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The action of self- and cast shadows on the mechanisms of perception and representation of the cinematographic image

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Abstract

In the absence of information provided by stereoscopic vision, based on ocular disparity, in the case of mechanically reproduced image analysis (cinematographic image or photographic image), the visual perception mechanism uses information from the analysis of cast shadows and self-shadows to discriminate, identify and recognize the shapes in the frame. The same type of information is also used by the mechanism of cognitive representation to construct or assign cognitive meanings to the mechanically reproduced image.

Keywords: shadow, lights, cinematographic picture, visual perception, cognitive representation

Introduction

The cortex processing of the information matrix that defines the three-dimensional space (including its content consisting of atmospheric forms and attributes), compressed into the cinematographic or photographic image (mechanically reproduced image), is impossible to achieve only in the presence of light, but also of the absent partner, the shadow. Together, they define, model and transform the geometry and attributes of the materiality of the forms in the frame, but also their overall dimensions or of the surfaces that compose them.

Although the cognitive mechanisms on which the visual apparatus is based mainly use stereopsis (binocular disparity) and use this disparity as a metric cue for evaluating the geometry of shapes, the dimensions of concavities or convexities of shapes, spatial depth, in the case of 2D imaging, as it is the mechanically reproduced image, in which the three-dimensional space is compressed to a single plane (that of the screen on which the film or photograph is projected or that of a simple sheet of paper - the case of photographs printed on a substrate), these mechanisms can no longer successfully use ocular disparity and then must rely on other monocular cues. These visual cues are based on cognitive analysis of the evolution of light and shadows (in fact, the distribution of light gradients on the surfaces of shapes), analysis of the evolution of textural samples, etc.

From the very beginning it must be established that, from the point of view of a study on the perception and cognitive representation of a mechanically reproduced image, the action of light and, implicitly, of shadow, has no effect whatsoever on the space contained in an image or on the forms (objects) that populate that space. The effects actually manifest themselves on the main cognitive mechanisms with which the human visual apparatus operates (the mechanism of attention, the mechanism of visual perception and the mechanism of cognitive representation) because they will process sets of information affected in one way or another by the two modifiers (light and shadow).

Regarding the discrimination of shadows and their interpretation as not being distinct shapes, but only the result of the action of light on the shapes, it was found that cognitive mechanisms do not have particular problems of interpretation (Mamassian, 2004). Perceptual systems solve this problem relatively easily, constructing shape-shadow correspondences based on general estimates of the geometry of shapes in the visual scene under consideration. Moreover, a series of experiments (Braje, Legge, Kersten, 2004) highlighted that perceptual system were able to differentiate shadows even if the test images were altered by altering clarity, so the contours of the shapes were no longer so easy to discriminate. Under the circumstances, perceptual mechanisms are highly evolved in terms of extracting visual cues by analyzing the effects of light on shapes, in this case, shadows.

Physically, the shadow is an area where direct light generated by a source cannot reach due to the obstruction of light rays by the object itself or by another object, more or less opaque, located between the light source and the target object. As such, the shadow is a two-dimensional projection of the interposed opaque object, which reproduces, with certain distortions, its silhouette. The accuracy of this reproduction depends on several factors: the angle of the source with respect to the object, the qualitative and quantitative parameters that define it (spot shape, direct or reflected light from a third reflective surface, coherent or diffuse light, luminous flux intensity, etc.) and the geometric shape of the interposed object.

In his paper on painting, focusing on the physics of human vision (here we find detailed insights on light, darkness, colour, form and the relationships between them), Leonardo da Vinci postulates that “Shadow is the means by which objects take shape, and therefore the forms of bodies can only be understood in detail with the help of shadow.”(da Vinci, 2010, p. 183). To emphasize the importance of shadow in the cinematic or photographic image, we set out to draw a parallel with the notion of *personal shadow*, introduced in psychoanalysis by Carl G. Jung. Jung claimed that “The Shadow is a moral problem that challenges the personal ego completely because no one becomes aware of the shadow without making considerable effort. To become aware of this is to perceive the dark aspects of oneself as present and real. This act constitutes the essential condition of self-knowledge and therefore faces considerable resistance” (Jung, 1976, p. 145).

This “shadow “ belongs to the world of the individual unconscious and, in the psycho-analyst’s view, would have a compensatory function. The personal shadow can be understood as a dark universe that coexists in parallel with the universe of our visible personality, we can assimilate it to the negative side of the character of each individual, that side “unacceptable” for himself or for other fellows, unacceptable because it is totally opposite to the personality patterns accepted by both the individual and the society in which he lives at a given time.

The content of the personal shadow is similar to that of the visible and accessible side: thoughts, fantasies, desires, impulses, primary or elaborate emotions, with the difference that we do not want to expose them because they are built on concepts totally opposite to cultural or social templates, which is why we consider them (ourselves or our fellow human beings) unacceptable, immoral, unethical, dirty or dangerous. We deny them more or less, although we are often perfectly aware of them, and push them into the subconscious, where they are kept in a latent state through a conditioned cognitive process, parameterized by the anthropological conditions of the environment in which we live. In many cases, the individual is not aware of the personal shadow and its “powers”, because it is not easily accessible, being one of the reasons behind most psychological or even pathological (psychiatric) conflicts. At the same time, as recognized by both the famous psychoanalyst and modern researchers, the interactions of the personal shadow with cognitive systems generate the fuel that feeds the wellspring of creativity and unconventional thinking. Capitalizing, we grow aware that the physical shadow is the modelling factor that values the form, defines a large part of its character and many of its visual attributes, can beautify it or make it ugly, can dynamize it through tension or stabilize it, anchoring it firmly to other forms, backgrounds or the Earth. At the same time, by its power of visual connection with the environment or the other forms in the frame, it can assign to the form a higher hierarchical degree in visual composition.

