

**Abstract:** Due to the present conditions and living in a complex environment that generates and receipts information, the human being should have a wide range of tools, which allows him/her to suitably percept and process information. By using mental mechanisms for processing information and having specific functions, the human being may analyse and synthesize the great number of stimulus comprising a large quantity of dates of different scopes. For the human being to adapt rapidly to the requirements of environment he/she should correctly perceive the meaning of physical or symbolical things and depending on them he/she should elaborate the goals and action decisions as well. Under those circumstances, the perception of graphical and visual information in different activity fields should be analysed.

**Key words:** environment, sensation, perception, representation, psychology, visual, stimulus, graphics.

## 1. INTRODUCTION

In order to perceive the environment it is required an interaction between things properties and individual's condition. For this, we should analyse the number of the object we notice and the perceptible mechanisms along with the visual phenomena. Thus, the sight does not only represent a mechanical registration of some different elements but the interception of some imagines with certain significant structures.

According to the principles of shapes psychology (Gestaltpsychologie) the perceptible experience is not made of fragmental and separate sensorial elements and then joined by an associative process but it is made of perceptive whole organized in a certain structure with a certain signification. The Gestaltpsychologie adepts emphasize the priority of the whole to parts and take into consideration the significant value of things, essential to their formal and structural properties. On the strength of Gestaltpsychologie the perception of an object or phenomenon is made on the basis of simplicity principle according to which the aim of any visual imagine is the simpler configuration available to the visual sense under given circumstances.

That principle leads to a clearer understanding, on rational basis, of the whole and parts, of the movement and the rest, of the compactness and transparency, etc. However, a sole principle may not explain all what we see and it may lead to one-sided interpretations. In the graphic representations it is required an analysis of the relation between the intellectual knowledge and the graphic way of designing. In certain fields (anatomy, biology) there should be achieved representations that "explain" the inside in close relation with the outside.

A removal of the "photographic" aspect may determine the achievement of a representation that reaches the proposed goal by using a certain visual language.

**The visual language** – as a part of the so-called language – represents an abstract shapes code, which addresses to the immediate perception, biology and less to the intellect conditioned by culture.

The language used in the design is made of elements (shape, texture, colour) being in a relation forming a contrast (open-closed, vertical-horizontal, static-dynamic, etc).

Certain signs like letters are codes used in both visual and verbal language.

**The so-called language** is a system of graphic and associate signs, which aim is knowledge and communication. From social point of view, it depends on a certain cultural environment. Based on perception mechanisms and laws the **graphic and visual language** may be perceived, in a certain cultural context, as not being changed after a certain period.

A great number of knowledge may be sent better by graphic sign rather than by words. Referring to the reproducing of some non-graphic phenomena or elements in the graphic language, Wassily Kandinski used the word *transposition* – "any phenomenon of outer or inner world may receive a graphic expression – a kind of translation".

## 2. VIEW AS AN ACTIVE EXPLORATION

The perception of the imagines in relief is acquired during the time and through the lived experience. It is an **active exploration**.

The optical imagine on the retina stimulates about 130 million of microscopic receivers, each of them reacts upon the wavelength and the light intensity received. The receivers groups are set by neural connections. We may apparently be tempted to consider that the perception processes of a figure are almost entirely passive and carry on in a linear way from small elements to the structure of larger units. Those assumptions are wrong because the shapes visual perception is an active process in a high degree.

Rudolf Arnheim in his work "Visual art and perception" noticed: "First, the imagines world is not simply printed on a susceptible retentive organ. Looking at an object, we rather «seek to touch it». We move a sort of invisible finger in the environment, go to far places where the objects are, we touch them, catch them,

*examine their surface, follow their outline, explore their texture”.*

It is remarkable the intuition of the ancient thinkers who described the physical achievement of a view in a way close to the reality. In “*Timeu*” (*Timaios*), Platon shown that gentle fire warming the human body goes out through eye in a thick light stream. A tangible bridge is created between the onlooker and the noticed thing. Through it, the bright impulses emanated from the object flows towards eyes and through them towards soul. In the text: “*Indeed, they managed that the pure fire inside our body and related to it be emanated through the eyes (...), so that any thing the inner fire would focus on, hits the outside one. Thus, the whole - because of the homogeneity - reaches to be affected in the same way and to convey to the soul, though the entire body, the movements of the objects coming into touch with it and giving the sensation called sight*”. (Platon-Works VII-*Timaios*, 45 c-d).

