

Perception and Creativity

E Nečka, Jagiellonian University, Krakow, Poland

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Glossary

Allocentric perception The tendency to perceive nonhuman objects from their own perspective.

Laws of perception Universal, automatic, and inborn principles through which organisms perceive complex stimuli.

Perceptual learning Perceiving complex objects better and better thanks to systematic exposure to them.

Physiognomic perception The tendency to perceive feelings and motion in inanimate objects.

Visual thinking Thinking in images rather than words.

Perception is the process through which people acquire, interpret, and organize information coming from their sensory organs. It starts with sensory registration of the information and ends with construction of mental representations of the perceived object. Perception influences every act of creation because the way people perceive things determines how they think about things. If perception is inventive, it leads to creative thinking, but if it is mundane, the result cannot be especially amazing.

Creative Organization of Perception

Perception is not just passive reception of incoming stimuli, but involves active construction of mental representations. The classic viewpoint, rooted in philosophical associationism and introspective psychology but also typical of lay theories of the human mind, assumes that perceptual experience is the sum of simple, basic sensations, such as sounds, odors, or flashes of light. According to this standpoint, perception of a red square, for instance, amounts to summing up basic sensations of straight lines, angles, and redness. Objects are assumed to be perceived in the same way regardless of external conditions (unless these are extremely difficult or atypical) and notwithstanding internal states of mind (unless the mind is disturbed, as in the case of illusions or hallucinations). Their perception is also regarded as independent of individual differences: all people are supposed to see a red square in the same way, although they may differ in personality, values, life history, culture, and many other dimensions.

The classic view was first questioned by *Gestalt psychology*, particularly Kurt Koffka, Max Wertheimer, and Wolfgang Köhler. According to them, people perceive the world in a holistic way, that is, they see the 'forest before the trees.' The primacy of high-level structures over basic sensations is supposedly possible thanks to the so-called '*laws of perception*,' which are universal, inborn, and automatically triggered by incoming stimuli. For instance, the law of continuity makes people perceive separate elements (e.g., stones) as something more complex (e.g., a road) due to the fact that separate elements are arranged in a way that suggests spatial continuity. The law of similarity makes people perceive a set of objects (e.g., basketball players) as a unity (a team) thanks to their being dressed identically. And the law of closure is responsible for perception

of 'flawed' or 'incomplete' objects as if they were 'fixed,' that is, closer to their ideal representations. For instance, on being exposed to an incomplete circle people still see a circle, although they are aware of its imperfections.

If perception is organized according to Gestalt laws, it must be regarded as creative by nature. In other words, people demonstrate creativity in every act of perception, because they are able to compose complex and holistic mental representations before, if ever, they focus on details. The law of closure seems particularly important from this point of view. A human tendency to 'improve' in the mind objects which, in reality, are not perfect at all takes many different forms, some of which are not entirely perceptual in nature. For instance, an unsolved problem may be perceived as an incomplete figure that needs completion; a decision not made yet may be represented in the mind as something that needs improvement. Therefore, the need for closure postulated by the Gestalt school usually leads to enormous mental transformations, potentially resulting in new and valuable (i.e., creative) products, although if the closure is premature, the results may lack relevance and effectiveness, and thus creativity. Perception of the problem at hand is not synonymous with perception of relatively simple physical objects, in the sense that the former involves not only perceptual but also thinking processes, but the tendency to 'improve in the mind' objects that lack perfection seems very similar in both cases.

A question arises, though, whether this tendency to create complex, holistic representations has different levels of intensity depending on abilities, personality, temperament, and other individual traits. The Gestalt psychologists were not interested in individual differences; rather, they focused on general laws of perception. But if the Gestalt laws are universal, inborn, and therefore stable across individuals, perception may be called creative only in a very specific sense, namely, as a creative 'invention' of nature or evolution, but not from an individual person's point of view. If, on the other hand, these laws are common and universal but acquired through development and therefore much more differentiated among individuals than the Gestalt psychologists would like to admit, we can hypothesize that some persons are more skillful in the creation of holistic perceptual representations than others.

This problem was investigated by Morris Stein who exposed his participants to Rorschach inkblots for different durations, that is, 10, 100, 3000ms, or without any time pressure.