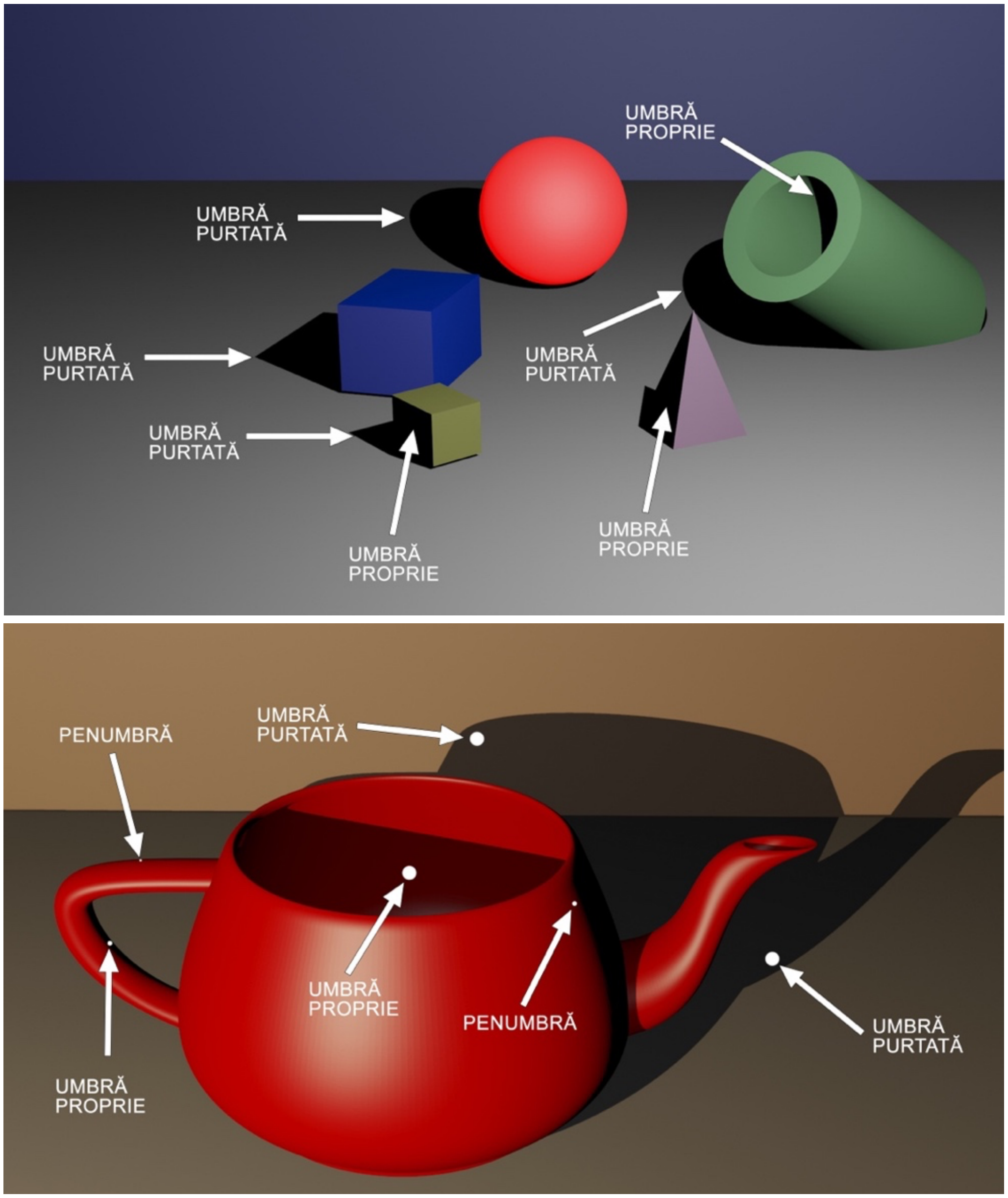
Classification of Shadows

Shadows can be of two types, self-shadows and cast shadows (fig. 1A, B, C). Self-shadows are due to the orientation of the shape with respect to the light source or to the concave/convex variations of the surfaces that compose the geometry of the shape, shading self-shadows. Cast shadows are the shadows cast by one shape on the other shapes near the target shape, on the backgrounds or surface on which the shapes are placed. In turn, cast shadows consist of two sub-zones: the main shadow and the penumbra. The penumbra is an illuminated sub-zone with an intensity much diminished from the value of the source intensity, being an area defined by semi-obscurity. This is installed at the boundary of the areas defined by the cast shadow and the zone of illumination at maximum intensity of the source (the unshaded zone). The penumbra is constructed by a graduated distribution of light gradients, with the maximum limits given by the shadow area (the smallest, darkest gradient value that goes up to pure black), respectively by the area illuminated at the maximum intensity of the light source (the largest, brightest gradient value that goes up to pure white).

Action on the mechanisms of perception and image representation

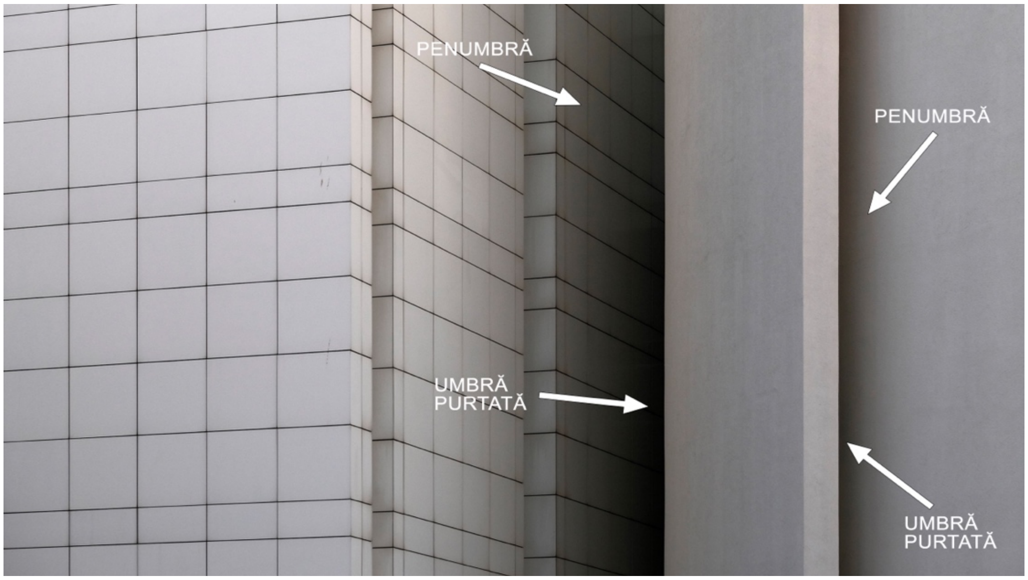
From a physical point of view, cast shadows and self-shadows have the exact nature, but from a perceptual point of view, they produce different effects in the sense that the shadows themselves can be valuable visual clues for the mechanism of perception because they can define up to a point the geometry of the form. In this way, the cognitive mechanisms that solve the visual equation of space provide crucial information necessary to go through the stages of perception. At the same time, cast shadows also provide essential information regarding the proportions of the shape relative to the three-dimensional space in which it exists, the dimensions of the shape in the depth of the frame, and respectively the distances between shapes or between shapes and backgrounds. We note that all the mechanisms involved in the functioning of the visual apparatus when analyzing a mechanically reproduced image benefit from information packages with a decisive role in assessing and estimating the proportions of the elements that make up a compositional architecture.