The eyes should not be reduced to the part of some identification and measuring tools because the visual perception is not obtained with the mechanical exactness of the camera that records everything impartially. **The sight means the observation of some important features of the objects.** This does not mean that the sight sense takes no care of details. On the contrary, the small modifications in the known things should be noticed, the onlooker been able to determine accurately the elements that may cause the change of the general look, because the signs indicating the modification are parts of a certain frame.

At the same time, the sight process should be able to meet the conditions of making up general notions. “*The sight takes into considerations the raw material of the experience creating a suitable configuration of general shapes applied not only to the individual case but also to an indefinite number of similar cases*” (R. Arnheim – *Visual art and perception*).

All those processes taking place in the visual sector of the nervous system are similar to the superior processes of thinking and reasoning. It is seemed that the sight acts at both the **perception level** and **the intellectual one**, and the present tendencies in psychology determine **the sight** to be called **a creative activity of the human mind**.

### 3. PERCEPTION MECHANISMS AND LAWS

The human being is an information generator and receiver but living in the same informational environment, he should have several tools that give him the possibility to work with information. The **psychical mechanisms for primarily processing of information** are found among them.

- **Sensation** is a psychical mechanism by means of which the human being catches, records and performs an **initial** and simple information **processing**.
- **Perception** as a psychical mechanism for **studying thoroughly** the objects as distinct wholes, as structures containing inter-relational elements, makes approachable the **objects signification** on the strength of which they

get a great adaptable value.

- **Representation** gives the human being the possibility **to express again** and show himself **his own experience**. By that mechanism, the human being may recall his/her experiences, bring them into the present and use them in his interest.

Sensation and perception are often defined and individualized as against one to the other.

Sensation is “*a stimulus individual experience*”, perception is “*a process of interpretation, the organization of the material provided by stimulus*” (R. Crook and J. Stern, 1991). “*Sensation may be considered as a first contact of the body with sensorial stimulus, while perception is the process by means of which they are explained, analysed and integrated with other sensorial information*” (R. Feldman, 1993).

“*Passing from sensation to perception means passing from analysis, especially excitations differentiation, to analyse and synthesis of the sensorial properties of the objects, being reflected in sensations*” (S.L. Rubinstein, 1962).

The perception mechanism may not be well defined without an analysis of the sensation characteristics. Many criteria may define the sensorial ways.

**The visual sensations** may be defined by:

- **Their part** performed in the human existence and activity – Provides the knowledge of some properties of the objects (shape, size, position, distance) – Being an integrant element of the sensorial experience, Organizes and coordinates movements.
- **Stimulus**, which releases sensations – The electromagnetic waves.
- **Receivers** performing the information encoding – The retina with photo-sensible cellular elements, the cones (5-7 millions, sensible at colours objects) and bars (125-130 millions, the night sight receivers).
- Analyser **cortical projection** – Occipital lobule. The primary sight cortex is placed on the edges of the calcaline ditch.
- **Sensorial experience dimensions** – Chromatic accent – Luminosity – Saturation.
- **Theories** – Three-colour theory (Young, Helmholtz) – Four-colour theory (Hering) – Polychrome theory (Wundt).

#### 3.1 Explanatory and interpretative models of perceptions

The most known explanatory and interpretative models of perception are:

- Grid model;
- Prototype model;
- Distinctive attributes model;
- “Whole” model - *Gestaltpsychologie. Compounds recognition theory*;
- Bracing and sensorial model;
- Constructivist model;
- Model achieved by computer.

