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PHD THESIS SUMMARY

THE VISUAL PERCEPTION AND COGNITIVE REPRESENTATION OF FILM IMAGE

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TABLE OF CONTENTS

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ARGUMENT

Watching a film is a profoundly conscious experience, as film is a multidimensional, multisensorial stimulating apparatus which impacts the entirety of the cerebral cortex and strongly influences its responses, reactions and cognitive constructs. Thus, adding neurocinema to the fields studying the cognitive activity of watching a feature film is a must as neurocinema tries to analyze and verify steadfastness and coherence and to come up with arguments to the cognitive reactions, responses and constructs stemming from scrutinizing the film. Neurocinema presents itself to us as a new field of study, creating great opportunities for planning specific tests and experiments which can validate or invalidate a multitude of hypotheses related to the cortex's processing activity and the involved anthropological-cultural differences.

The main motivation behind this research is the need to understand as closely as possible the way in which the image's graphical-visual composition and the cinematographic means of expression influence not only the way in which neuropsychological processes and mechanisms are executed by the visual cortex and other cerebral structures involved in visual perception and in constructing the cognitive representation of a mechanically reproduced image, but also the results of executing these processes. I have obviously only used information pertaining to the cognitive processes involved in resolving the spatial matrix of the field within the film frame, by connecting information from various fields and stating and analyzing several hypotheses. I'd like to point out that some hypotheses are currently at a turning point between myth and truth, as some concepts have not yet been sufficiently researched or they have just been empirically researched and their steadfastness is shattered by newly surfaced neuroscience information.

This thesis strives to provide a rigorous, scientific perspective on concepts that set certain directions in the development of compositional architectures or the use of cinematic means of expression in film image, as well as revealing how these elements influence processing mechanisms and the assembly of visual information. Although scholarly literature includes a relatively large number of studies focused on deciphering the complex mechanisms of visual perception and cognitive image representation, starting with Gestaltism which left its mark in the beginning of the 19th century, an *interdisciplinary* (as it's a study that uses cooperation and the merging of contemporary fields of study, ignoring the strict boundaries of fields of study) and a *transdisciplinary* approach (as it goes as far as integrating the curriculum), combining the viewpoints of image creators with those of neuroscience specialists is a rare occurrence. A unified curriculum approach (a hallmark of transdisciplinary work) focuses on real-life problems and meaningful, impactful experiences, as they occur in the current, dynamic, day-to-day context of feature films.

We thus take note that most studies tackle the subject matter from a field-specific perspective: neuroscience or psychology specialists - from the perspective of the neurological, anatomical and mental structure and function of the cortex and film industry specialists (mainly film critics and film study specialists) from a philosophic perspective and from the perspective of art reception.

I believe that an approach combining the knowledge gained during the recent 30-40 years of studying the visual cortex and the specific mechanisms of visual perception or image cognitive representation is well-suited and can have an impact on the quality of film production. An important characteristic of digital technology, nowadays widely used in cinema, is the increased ability to stimulate original, creative stylistic approaches, with image transposition techniques impossible a mere two or three decades ago. As such, contemporary productions gained a different type of structure, much more vibrant and intense, which led to the creation of visually striking content. Meanwhile, we cannot overlook the danger of "getting lost" in the current tangled web of technology which can have serious repercussions on the aesthetic and communicative qualities of the image.

An analysis or overview of cinema styles or currents is not what the current thesis offers. This is due to the fact that irrespective of the sets of principles, concepts and values promoted by each of these currents, the image has the same graphical-esthetical or cognitive intentions. Regardless of whether we're talking about German expressionism with its triumphant symbolism, Italian neorealism with it's use of candid images combined with real, unedulcorated scenography, (notice the resemblance of the new Romanian wave to this current), as in the rich and luxurious Hollywood productions, the new British wave with its black and white films, the image of contemporary film has- at least in theory- to meet the same requirements: the manipulation of perceptions and cognitive processes giving rise to mental representations and conceptualizations.