The cast shadow also acts in cases where the plantation of lights is designed to illuminate mainly the second planes or backgrounds, the main subjects being positioned in the counter-light. In these cases, the textures that define the main subject are dematerialized down to black, and this solution is often used for the purpose of amplifying the dramatism of the scene or to hide certain elements by underexposing the surfaces that define the geometry of the subject. Basically, the subject-form acquires the materiality of a monolith, and the contrasts at the outer limits of the form are maximum, as we can observe in the images in fig. 2A, B, C.



A

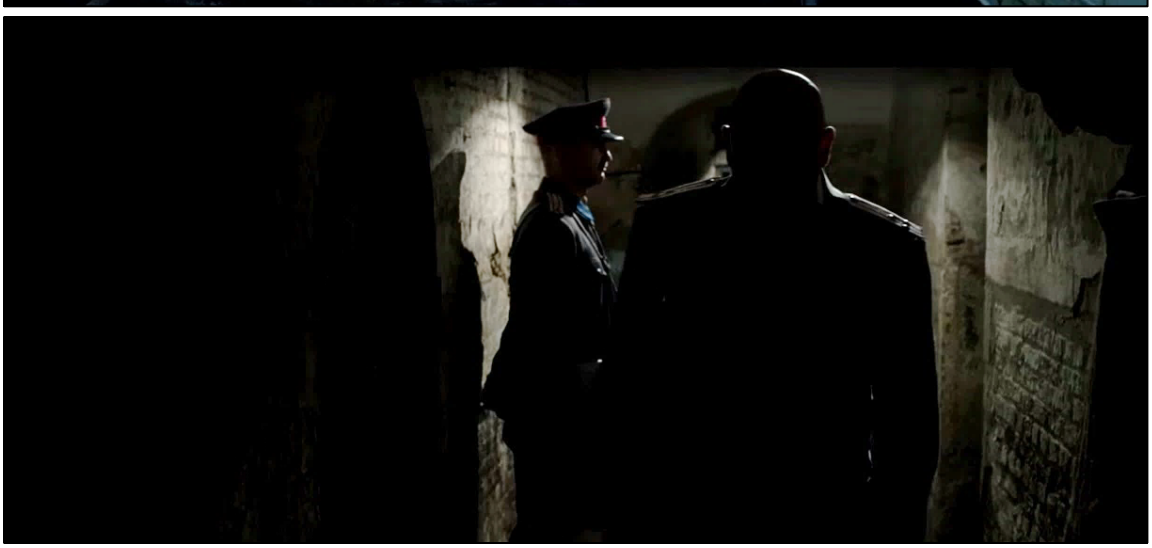
B



C

Fig. 1A, B, C. Examples of shadows and penumbra areas (sources: Florin Constantinescu, 2022)

A



B


C

Fig. 2A, B, C. Example of own shadow action when shooting in counter-light (sources A: *Aurora*. Directed by Cristi Puiu, 2010; Mandragora. Romania, France, Switzerland, Germany / B, C: *Between Pain and Amen.* Directed by Toma Enache, 2019; At Steaua Film Studio. Romania)

In fig. 4A-E an example of the perception of a complex shape is described, in relation to the intensity of the light acting on the shape and, implicitly, the self-shadows generated by the shape. Five variants of the action of a luminous flux on a complex three-dimensional shape are presented. Although, in reality, the form has not changed its geometry, position in space or real attributes of materiality, perception and visual representation change substantially from one step to another, because as a result of the action of an increasingly intense luminous flux, certain initial visual information or clues are altered or altered to the point of total destruction, by blurring their own shadows. Differences in perception or representation are maximum for Variant 1E versus variant 1A.

A test (**TL_01**) carried out on five groups of 10 different subjects revealed essential changes in perception and, implicitly, changes in the cognitive construction of the meaning of the image, simultaneously with the modification of the luminous flux falling on the shape and substantially altering the cast shadows, reflections and textures of surfaces. We note that apart from the alteration of the cast shadows, a number of other attributes are altered to the total dissolution of the form. For example, the metallic appearance of the material foreshadowed by the specific texture is strongly altered: metallic reflections and mirroring due to glossy, polished surfaces disappear. At the same time, shape geometry loses important descriptive information, which reduces the complex three-dimensional shape to a few flat surfaces that almost do not interact. Thus, the cohesion and union of the surfaces which, for the mechanism of perception and that of representation, used to build a complex but unitary geometric form, disappears.