The task was to interpret every inkblot by saying what was shown in a given picture. Participants' interpretations were evaluated for consistency and integrity. Responses with some central organizing idea were ranked higher than responses focused on separate details. People who provided consistent and integrated interpretations in the case of very complex inkblots and were able to do so in spite of time pressure obtained particularly high scores. It appeared that the individual scores of integrity of perception correlated very highly ($r = + 0.88$) with peer rated creativity. It seems, then, that even though all people perceive the external world through complex, holistic, and meaningful ideas, some people are particularly good at this task and such people are judged more creative than others.

Physiognomic and Allocentric Perception

The classic view of perception was also questioned by the so-called New Look approach. According to Jerome Bruner, people perceive the external world through their internal states, particularly motivational factors, like needs and goals. For instance, hungry people are set to smell food easily, poor children tend to overestimate the size of coins, and anxious people usually notice signals of threat everywhere in the environment. These effects are first described under the labels of perceptual defense and perceptual sensitivity. Internal states of mind are regarded as essential factors in perception and the interpretation of external events. In general, subjective feelings influence perception to a great extent, particularly if perceived objects show incoherence or ambiguity.

If perception is affected by inner states of mind, mental states can be projected onto external objects. In particular, people can attribute feelings and emotions to non-living creatures, which is called *physiognomic perception*. The term comes from Heinz Werner who defined it as the ability to perceive affect in inanimate things, as well as a tendency to see dynamic movements in normally static objects. For instance, people say that a stone is angry, a book is dancing, or a house is missing its residents. Perceptions of this kind are creative in a sense, because they produce results (i.e., a mental representation of an angry stone, etc.) that are both novel and appropriate. Furthermore, they may lead to eminent creativity if transformed into pieces of art or poetry. Everything depends on the amount of novelty and appropriateness. If it is small, physiognomic perception is just an act of everyday creativity, that is, a kind of potential rather than actual achievement. But if the amount of novelty and appropriateness is large, this phenomenon results in eminent pieces of art.

Physiognomic perception has been demonstrated in experimental studies of creative visual perception. Participants were exposed to a series of drawings representing 'still life.' Exposure time was very short at the beginning of every series (10 ms) but was made systematically longer and longer. Participants were asked to interpret the drawings by giving them meanings and titles. The authors were interested in the extent to which these interpretations violated the realistic, usual ways of perceiving objects. As the exposure time was increased, the interpretations became more and more realistic, which makes sense because an object shown for several hundred milliseconds is more

explicit and less ambiguous if compared with the same object shown for a much shorter period. The series would stop when a person used the 'proper' name of the object. The drawings were then presented in a series with systematically decreasing exposure time, which resulted in increasing frequency of idiosyncratic and unusual interpretations. The authors believed that the number of original and idiosyncratic interpretations represents the creative potential of a person.

Psychologists make use of the phenomenon of physiognomic perception in two ways. First, there are attempts to assess individual creativity by means of physiognomic perception ability. The Physiognomic Cue test consists of schematic drawings that may be interpreted in one of two ways suggested to a testee. The first interpretation is commonplace, such as 'sun,' the second is more original and 'physiognomic,' such as 'joy.' People are asked to indicate a preference for one of these two interpretations using a standard Likert scale. Second, physiognomic perception is widely used in creativity enhancement and training. Participants in such training may be asked to attribute feelings to bricks, or to imagine social interactions between pieces of furniture. Such exercises improve creative imagination and creative skills through deliberate manipulation of human perception.

A term very close to physiognomic perception is *allocentric perception*. Ernest Schachtel uses this term in reference to a tendency to perceive nonhuman objects from their own perspective. The opposite tendency, called *autocentric perception*, consists in perception of nonhuman objects from a purely human point of view. For example, the autocentric perception of a laptop computer would concentrate on its functions, the extent to which it is useful or useless for humans, or its potential to be improved as an even better tool for humans. The allocentric perception, on the other hand, would concentrate on the laptop's traits and attributes that surpass its human-centered functions. In other words, in allocentric perception people concentrate on the laptop as such, not on the laptop as a tool. This kind of perception may be difficult in the case of artifacts, that is, objects made by people for some specific purpose. In such cases, autocentric perception looks natural and easy, whereas nature can be perceived in the more allocentric way. According to Schachtel, allocentric perception is a key to creativity, particularly in fine arts.