The thesis main objectives branch out in two lines of research:

1. Researching certain hypotheses pertaining to the direct influence of cinematic means of expression on the mechanism of visual perception and cognitive representation (the ability of these means of expression to alter, manipulate, amplify or modify the execution process of the mentioned mechanisms);

2. Researching and validating certain hypotheses pertaining to the direct influence of composition in its entirety to the image's cognitive representation mechanism (altering and/or manipulating this mechanism).

It's not hard to notice that visual expression in cinema, in relation to the defining criteria describing the concept of *art*, is presently and more than ever subject to a series of intertwining elements which, as already mentioned, originate from fields of study that have an impact on visual arts in today's view: neuroscience, psychology, philosophy, communication sciences and semiotics. The ethos of visual expression, masterfully emphasized in film art, cannot be researched by reducing the complex rhetoric of the imaginary or by resorting to the simple explanation of the construction mechanisms and procedures of the image's compositional structure.

Regarding the drawing up of the research's conclusions, I mention that each subchapter separately, respectively each test or experiment contains the conclusions for that particular researched subject.

The present study is meant to substantiate a certain segment of scientific debates, with immediate practical utility, regarding the ways in which the genesis of the visual message in film image is conditioned, tuned and controlled by manipulating the mechanisms of visual perception and cognitive representation of the image, using cinematic means of expression and the architecture of the graphical composition of the image. At the same time, the study analyzes the evolution of the performance of cognitive mechanisms and processes involved in solving the visual equation of the space within the film frame, which turns out to be conditioned by the qualitative and quantitative parameterization of the cinematographic image creation techniques. Therefore, it researches the reactions and responses of the mechanism of visual perception and the mechanism of cognitive representation in the performance of the processes of acquiring and processing a mechanically reproduced image, in this case, film image.

Another research direction addressed in this study is the examination of the limitations of the above mentioned mechanisms and cognitive processes, caused by the overload of visual information flows (the frame's compositional overload), and the brain's correction and control mechanisms of these flows (peripheral blindness, raw image processing). In parallel we also study the cognitive consequences produced by alternating visual stimuli.

The thesis does neither open up a new field of research nor complete the study of the very broad and complex field of mental processing of film image, but combines the accumulated knowledge within film art image in the recent 2-3 decades with neuroscience-based knowledge (especially neurobiology and psychology). The work joins the current body of research that fuels present-day scientific debates and dilemmas regarding the way in which we perceive a technical image (photographic and cinema image), as well as those who try to explain the mechanism and processes used by the cerebral cortex in its cognitive representation of the image.

The purpose of the tests and experiments in this research is to perform a rigorous analysis of certain effects supposed to happen through the modeling action of means of graphical expression and composition on the mechanisms of image visual perception and cognitive representation. It strives to verify certain formulated hypotheses pertaining to the evaluation of the influence of the graphic aspect of the image on sensory and cognitive processes within the field of visual perception and cognitive representation. The tests and experiments neither evaluate the subjects' personality traits nor create psychological profiles, they merely outline a type of cognitive response under a set of stable, coherent and uniform conditions for the whole sample of subjects.

THESIS STRUCTURE

The study proposes a certain path for advanced research and exploration of the aforementioned theme and generates a remarkable potential for decoding the cerebral mechanisms involved in analyzing and processing a mechanically reproduced image. The research is structured in three parts, in addition to Introduction and Filmography.

The first part, included in chapter 1 ("EXAMINING THE INTERACTIONS BETWEEN THE MECHANISM OF VISUAL PERCEPTION AND FILM IMAGE") comes to the conclusion that there are fundamental differences between the perception at rest of a real tridimensional image and the bidimensional one within the frame of a mechanically rendered image, the two types of perception being quite different: in the first instance perception is non-conditional and in the second instance it's conditional and strongly influenced by the means of graphical expression which transform the visual appearance of the included space and shapes. In other words, the first type of visual perception (used in the real world, at rest) distinguishes between objects and shapes distributed in an unorganized, random layout, such as in space in the real world, observed from relatively random station points. We look at something from a certain station point only because in a certain moment we are at that station point. Should an immediate need occur or if the situation commands it, we move to a different position from which we gather needed or further detailed information.