<table>
<tr><td colspan="3">HYPOTHESIS: the alteration of the perception and cognitive representation of a three-dimensional shape increases with the level of elimination of self-shadows (including self-shadows) and the texture of the shape's surfaces</td></tr>
<tr><td>TEST</td><td>QUESTIONNAIRE</td><td>TABLES, GRAPHS</td></tr>
<tr><td>- Display for each group of subjects one of the five image variants (see fig. 3, variants A, B, C, D, E).
- The images contain the representation of a complex three-dimensional shape, with metallic texture and illuminated with an increasingly powerful luminous flux (the shape will have its own contours and shadows more and more blurred)
- Each subject will answer only one question.
- Picture display time: 10 seconds
- Sample of 50 subjects (25 male, 15 female, ages 20-45 years) divided into 5 groups of 10 subjects.</td><td>Questionnaire C_TL_01

1:What do you think this picture represents?</td><td>Results table T_TL_01

- The answers were grouped according to the category of forms and materials identified by the participants in the test.</td></tr>
</table>

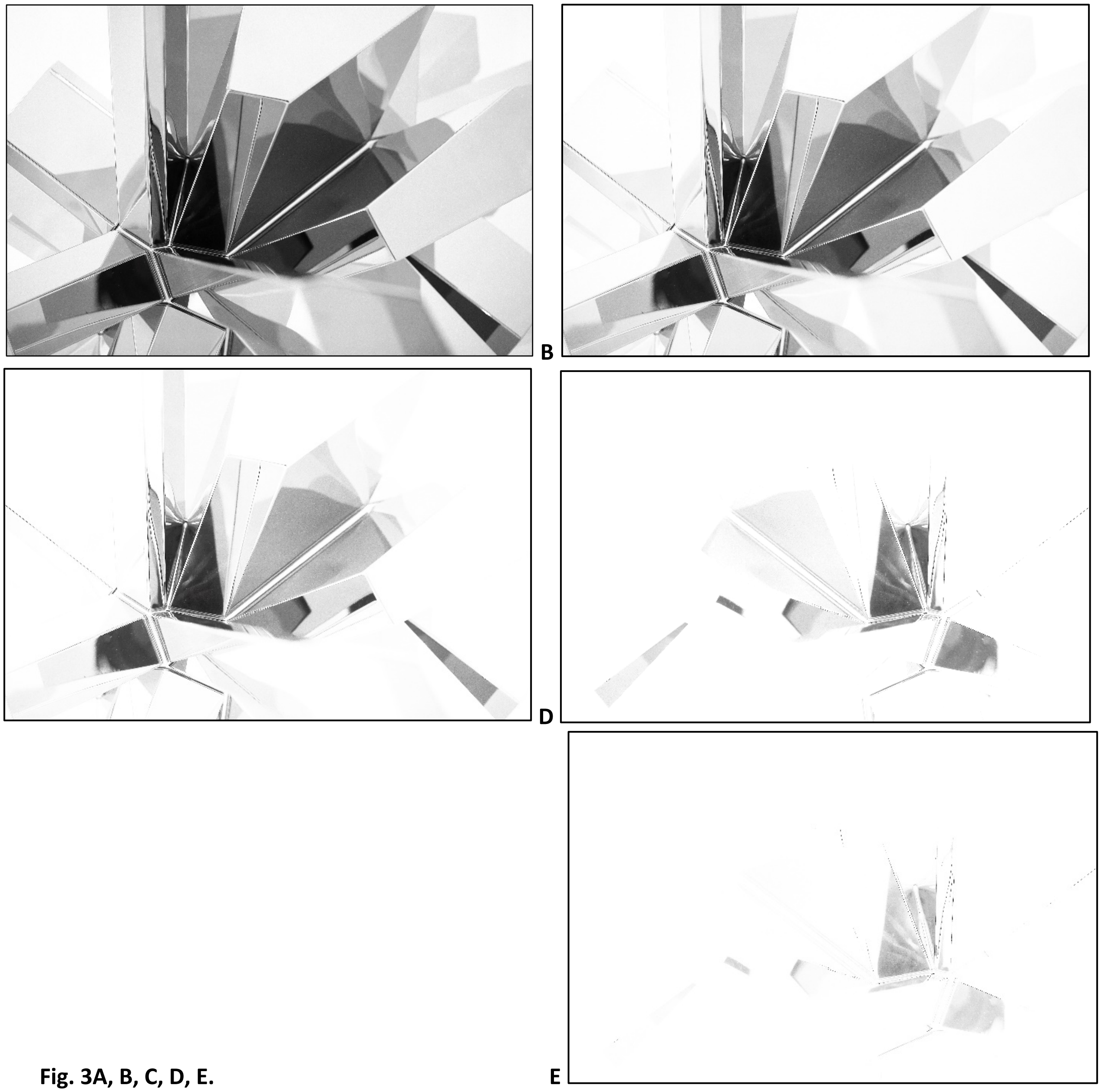


Fig. 3A, B, C, D, E.

subjects	GROUP 1 Perception / representation img. A	GROUP 2 Perception / representation img. B	GROUP 3 Perception / representation img. C	GROUP 4 Perception / representation img. D	GROUP 5 Perception / representation img. E
1	crystal	metal shape	metal shape	I don't know	I don't know
2	metal shape	crystal	I don't know	I don't know	I don't know
3	crystal	metal shape	crystal	I don't know	I don't know
4	metal shape	crystal	I don't know	I don't know	I don't know
5	metal shape	crystal	I don't know	I don't know	I don't know
6	metal shape	metal shape	metal shape	I don't know	I don't know
7	crystal	crystal	I don't know	I don't know	I don't know
8	metal shape	metal shape	metal shape	I don't know	I don't know
9	metal shape	crystal	crystal	I don't know	I don't know
10	metal shape	crystal	crystal	I don't know	I don't know

Table T_TL_01

By grouping the subjects' responses into categories, we obtained two coherent, concrete responses that represent the correct answer: "crystal" and "metallic form." In fact, the image is about a three-dimensional metallic shape constructed like a crystalline geological formation. From the analysis of the test results, we notice that the subjects in groups 1 and 2 identified and recognized 100% the subject of the displayed image (see table T_TL_01). Group 3 subjects correctly recognized/categorized the form in a proportion of 60%, but 40% of them had problems recognizing/categorizing the form presented in the image. In contrast, none of the subjects of groups 4 and 5 could recognize/categorize the form shown in the image.

