next is not clear. Eysenck [1] believes that perception is mainly influenced by information that comes from top-down (top-down) processing and is influenced by individual factors (individual experiences, knowledge, beliefs) [1]. Bullier [2] believes that it is not only the extent to which brain neurons are stimulated by an external stimulus that changes, but also the type of stimulus to which the neuron selectively responds. The crucial element in these changes is that they do not necessarily follow visual stimulation but may precede it as a modulation or preparation of the primary visual area resulting from other top-down or bottom-up influences. He also believes that the processing of incoming sensory data depends to a large extent on the state of the brain at the given moment. The brain is not considered a processor of sensory inputs to generate motor outputs, but a self-sustaining machine that processes internal information by taking samples from the external world. Spivey (2007) states that visual perception through the process of expectation constantly seeks to produce interpretations.

Edelman (1999) argues that objects are recognized through a process of comparing the object formed during visual processing of inputs with object models stored in memory from previous perceptual experiences. This comparison is based on knowledge of specific objects, that is, it is cognitively permeable (Edelman, 1999). The individual's experience plays an important role in perception since visual processing at all levels can undergo changes guided by it [18,19]. The construction and recognition of objects is based on their analysis into parts and depends on the knowledge and experience of the specific objects [20,21].

Conclusion

Finally, several researchers conclude that the representational content of experience is entirely non-conceptual. As a result of a review of the relevant literature and the conflicting positions and opinions that have been expressed, we conclude that the theoretical saturation of perception is simultaneously a philosophical and scientific position which, from the perspective of cognitive science, must be further compared with the findings of empirical research.

References

1. Eysenck MW, Keane MT (2000) Cognitive Psychology: A student's Handbook. (4th edn), Hove: Hauvence & Erlbaun.
2. Bullier (2006) What is fed back? In: Van Hemmen JL, Sejnowski TJ 23 problems in systems neuroscience. Oxford University Press, 103-132.
3. Kostaridou A (1992) Cognitive Psychology. Thessaloniki Art of text.
4. Gibson JJ (1979) The Ecological Approach to Visual Perception. Lawrence Erlbaum Associates, Publishers, Gutenberg, 2002.

5. Gibson JJ (2002) - Gutenberg , 99- 103.
6. Stokes D (2012) Perceiving and Desiring: A new look at the cognitive penetrability of experience. Philosophical studies 158: 479-492.
7. Kargopoulos F (2008) Representation and Cognition, in the volume Philosophy and Science (ed. D. Sfendoni), Ziti Publications, Thessaloniki, 297-308.
8. Theofilidis Antonis, Kargopoulos Filippos (2021) Mind's selective attention to previous experience. J Psychi Res Rev Rep 3: 1-8.
9. Theofilidis Antonis, Kargopoulos Filippos (2021) Investigating the Limits of Human Spatial Perception and Spatial Thinking. Dual Diagn Open Acc 6: 5.
10. Fleck L (1981) Genesis and Development of a Scientific Fact. University of Chicago Press, Chicago.
11. Daston L, Galison P (2007) Objectivity. New Zone Books.
12. Daston L (2008) On Scientific Observation. Isis 99: 97-110.
13. Kuhn TS (1970) The Structure of Scientific Revolutions. (2nd edn), The University of Chicago Press, Chicago.
14. Kanwisher N (2001) Faces and places: of central (and peripheral) interest. Nat Neurosci 4: 455-456.
15. Lamme VA, Roelfsema PR (2000) The distinct modes of vision offered by feedforward and recurrent processing. Trends Neurosci 23: 571-579.
16. Hanson NR (1958) Patterns of Discovery. Cambridge University Press, Cambridge.
17. McDowell J (1994) Mind and World. Harvard University, Cambridge, MA.
18. Antonini A, Strycker MP, Chapman B (1995) Development and plasticity of cortical columns and their thalamic inputs. In: Julesz B, Kovacs I, Maturational Windows and Adult Cortical Plasticity. Reading, MA: AddisonWesley.
19. Karni A, Sagi D (1995) A memory system in the adult visual cortex. In: Julesz B, Kovacs I, Maturational Windows and Adult Cortical Plasticity. Reading, MA: Addison Wesley.
20. Biederman I (1987) Recognition-by-components: A theory of human image understanding. Psychol Rev 94: 115-147.
21. Abdel Rahman R, Sommer W (2008) Seeing what we know and understand: How knowledge shapes perception. Psychon Bull Rev 15: 1055-1063.