However, when it comes to film image, we distinguish between objects or shapes within a frame with heavily altered attributes through means of graphical expression and laid out in accordance with a compositional architecture, purposely crated to facilitate the genesis of a certain cognitive representation of the image in question. We infer that in this situation we do not perceive real objects, shapes, spaces or conditions, but their mutated variants, conditioned by the vision of the image creator. Moreover, composition is no longer random, but purposely laid out in accordance with a graphical structure which in its turn further manipulates the cognitive representation of the image.

The fundamental difference between these two types of perception comes from the fact that the image of the real field of view is not sent to the brain in a unique form, as in the case of a photography or cinema image, but as a burst of successive images recorded from two different angles (stereoscopically), each focused at different planes of focus within the field of view. This means that while analyzing an image from the real field of view, the brain has at its disposal not only a single information block (which defines a single spatial plane within the tridimensional space), but a multitude of information blocks defining several spatial planes within the analyzed visual space, each recorded from two different perspectives (corresponding to the two retina fields). This is enough information to enable the cognitive mechanisms to evaluate and estimate from all perspectives the tridimensional space along with the contained shapes.

In the case of the visual perception of a bidimensional, mechanically reproduced image, the visual cortex has at its disposal a single information block which incompletely defines the spatial content due to the lack of stereoscopy and many of the required pieces of information needed for the evaluation and estimation of the perception of space. In this situation, although the cortex (see fig. 2 - the diagram of flows and processing compartments of visual information) has the ability through feedback to order the muscles controlling the eye ball and the lens of the eye to focus on different focusing planes, the result of such an action is negative because an object perceived as blurry in a bidimensional image cannot be more clearly seen than when it was “frozen” in place in the image. Consequently, when looking at such an image, irrespective of the visual mechanism, blurry objects remain blurry because the mechanically reproduced image completely lacks any kind of third dimension (defining spatial depth). In this situation, we have fixed focus on a single plane, the plane of focus of the cinema or TV screen.

In reality, the visual cortex is not analyzing a tridimensional space, but a pseudo-tridimensional one in which all spatial depth layers are compressed, over imposed one on top of the other, and the information blocks describing the tridimensional matrix of space together with the geometry of the shapes populating this space are forever lost. Although information loss seems catastrophic, the mechanism of perception succeeds in partially resolving the spatial matrix using certain visual cues and heavily relying on previous cognitive experiences whose defining characteristics are stored in memory. This is made possible as the projection of the real tridimensional space on the retina is also bidimensional and the process of “merging” images produced by the retina fields is executed in the primary visual cortex. In this instance, we notice that the saccadic movement process is of very little help when it comes to the lack of visual information or clues due to the fact that the linear structure of the image doesn’t provide coherent information pertaining to the real depth at which forms are located within the depths of the visual space.

Chapter 1 contains the following:

1.1. The mechanism of visual perception

1.1.1 Stages of visual perception

1.1.2 An analysis of the mechanism of visual perception's influencing factors

1.2. The perception of space, movement and color

1.3. The mechanism of attention

1.3.1. The reading direction of an image

1.4. The limits of the mechanism of visual perception

The analysis includes the research *Read Write Direction* as there are major differences in reading a film image due to cultural - anthropological factors conditioning the population group the visual reader is part of.

I'd like to start by mentioning one of the most famous quotes regarding the functioning of the mechanism of visual perception, a quote from two important researchers, John Findlay and Iain Gilchrist: "The mechanism of perception implies the preferential processing of some visual elements to the detriment of others." This definition accurately embodies millions of years of biological evolution of one of the most complex neurobiological systems, present in almost all animal species. Visual perception is a process executed at the highest level of sensory knowledge. It differs from sensations as we consciously assess a certain object as being whole and coherent whereas through sensations we gain simple, basic information about the characteristics of a certain object or phenomenon. It is without doubt one of the most refined forms of sensory knowledge. Visual perception consists of four phases with the following consecutive execution stages: *detection, discrimination, identification and recognition/interpretation.* Some authors identify five phases, adding *stimulation* as the lowest starting phase of perception.