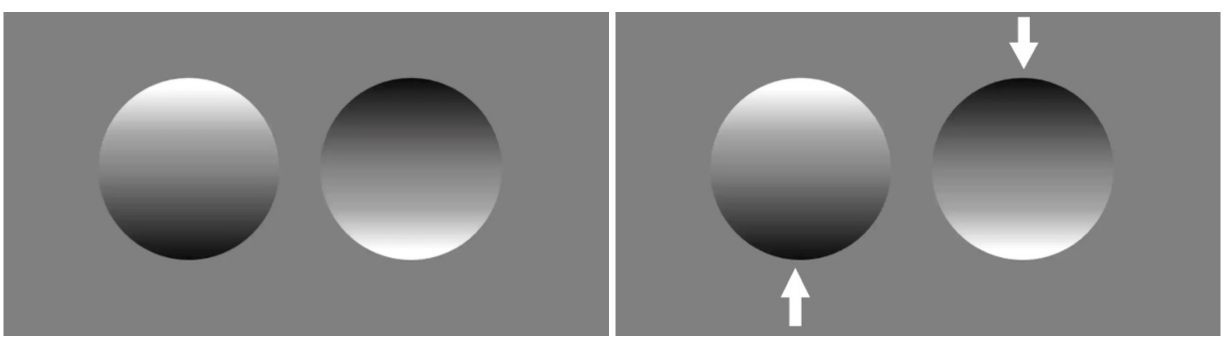
This test shows us that the mechanism of perception makes full use of the light-object-shadow configuration and in the operations of analysis and estimation of forms builds direct correspondences between light, form and shadows.

As for the mechanism of representation, the self-shadows become an integral part of the object itself, are part of its existence, shape it and modify some of its attributes and characteristics, transforming the real form into one of the countless prototypes with which cognition operates, depending on the characteristics and parameterizations of the light sources used in the filming of cinematic plans. At the same time, the self-shadow is the most important amplifier of drama or dramatic tensions, as well as of negative emotional experiences (anguish, fear, horror, emotional tension), which is mainly due to the activation of the cerebral amygdala. Any shadow brings with it a dilution or alteration of the information describing a shape. The more important these dilutions or alterations are, the stronger the neuro-biological reaction, since the lack of visual information, in specific contexts implies a reduction in biological security to which the cortex reacts implicitly.

As for the subjective effect, it has a direct influence on the cognitive representation, because it will undergo important changes by changing the emotional register it causes. Within this context, we put forward a brief analysis of an elementary example in which the change in the direction of illumination causes a total transformation of cognitive representation (images in fig. 4A and 4B). We record that in variant A, the mechanism of representation instantly establishes that the disk on the left has a Convex visual appearance, and the one on the right a concave one. When changing the direction of illumination by 180O (variant B), the discs radically change their visual appearance, the shape on the left acquiring a concave appearance, and the one on the right convex.

Both cognitive mechanisms that solve the visual equation are very easy to mislead, because both work based on accessing prototype libraries and comparing newly viewed entities with those stored in long-term memory. If, based on current information, the prototypes identified for fig. 4A induce the concepts “concave” and “convex”, and those in fig. 4B, conversely, and the cortex has no additional information available to help it correctly estimate the directions of illumination or the geometry of the shapes, it will conclude that all the determined concepts are correct.

A



B

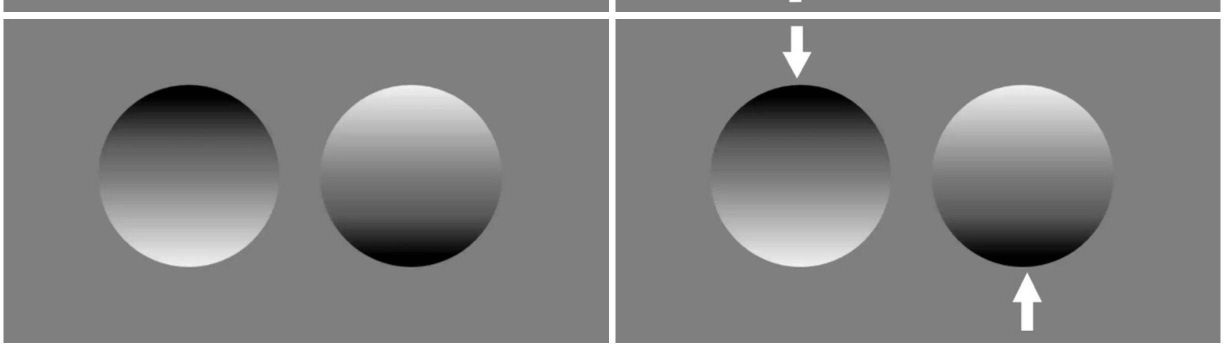


Fig. 4A, B. Two plane disks, on which two linear developments of light gradients are represented. On the right, the meanings of the directions of illumination are represented (source: Florin Constantinescu, 2021).

In the next step (fig. 5) we superimposed on our disks in fig. 4A two rectangles gradually illuminated, the first from the bottom-up direction, and the second from the opposite direction. The representation changes again, substantially, and the visual appearance of the disk on the left turns into “empty sphere with a light inside” from which a parallelepiped was cut, respectively for the disk on the right into “full sphere” from which a parallelepiped was cut.