Visual Thinking

Humans, in opposition to other species, can perceive the external world through images or through words. In consequence, they can think and process information in two modes: verbal and nonverbal. According to Allan Paivio, humans have two mental systems based on separate codes of information processing. The verbal system uses so-called logogens as forms of representation, whereas the nonverbal system is based on representations called imagens. These two systems can cooperate, meaning that a piece of information obtained through the nonverbal channel can be verbalized, while verbal information can be expressed in mental images. However, one of these systems has priority in given situations, which means that sometimes the processes of translation from words to images or vice versa results in error or inadequacy.

The dual coding theory has consequences for creativity. First, the question arises to what extent images can be equivalent to words or vice versa. Rudolf Arnheim is a persuasive advocate for the idea that people can think with images as efficiently as they can with words, if not better. An act of artistic creativity is just an act of thinking and reasoning with images. Artists can solve problems without words because images, not words, are primary components of their thinking. This idea of Arnheim's is close to the Freudian notion of primary processes, which – apart from being impulsive and unconstrained – were assumed to be imaginary in nature. Visual thinking is perhaps vital for artistic creativity and less common in other domains, such as scientific or technological creativity, although introspective data from eminent scientists, including Albert Einstein, do not leave any doubt concerning the importance of mental images in problem solving. The same should be said about literature and poetry; although writers operate with words, they must constantly visualize. The use of metaphor is an interesting example of how verbal and nonverbal codes cooperate in production of something that is called 'figurative language.'

Second, the question can be put whether mere exchange between verbal and nonverbal systems can increase the likelihood of creative outcomes. Conceivably none of these systems is more creative by nature, but their interaction may result in remarkable outputs. The use of metaphor in poetry looks again like a perfect illustration of such an output. Typically, culture relies on words; therefore, the mere change of code to nonverbal must produce original effects. Writing and reading is the dominant mode of cultural exchange and tradition. If the culture were rooted in images rather than words, verbalization instead of visualization would be regarded as a potentially creative action. Arnheim claims that all thinking, not only in artistic creativity, operates on visual representations, and this idea may look exaggerated, but a more moderate idea that creativity is stimulated by exchange between words and images looks acceptable.

Perception and Appreciation of Art

Perception is important not only for production of novel and valuable, or at least appropriate, ideas but also in understanding and appreciating them. Without sensitive and well-prepared audiences, creativity would be useless; one can even doubt if it would appear at all. The problem seems particularly important in the field of art education.

People can be taught how to listen to music or how to appreciate a painting, although 'naïve' and unprepared perception may have the value of fresh, uncontaminated experience. People may prefer listening to a piece of music without too much knowledge about the composer, his or her biography, or the particular musical genre. The same is true of visual arts: sometimes it is better not to know too much about the artist and his or her style of painting. One does not need to know the culinary details in order to be fond of food. However, we should not ignore the fact that knowledge influences the way people perceive pieces of art to an enormous extent.

There are two ways of studying perception in cognitive psychology and cognitive science. The bottom-up approach

to perception underscores the importance of basic sensory processes, deeply rooted in the physiology of vision, hearing, and other senses. The top-down approach to perception underlines the importance of psychological traits and states as factors determining the way objects are perceived. These factors include mental sets, expectations, feelings and emotions, values, abilities, personality traits, and complex models of the world. Any act of perceiving needs both bottom-up and top-down processes, although their proportion may differ depending on the object of perception and the overall context in which it is being perceived. For instance, listening to birds' singing is less dependent on acquired knowledge than listening to human speech, simply because the former does not involve semantics and the latter would be impossible without acquired knowledge of the meaning of words. If a person listening to birds singing is an ornithologist, his or her knowledge may be more important and more influential than in the case of lay listeners. Still, the amount of top-down processes is relatively small if listening to birds is compared with speech comprehension.