Essentially, by executing this process, the real image from the visual field, projected onto the retinal fields, becomes a visual perception through cognitive interpretation of stimuli reaching the retina's specialized cells. As a result of the physical-chemical processes that take place in the retina, information contained in photon clusters gets converted to electrical signals and, later on, through neurobiological processes, these signals are interpreted by a special structure inside the brain, the visual cortex, and become an image. Visual perception has not only a complex informative function, but also an adaptive-regulatory one with the help of which it plays an important role in the body's processes of adaptation to environmental influences and complex activities (for example, writing, reading, making or handling tools or vehicles etc.).

Similar to sensorial images which get created as a result of concrete sensation forming, we can also say that perception's end result is a subjective one, the so-called *mental image.*

Attention drawing is one of the most important intentions when creating film footage. Without establishing compositional directives aimed at mobilizing and manipulating the mechanism of attention, leading it to our desired points or areas, the image loses some of its vectorial ability to render or illustrate something meaningful, and image perception at a superior conceptual level cannot be achieved in the absence of the triggered mechanism of attention, focused on the important element.

The mechanism of attention is the main neurological process which underlies the extremely important selection of received information. It implies a permanent change of our awareness of a shape or action at a certain moment in time. Focusing is the most important construct of attention, the simultaneous focusing of all senses on a certain center (mainly our seeing, smell and hearing) and the high-priority resolve of stimuli recorded through these senses at the time of focusing. Some study reveal that we have the ability to change focus at a rate of 10 times per second, much faster than the speed of pointing our sight to other directions which is 3-5 times per second. According to a number of research, saccade eye movements are part of a complex process required to construct as clearly and refined as possible a representation of the field of vision and they are responsible with the repositioning of visual stimuli creating the image on the fovea. Practically speaking, the spatial image within the field of vision is divided into smaller areas, analyzed in succession through rapid eye movements - saccades. This leads to an increase in visual information density and accuracy.

A visual perception and cognitive representation of an image that is as efficient as possible requires a rigorous selection of information obtained in this manner. As the amount of information can take on gigantic proportions, far exceeding the resolve capacity of the visual cortex, the cortex developed several mechanisms, on one hand to reduce as much as possible the information flows that require processing and, on the other hand, to precisely select those pieces of information that are vital or really necessary to cognitive processes.

The fundamental differences between sensation and perception are established during research, as I have found out that there are plenty of confusions lingering around in scholarly literature. We have thus determined that perception does not equal sensation, as sensation is just a rudimentary, primal type of mental representation of reality and being a primitive, fast process and due to the lack of sufficient information and the precarity of the process, it's also improbable. As a mental representation of a certain reality, sensation can nevertheless convey some simpler characteristic of a certain entity or phenomenon (superficially reflecting the characteristics of one or several stimuli). Sensation is a mental element indivisibly linked to knowledge (as there is no lower level) but sensation does not occur by itself except in some of rare instances, for example in the early days of a baby's life or in some pathological situations. It’s the end result of basic, primal cognitive processes, only achieved due to the sensitivity of specialized organs in picking up external stimuli, an integral part of the biological architecture of the human body.

Another important conclusion reached in this first chapter is that the distance from which a certain visual reader follows a screen (any type of screen: cinema, TV, computer, laptop or even tablet or mobile phone) is very important because the greater the distance between the visual reader and the screen, the larger part of the screen’s surface lies within the field of view of maximum acuity (stereopsis area). At the same time, however, too large a distance from the screen greatly reduces the size of shapes which causes perception issues at all stages of the mechanism of visual perception (detection, discrimination, identification, recognition/interpretation).

An important subchapter deals with researching the ways in which the mechanism of perception solves the complex equations of space and movement in a mechanically reproduced image.