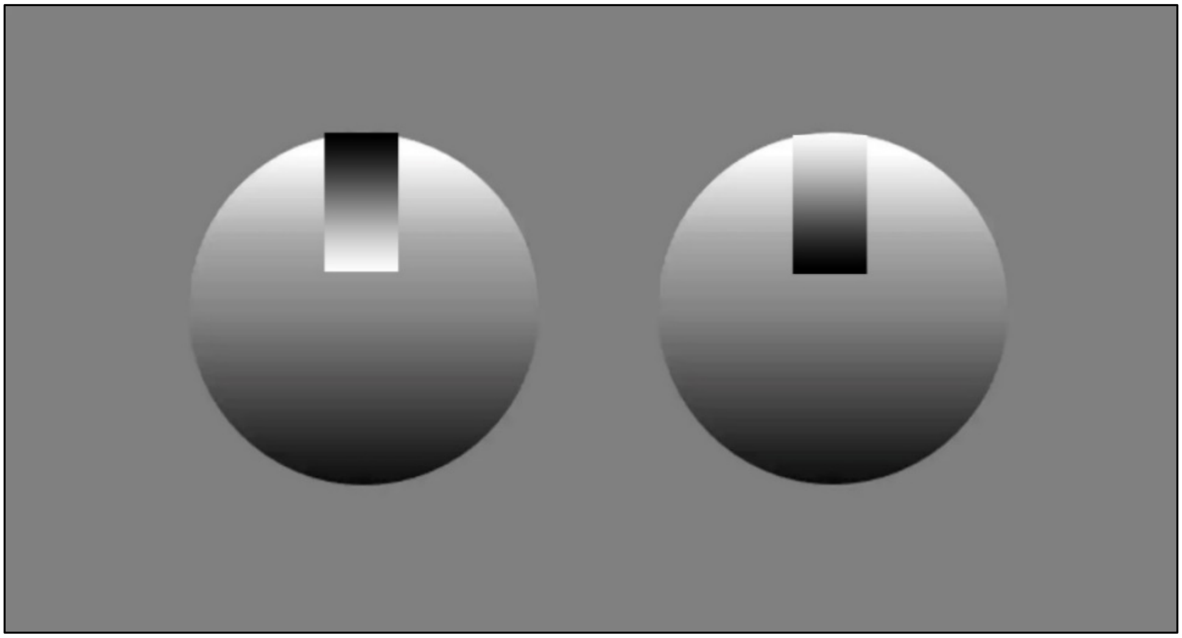


Fig. 5 Rectangle overlay over the disk (source: Florin Constantinescu, 2021)

We note that although the plane rectangles superimposed on the disks do not spatially intersect the disks (it is only a visual appearance due to the chosen perspective), the representations have changed substantially, the disks have become spheres, of which the one on the left is “empty” and has a light inside, and the one on the right is “full”. The example demonstrates, once again, the ability of light to strongly alter cognitive representations, although, of all the parameters, we have only altered the direction of the incidence of light rays.

Similarly, due to the fact that the cerebral structures of the visual cortex always call the same library of prototypes, schemes and mental images, often erroneous results are obtained regarding the construction of the representation, as we observe in the representations in fig. 6. Under the circumstances, it is very difficult to determine whether the outer hexagons are convex or concave volumes, regardless of the direction of illumination.

A survey of 18 students found that for image 6A, 11 said the rectangles were convex, and 7 thought they were concave. In contrast, when viewing figure 6B, the results were as trenchant as possible, 17 subjects claimed that the rectangles are concave, and only one claimed that they are convex. The conclusion is that the prototype library constituted in memory recorded a new prototype, with the visual appearance “configuration of nine rectangles illuminated from the left”.

When viewing the second image (variant 6B), at the consultation of the prototype library, a prototype was found almost identical from a geometric point of view, with the difference that it shows the shadows distributed on opposite faces (inversely) compared to the prototype stored at the previous viewing. The decision of the representation mechanism, unlike the one in the case of viewing variant A, in which there were serious doubts whether the rectangles are concave or convex volumes (see the ratio 11:7 of the subjects), is as trenchant as possible, namely that the hexagons are concave volumes. No time, the cortex did not take into account that the images are absolutely identical and only the direction of illumination has changed from right to left, not the geometry of the rectangles. Obviously, we are dealing with an erroneous decision regarding the construction of cognitive representation, which took into account only the geometry of shapes and was pre-programmed “to believe” that the direction of light is also from left to right, that is, exactly the conditions of visual appearance according to the first memorized prototype.

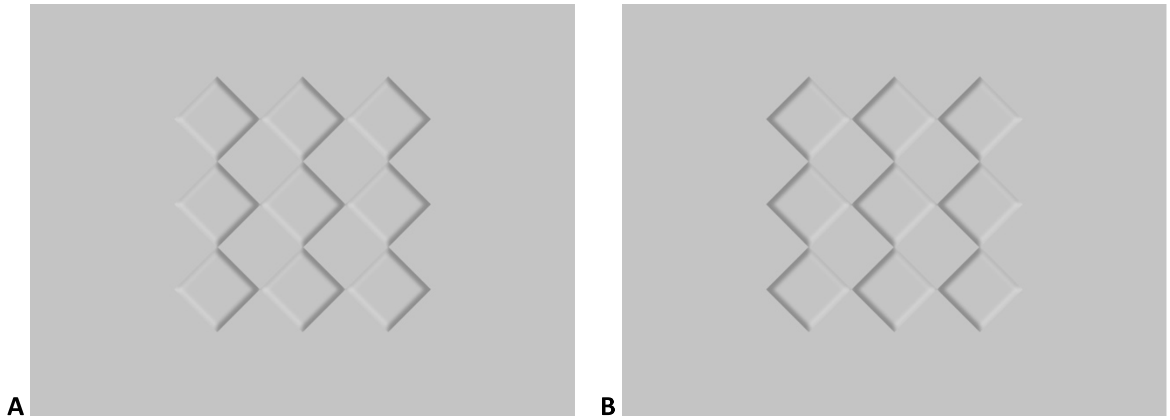


Fig. 6A, B. Differences in perception by changing the direction of illumination left-right (source: Florin Constantinescu, 2021)

The question arises, why did most of the subjects a priori believe that the light source was located on the left? For many years, psychologists or researchers of the field of visual perception have considered that the visual cortex, in processing information describing light gradients and shadows on the surfaces of shapes, when the direction of light is vertical (from bottom to top or vice versa) and has to decide whether a shape is convex or concave, choose, implicitly, that it is a top-down illumination and the shapes that present black and white gradients from top to bottom (white to top, black to bottom) are convex, and those that present evolutions of black and white gradients reversed are concave (fig. 7A).