#### 3.2 Perception mechanisms and laws Perception sensorial mechanisms

- Perceptive exploration;
- Grouping and its laws – *Perception gestalt laws*.

#### **Intellectual perception mechanisms**

- Anticipation;
- Schematizing;
- Interior organization of the perceptive field.

#### **Perception general laws**

- Perceptive integration law;
- Perceptive structural law;
- Perceptive selectivity law;
- Perceptive constancy law;
- Significance law;
- Law for projecting perceptive imagine.

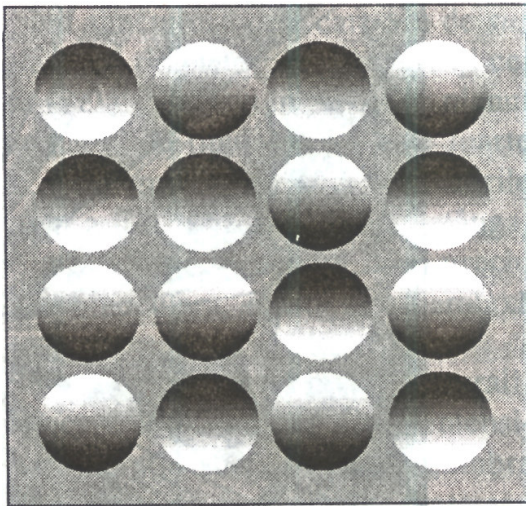
### **3.3 Visual space perception**

The need to know the spatial characteristics of the objects, such as *shape, size, distance, orientation, direction, volume* or *relief* imposed the coming out, strengthening and development of a complex perception form called **visual space perception**.

The main features of the perception resulted from reflecting the object spatial qualities are:

1. Shape perception;
2. Size perception;
3. Distance perception;
4. Orientation (direction) perception;
5. Relief perception.

The perception of the three-dimension space takes



**Fig. 1** Shadow part in visual perception.

place in terms of *volume, distance* or *depth* where the objects are located. For this, the individual resorts to *monocular* and *binocular indexes*.

#### **Monocular indexes:**

- Relative objects dimension (size);
- Plan height;
- Superposition,
- Shadow;
- Texture gradient;
- Movement parallax;

- Linear perspective.

#### **Binocular indexes:**

- Imagines disappearance (stereoscopy);
- Ocular muscles convergence.

Claude Bonnet classified the indexes for the perception of the three-dimension space into three categories: *static indexes* (accommodation, convergence, stereoscopy); *dynamic indexes* (movement parallax, dynamic change of size, dynamic stereoscopy); *pictorial indexes* (linear perspective, contrasts, interposition).

### **3.4 Gestalt psychology**

The model has its origin in the research of gestalt psychologists (configurations people) begun in Germany in 1912 and carried on in the USA around the 1930's. Max Wertheimer (1880-1943), Kurt Koffa (1886-1941) and Wolfgang Köhler (1887-1967) postulated the part of the whole in the perception (Gestalt – organized whole).

The Gestalt psychology operates with perception phenomena classes, such as:

- Sensorial qualities and dimensions perception;
- Configurations perception;
- Perception constancy;
- Perception reference to a reference system;
- Nature of the perception object;
- Effect of the onlooker condition.

The main general ideas of the gestalt are:

#### **1. Shape and isomorphism**

Shape is the fundamental principle of the way the objects become visible to the onlooker.

#### **2. The character of whole**

Although an element may consist in many parts, its essential character is the whole that is transcendent to the characteristics of the constitutive elements. The perception of the relations among components is an essential point of the perception of the whole.

#### **3. Forces field**

For the perception of any object, the aggregate is considered as an assembly of combined forces that conveys the change from an element to the other.

#### **4. Flexibility, transformation and transposition**

Fields and configurations observe the intrinsic laws of the human body.

#### **5. Size, symmetry, shape perfection**

The tendency for its configuration and condition is to be simple, balanced and symmetrical.