Space and movement are inextricably linked to the image structure, they are manipulated and transformed into means of expression. Any kind of movement of a shape in a given space represents an evolution in time of space as a whole, as the tracked shape is an integral part of it. The perception of shape refers to the assessment of the distance between the object and the viewpoint, of distances between objects and between objects and certain landmarks. Scientific theories show that trials and failures play an important role in increasing the accuracy of the assessment of physical spaces and distances.

Normally, the mechanism of vision has the ability to evaluate tridimensional space from a dimensional point of view, relying on the fact that an object in space is observed by each eye from a specific, different angle (stereopsis). The angles of the projections on the two retinas are different (we suffer from retinal disparity) and the visual cortex takes advantage of these differences in order to calculate the depth distance to the object viewed. There is an obvious problem with evaluating depth distances in a mechanically reproduced image: the object viewed is no longer part of a three-dimensional space, and it’s no longer projected onto the retina through the same retinal disparity, resulting in difficulties in interpreting depth distances. This is the reason why film image has to resort to using other tricks to help the visual cortex with calculating depth distances. For this reason, before recording an image, it’s mandatory to analyze the physical space encompassing the shapes chosen in the composition. In this way, the spatial characteristics of shapes will be known and they will be transmitted to the mechanism of perception through the judicious use, especially of filming perspectives, but also of lighting and scenography.

The first part of the study also contains seven experimental tests assessing the validity or invalidity of several important hypotheses. Research hypotheses formulated in this paper are of the attributive statistical type. Thus, the tests developed for this study use as a starting point hypotheses assessing a certain type of subject behavior, behavior that can be identified, measured and compared. For accuracy reasons, formulated hypotheses contain a single variable on which data could be collected, data which, through statistical analysis, allowed the evaluation of the construct in question. Assessments of test participants' behavior are quantitative and allow the quantification of their behavioral reactions, as well as the establishment of associations or relationships between the projected stimuli and the reaction of the subjects. The testing and experimenting methodology is explained in detail below, along with a selection of studies used in the development of this methodology.

Verified hypotheses:

- the variation of the field of view area is directly proportional to the observation distance;
- horizontal compositions are more eye pleasing (enjoyable) than vertical ones:
- the lack of visual cues leads to the non-identification of shapes, and the non completion of the mechanism of visual perception leads to an alteration of the process of cognitive representation of an image;
- depending on the task, while performing field of view analysis only relevant shapes are stored into memory, as requested by the explicit search task (immediate task).
- the shorter the duration of visual stimuli, the lower the accuracy of the perceptual processing of shapes. As the speed of the camera movement increases, the ability of the perceptual system to correctly solve the visual equation decreases;
- after the information definition of a shape has been loaded into memory, the process of perception is much faster, with far better results;
- the visual processing speed of a shape within an image decreases as the complexity of the image increases.

The second part of the study is devoted to the second level of cognitive processing of film image, namely the construction of the image’s cognitive representation, while at the same time researching the influence of the means of cinematic expression on the representation (Chapter 2 ANALYSIS OF THE INFLUENCE OF MEANS OF EXPRESSION ON COGNITIVE REPRESENTATION OF FILM IMAGE).

The following are included in Chapter 2:

2.1. An analysis of factors influencing cognitive representation

2.2. Code, symbol, metaphor, motive. Mental diagrams and images

2.3. The mechanically reproduced image as a document, utilitarian object or ideal object

2.4. Light - the stylistic motor of cognitive representation

2.4.1 Shadow

As noted, the mental processes conditioning and making the performance of the stages of visual perception possible are quite numerous and insufficiently explained. As demonstrated by the plethora of studies and experiments conducted in the last two or three decades, it’s a fact that sensations strongly interact with superior cognitive processes taking place at level II. This has compelled psychologists to hypothesize sensory fusion, which suggests that all sensations generated at a certain moment can merge, giving rise to an intermediate link between pure sensation (which is exclusively produced through sensory information) and cognitive perception of the image (relying on preexisting representations in the accumulated and stored knowledge base).