This is because natural illumination (from the sun), which we have been accustomed to over a million years of evolution, always comes from an oblique-up direction. It is worth mentioning that in the case of reading mechanically reproduced images, "top" means the top of the frame. However, other research studies (Sun and Perona, 1998, Elder et al., 2004, Braje ET.A., 2000, Berbaum ET.a., 1983) showed that this hypothesis is valid only in some instances and under certain conditions, such as those in which the visual system quickly analyzes a more complex image, which contains in addition to a target form, several distractor forms, which are illuminated from top to bottom.

In cases where the illumination is lateral (left-right or vice versa), the interpretation of the direction of light favors the left->right direction, and as a result, the shapes for which the gradients are distributed from white to black, from left to right, are interpreted as concave, and the shapes with the reverse distribution are convex (fig. 7A, B, C). In the same way, we also explain the case presented in variants A and B of image 6. Because, reflexively, we consider that the light also comes from the left->right direction, we will decide that the hexagonal shapes are convex. This example reveals another important characteristic of light: the ability to intervene subtly, almost insidiously, on the functioning and decisions of visual cognitive mechanisms, with surprising results especially in the plane of cognitive representation, much more important in terms of imaginative or figurative type construction.

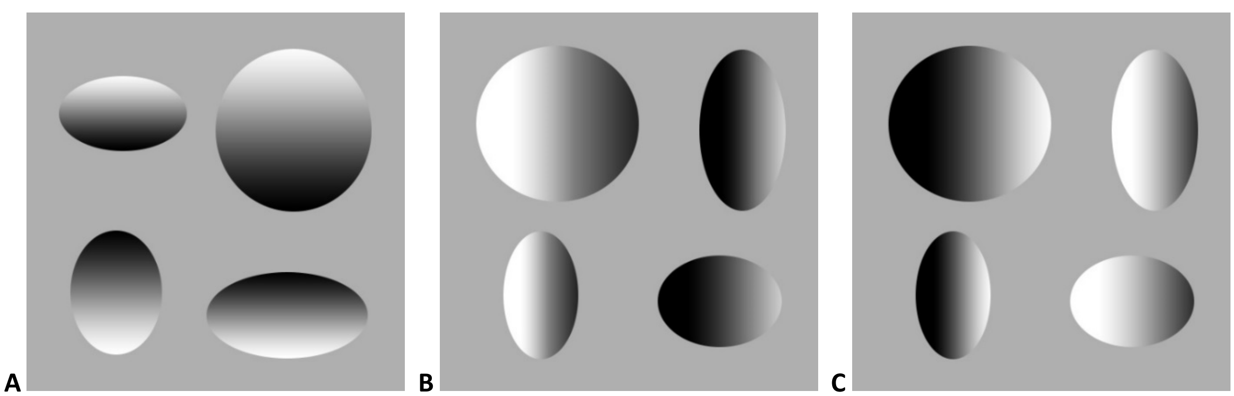


Fig. 7A, B, C. Influencing the perception of concavity/convexity of forms depending on the direction of illumination (source: Florin Constantinescu, 2021)

Here it should be mentioned that, in the process of building a cognitive representation of an image, in which the shapes are very dimly lit, or they show strong modelling of the geometry due to the action of the shadows (especially in the case of beings), the cerebral amygdala plays a very important role, as shown by a series of researches (Borst and Kosslyn, 2006; Phelps, 2006; Fox et al., 2000; Becker et al., 2011) undertaken in the last two decades.

Research teams led by Borst G., Phelps E., Fox Elaine or Becker D. have established that the mechanism of representation works more effectively in conditions of stress caused by certain types of emotions, especially fear or fear, cases in which the cerebral amygdala strongly intervenes. Neuroimaging has revealed intense and important activations of various areas of the cerebral cortex when viewing dimly lit shapes or with subtle modelling illumination, which allows many structural details of the viewed shapes to be hidden, unlike when the same shapes, but lit much more intensely and on all surfaces, they produced them.

In addition, two other studies (Phelps, 2006 and Bocanegra, 2009) that consider the contrast between lighted and dark areas, in the case of a patterned point illumination, point out that as much as these contrasts between the various surfaces of the shape is higher, the more powerful emotional experiences (emotions) are generated, and the associated cognitive representations are more pronouncedly negative.

In this context, because it is often considered that there are differences between the emotional experiences caused by the darkness due to the night and the darkness due to the lack of light, (in an interior space), we mention a salient research study (Yadan, 2015) which concluded that the differences between the emotional experiences produced in the two cases are minimal and inconclusive. The explanation for this behaviour lies in the fact that the lack of visual information that defines the form, especially in the case of human characters or other living beings, produces a priming of the amygdala regardless of the causes of the lack of light which, in turn, activates extensive areas of the cerebral cortex. The effect produces strong emotions, but also an over-processing of dimly lit forms.

In this regard, we conducted test **T_U_01** that validates which is the first representation constructed when viewing a heavily underexposed image (fig. 8), in which the forms hardly discriminate (Strong self-shadows, without details), and the main subject is invisible. The subjects could choose several possible options: the reflections of the eyes of an animal lost in the fog of the forest, the headlights of a car moving through the forest, the illuminated windows of a house, two people with flashlights, etc. It should be noted that in the image we are dealing with the second variant, namely the headlights of a car.

TEST T_U_01

HYPOTHESIS: In strongly underexposed images or filmed in the dark, the lack of information necessary for the mechanism of visual perception predisposes the subject to the construction of cognitive representations that illustrate a potential danger		
TEST	QUESTIONNAIRE	TABLES, GRAPHS, OBSERVATIONS
- Each participant will look for 5 seconds at the image in fig. 8 and will respond to the questionnaire request. - Sample of 24 subjects (12 male, 12 female, ages 20-45 years).	Questionnaire **C_T_U_01** - What do you think the two bright spots in the image represent?	Results table **T_U_01** Table **G_U_01** - The image is monochrome and without plastic valences.