#### **6. Organisation**

There is organisation in the configuration interior and in relation to the environment.

The gestalt psychologists laid on the basis of perception the classification as a sensorial mechanism of perception. According to this theory the constitutive elements of a stimulus or a perceptive field where it is, are not separated, isolated among them but on the contrary they belong to some ensembles even more wider. On the other hand, the figures made of various elements may give rise to different meanings for different persons. When there exists the same meanings, it is considered that there are applied **the general laws of the perceptive field organisation**.

The most well known are:

- **Proximity law:** the near elements are considered as parts of the same shape;
- **Similarity law:** similar elements are considered as parts of the same shape;
- **Continuity law:** elements orientated to the same direction have the tendency to organise themselves to the same direction;
- **Symmetry law:** figures having one or two symmetrical axis are “good shapes” and easily perceived;
- **Closing law:** as much as possible perception avoids the ambiguous interpretations. This law complies with the principle of the information economy.

### 3.5 Theory of recognition on constitutive parts

In 1987, the researcher called Irving Biederman elaborated the idea of “*the aggregate recognition on constitutive parts*”. Using a similarity to the alphabet letters that hundreds and thousands works may be created, he found a number of 36 simple and elementary forms, which he called *geoni*. The infinity of the environment objects emerges by combining those forms.

The objects manufactured by man may easily be recognised by means of the mechanism of breaking up into constituent parts because they have a more defined geometry. By that mechanism, of the model, the natural objects are recognised with difficulty. The properties of the *geoni* are:

- We can distinguish one from the other from any point of view;

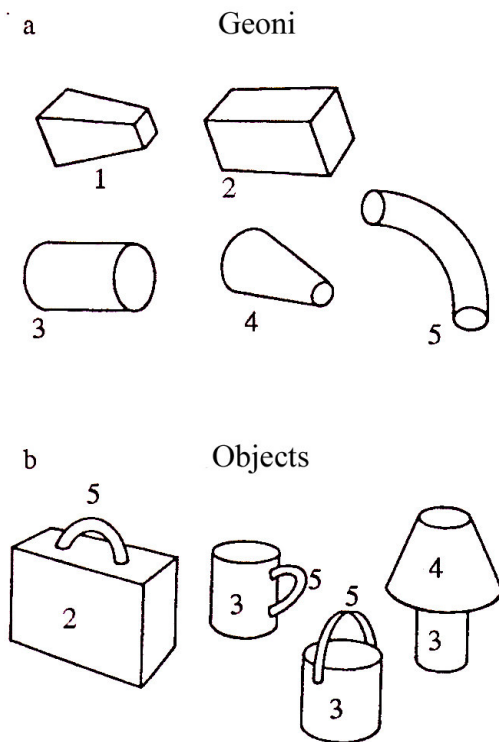


Fig. 2 Geoni and objects.

- They are not affected by the visual perturbations of the background.

*The fundamental principles of the recognition theory on constitutive parts* are:

- Only geoni are important. The colour, texture and details are not important;
- The determining properties are those which allow the identification of geoni;
- Information for identifying geoni becomes a priority;
- The visual analyser divides objects into geoni.

Even if certain geoni from objects degrade themselves and others are eliminated, their correct perception is maintained. Deformations become visible especially when some geoni disappear or their connections are hid.

### 4. CONCLUSION

The way “we see” is not defined only by the objective reality but also by the human reactions at visual stimulus and their filtration. The physical mechanisms for processing primarily the information – sensation, perception and representation have an important contribution to the understanding of the fundamental properties of the objects noticed.

The visual information along with other sensorial elements comes into interaction with emotional and intellectual functions of the brain in order to model its perceptions.

On the “line”, *object – visual perception – graphic representation*, there may appear a number of varied perturbation elements, of different conditions, affecting the object representation. Both visual perception and representations may be followed, analysed and controlled by using graphic elements.

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### Author:

Eng. **Lucian RAICU**, Ph. D., professor, University POLITEHNICA of București, e-mail: lucian@ttech.ro.