Previously acquired knowledge may affect current perception in a negative way. First, it accounts for the perceptual constancy effect. For example, people perceive grass as green regardless of light conditions, although sometimes grass reflects light in a way that produces the color of blue or violet. People know that normally grass is of green color; therefore they usually cannot perceive it as blue or violet. Similarly, they know the actual size and shape of well-known objects and therefore perceive them correctly, regardless of disproportions that may arise from seeing them from a distance or at a specific angle. Perceptual constancy is beneficial in standard situations requiring 'normal,' mundane perception, but it may hinder appreciation and acceptance of particular styles of expression in visual arts. The impressionists painted grass in many different colors, usually not in green. Second, previously acquired knowledge is likely to cause perceptual set. People are likely to see (hear, sense, etc.) what they expect to see, and the opposite is also true – they are unlikely to notice things that they do not expect to exist or appear in the particular circumstances. Perceptual set is so strong that people can swear they did not see objects that were shown to them but did not fit the scene. For instance, if shown a photograph of a professor's study they are sure that they saw many books on the shelves although, as it happened, there were no books whatsoever in this particular photo. They know that professors have many books and this knowledge is likely to disturb reliable perception of a particular image. Such effects, clearly demonstrated in laboratory experiments, influence the way people listen to music or appreciate paintings.

Previously acquired knowledge may also be useful in art understanding and appreciation. First of all, knowledge makes people sensitive to those aspects of a piece of art that are less salient than others but still very important. For instance, listening to a Bach fugue requires at least basic acquaintance with the structure of this particular musical form, that is, the idea of different transformations of the same motive pursuing one another. Moreover, knowledge helps perceive similarities between an object of perception and other objects, and therefore stimulates thinking by analogy.

Perception is influenced not only by explicit knowledge that can be acquired through art education but also by implicit

knowledge rooted in one's own experience. Frequent exposure to a complex stimulus, such as a painting or musical composition, makes people more and more sensitive to many concealed aspects of this stimulus. This is the phenomenon called *perceptual learning*. Typically, people are not aware of being better and better prepared for analysis of a complex structure, because these processes take place automatically. Perceptual learning improves sensitivity to previously concealed aspects of stimulation thanks to attention weighting, imprinting, unitization, and differentiation.

Attention weighting involves a change in the amount of attention paid to different aspects of a stimulus as a result of learning. If people 'inspect' a favorite painting many times, they can learn to direct their attention to those aspects of the painting that were entirely concealed from them at the beginning of the learning process. Imprinting amounts to development of specialized receptors or modules of the mind that can capture previously concealed aspects of a stimulus. Unitization is the process of combining previously separated aspects of stimulation, and differentiation is the opposite – it is the process of dividing what used to be perceived as a whole. These four mechanisms of perceptual learning can produce enormous change in people's sensitivity to various aspects of stimulation. They are particularly important in art education because pieces of art are usually very rich in stimulation.

Repeated exposure to an object results not only in perceptual learning but also in changes in its esthetic appreciation. This phenomenon is called the 'mere exposition' effect. A melody heard for the first time may not be appealing, but it tends to gain artistic value if played repeatedly. Of course, there are limits to such increases in attractiveness, meaning that the melody soon becomes 'worn out.' This is rarely the case with Beethoven's or Bach's compositions, but happens quite frequently with pop music and pop art in general. It seems that high-level creativity is less dependent on the mere exposition effect but also more resistant to depletion of artistic power due to the process of familiarization.

Conclusions

Perception is an ambiguous term. In a broad sense, it refers to every instance of mental assimilation of an object, not only physical but also social or symbolic. In this broad sense it is possible to speak of perception of the social climate or perception of US policy around the world. In the narrow, technical sense, perception means construction of mental representations on the basis of sensory processes, mostly auditory and visual. This article focused on the narrow sense of the word. However, perception is important in creativity in the broad sense too. In particular, the way people perceive a problem is of utmost importance for creative problem solving. Inadequate or stereotyped problem perception may result in adoption of inappropriate problem solving strategies or general inability to tackle the difficulty. Although very important, these issues refer to thinking and problem solving rather than perception per se.

See also: Aesthetics and Creativity; Behavioral Approaches to Creativity; Problem Solving.

Further Reading

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