Current psychology has not yet explained, not even defined, what the cognitive representation of an image is and how it’s generated. This has sparked considerable controversy, even with regards to terminology, with some authors using image representation while others, in recent years, using the term mental image. In my opinion, a closer to the truth definition would be that representation is a self standing psychological construct that has the ability to reflect in our mind part of an outside universe with whom it interacts one way or the other.

Each perceived shape, depending on the visual mutations it undergoes through direct action by graphically expressive means, generates and transmits one or several meanings, linked to other meanings, creating a complex network of perception-related semantical concepts. This network as a whole, when we’re referring to subtle, profound meanings, generated by refined visual expressions using plenty of symbols, motives, visual codes or metaphors, constitutes the foundation of what is currently called an art object.

There are several factors playing a key role in the cognitive perception of fundamental or superficial characteristics and traits of shapes and phenomena, contained in a mechanically reproduced visual scene. Practically speaking, at this second level of representation, the “new image” is not a physical representation of a visual scene’s concrete, material characteristics and traits, as a whole or in detail for each contained form, but an accumulation of cognitive representations conditioned by the processes through which the cortex, depending on the wealth of knowledge gained, interprets the visual scene and its content. The result of compiling and executing these processes conditions and manipulates our perceptions through continuous modelling. This modeling process is, in its turn, conditioned by the characteristics and features of the general context (of the visual scene as a whole) and in a particular context (of each form contained, in part), as well as by a person's experience and cultural level. Thus, a stable, rich and diversified knowledge base is going to have a different influence on perception and, implicitly, on visual representations, compared to a knowledge base containing fewer cognitive experiences.

At this level, stable and coherent information blocks transferred from a lower level are undergoing a refining process consisting of selecting, comparing, analyzing and combining these blocks in order to obtain a cognitive image of superior quality, due to the it's rich content of meanings and significations. There is a significant difference between the results of executing the two processes at these two levels: at the first level we are dealing with disparate information blocks defining the physical qualities of the designated shapes, with no cognitively determined relationship or interaction between them, while at the next level the process connects these information blocks, processes them by performing merging operations, and permanently compares them to similar or near-similar blocks in memory (those defining mental schemes or images, concepts, symbols), respectively removes or ignores residual or useless information, not needed for resolving immediate tasks.

Basically, visual representation is the result of exercising the cortex's ability to generate a mental experience, through reinterpretation and refinement of perceptual information, in the absence of direct contact with the reality captured by retinal sensors, solely relying on sensory information and the cognitive ability of the cortex (the ability to record, store, and later process information). Under certain circumstances, this neuropsychic experience can be accompanied by an emotional or aesthetical one.

It's very important to note that the whole construct of cognitive representation is very much based on the ability of this mechanism to *render*, as this psychic process solely uses the characteristics and attributes of shapes having the highest saturation of visual information, neglecting the others and supplementing them with memory retrieved information (containing mental diagrams, mental images, concepts, symbols, etc.). This is also the reason why the cognitive representation of an image features cognitive values with a content that is as diverse as the person reading that image. It's easy to comprehend that if we manipulate the internal content of a graphical composition, even down to the level of basic characteristics or attributes, we cause a mutation of the whole meaning of cognitive representation.

A second very important and interesting characteristic regarding how cognitive representation is constructed is the mechanism's *efficiency*. Thus, representation is similar to a graphical reconstruction procedure, which, on one hand, uses the coherent and stable information provided by the visual perception mechanism and, on the other hand, the information contained in a person's memory. Several mechanisms that try to solve the visual equation are involved in combining these two classes of information. The first mechanism involved in this process is *the contrast mechanism,* used for sorting and selecting the characteristics and attributes of the shapes within the frame to be used in the general representation mechanism.

Another process involved in this mechanism is *the process of association,* relying on comparison operations and trying to couple together two information sets until the main objective is reached - transforming the unknown into the known. The information pairing operation is heavily dependent on the quantity and quality of mental images and lifetime gained knowledge, as an association can only be made based on predefined and already stored in memory models.