Fig. 8 Image for the T_U_01 Test (source: Florin Constantinescu, 2021)

Image VIEWING 8			
SUBJECTS	Recognized form	SUBJECTS	Recognized form
1	eyes	13	eyes
2	eyes	14	eyes
3	something else	15	eyes
4	eyes	16	eyes
5	eyes	17	eyes
6	something else	18	eyes
7	eyes	19	something else
8	something else	20	something else
9	something else	21	eyes
10	eyes	22	eyes
11	eyes	23	something else
12	eyes	24	eyes

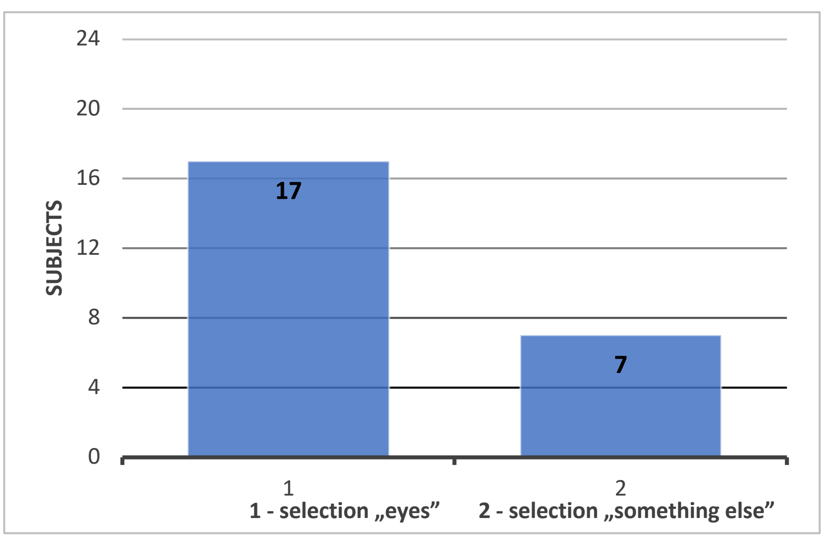


Table T_U_01 **Graph G_U_01**

Interpretation of test results:

In the results summarized in Table T_U_01 we labeled "eyes" if the answer was from the category "eyes of an animal" or with "something else" any other answer. The subjects mostly had two choices as answers: automobile headlights (6 answers), lighted windows (one answer). We note that the vast majority of subjects (70.83%) chose an answer that cognitively represents a situation of potential danger: a wild animal hidden in the mists of the forest. A lower percentage (25%) responded that we are dealing with the headlights of a car, so they explored other variants. Although the visual appearance of the bright spots, as well as the constitution of the image, do not contain anything threatening, the response of the majority of subjects indicates that the mechanism of the cognitive representation rather chooses the alert option, building, against all reason or arguments, a cognitive representation that expresses a potential danger.

The cast shadow is not an intrinsic characteristic of one form, but an action of this form on another or on the environment in which it exists, after all, an intervention on the integrity of the other forms or on the second planes. One of the most important roles of the cast shadow is played within the mechanism of visual perception, at the moment when the visual cortex must evaluate the geometry of shapes and the environment in which they are positioned.

Discrimination, identification and recognition are greatly aided by the constitution of the shadows, providing the contrasts necessary for proper evaluation. As a spatial projection of physical form, shape geometry provides very important visual cues in the "calculation" of geometry, position in space relative to other forms or backgrounds, and dimensional proportions. At the same time, it is important to specify that cast shadows enhance the ability of the attention mechanism in terms of orientation and directing attention inside the frame.

As for the roles of an aesthetic nature or those related to the construction of the representation, they are countless: the cast shadow unites the physical forms in the frame, connects them, generates dialogues and relationships between these forms, hierarchizes them (subordinates them or gives them powers increased), creates visual rhythms and imprints virtual kinematics to static forms (amplifies form dynamics); it is an amplifier of drama or dramatic tensions; establishes hierarchies and moderates visual weights; it can stabilize or destabilize the form, as well as the whole composition, strongly anchors the form to a surface (the earth, for example) or another body, generating attractive forces; incorporate the form into a group or family or exclude it, etc.

The ability of shadows to construct aesthetics has been exploited since the early years of cinema, and we mention here the director Robert Wiene, with his film "*The Cabinet of Dr. Caligari*", performed in 1920, "*Nosferatu, eine Symphonie des Grauens*", directed by F. W. Murnau in 1922, "*Algol. Tragödie der Macht*" directed by Hans Werckmeister in 1920 or "*The Killers*" directed by Robert Siodmak, 1946.

By manipulating the light/shadow dualism, filmmakers add to the panoply of means of cinematic expression a very important one, capable of building genuine visual metaphors. In this respect, we highlisght some famous films such as "*Taxi Driver*" (directed by Martin Scorsese, 1976, fig. 9) and "*No Country for Old Men* "directed by brothers Ethan and Joel Coen, 2007, fig. 10).

One of the most valuable attributes of the cast shadow is that it is able to act as a generator of key information shaping the dramatic register or as a catalyst for directorial intent. It works as a mediator between the compositional elements, being a visual entity with an extraordinary power of communication, which can generate aesthetic or emotional experiences with deep, but non-discursive meanings and strongly conditions all the cognitive mechanisms involved in solving the visual equation of the contained space in the frame.

It is important to emphasize that light and its indispensable companion, shadow, form the basic dough of the film's materiality and provide the basis of the entire cinematic experience. It helps us experience the full range of sensations, feelings, emotions and cognitive experiences that bring any film to life.

A **B**

C

Fig. 9A, B, C. Alienation and obsession: shadow as a visual metaphor (Source A, B, C: *Taxi Driver* . Directed by Martin Scorsese, 1976; Columbia Pictures. USA)

A

B

Fig. 10A, B. Defender of the law: shadow without identity (sources A, B: *No Country for Old Men*). Directed by Ethan Coen and Joel Coen, 2007; Paramount Vantage, Miramax. USA)

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