An important subchapter of this research deals with analyzing how the mechanism of cognitive representation is influenced by the action of symbols, codes, motives and visual metaphors in a mechanically reproduced image, while at the same time researching the genesis of the mental scheme and image.

The image creator is a communicator and his images use psycho-visual constructs organized into symbols, codes, metaphors or motives, entities sent to the receptor (the visual reader) in order for the cortex, while performing the process of cognitive representation, to create complex concepts, meanings and messages using as little resources as possible. By definition, these are visual signs or sets of visual signs that refer to something other than their selves, acting similarly to constructs of significance. Visual codes are architectures or functional matrixes organizing signs, which also include the procedural set that governs the ways in which signs are interconnected. Consequently, visual code is a cluster of information structured in such a way that, jointly used, it can generate a certain meaning for a particular group of individuals. They main characteristic of a code is that, for those who are accustomed to the meaning of the information it contains and its procedural set, it has the same meaning for all group members. If they are familiar with its structure, its visual signs content and the set of rules detailing how to use and connect these signs, these members can efficiently use the code.

In the case of film image, the coding procedure is an encrypted compression process of certain concepts and broad ideas into a visual container set up through visual composition. In this way, by using codes one can avoid two problems with a negative impact: on the one hand, it simplifies the visual narration, by avoiding the overload of explanatory images (images that should provide information describing the substituted concept or idea) and, on the other hand, avoiding editing cuts that alter the space-time continuum.

The last subchapter of the thesis' second part deals with the stylistic motor of film image, light. We are aware that light is more than just a physical phenomenon, it's an important part of the fabric from which the image's emotional and aesthetic, transcultural and universal languages are created and understood by any human being. Regardless of the creative exercise or visual analysis we perform, we come to the conclusion that light is the foundation of all types of human experiences, from the day we are born and until we die; without light there is no space and movement, shape, texture or color, and time becomes a meaningless notion, devoid of cognitive value.

We perceive visually and build representations of the shapes and space around us according to the quantitative and qualitative parameters that shape incident light, revealing this space and enveloping all shapes within. All transformations undergone by physical form under the action of light, obviously, in a virtual way, manipulate our sensory, epistemological or affective experience and force the cortex to generate new contextual meanings of visual appearances, inducing intellectual, affective and emotional resonances. Even the perception of the concreteness of shapes and space is deeply affected by the gradual distribution of light gradients in smaller or bigger samples. By interpreting the way in which light and shadow act in an image, our brain builds mythical, imaginary or symbolic constructs, tapping into the experiences each of us have since birth.

Although tragically invisible, light supplies the magical energy needed by everything around us in order to connect to us, generating interactions from which we extract the information we cannot live without. The role of light in the process of cognitive representation of the image is not just to highlight the space or entities that populate it. For high-level cognitive constructs, in addition to the decisive role in providing information about the characteristics and physical attributes of shapes, light becomes the best interpreter of drama and inner experience, sensitivity, strength or weakness, beauty or ugliness, and its contribution it's not only relegated to the provision of descriptive information, but, through its power to model space, shape and time, it becomes the supreme architect of the construction of cognitive representation.

The second part of the thesis contains five experimental tests rigorously certifying the following hypotheses:

- the detection of a composition's meaning depends on the connections between the shapes taking part in the compositional architecture. In the absence of such connections, meaning gets diluted until it disappears;

- regardless of the richness of stored experiences and knowledge, the process of representation can be easily manipulated by changing the image title;
- the mechanism of visual perception does not cognitively construct complex meanings similarly to the process of image representation;
- the cognitive recognition and representation of shapes provide varying results depending on the nature of the stored prototypes (mental schemes or concepts), strongly influenced by their physical characteristics;
- in strongly underexposed images (or filmed in very low light), the lack of information necessary for the mechanism of visual perception predisposes the subject to the construction of cognitive representations depicting a potential danger;

The third part of the thesis, detailed in chapter 3 (MODELLING CONCEPTS OF VISUAL PERCEPTION AND COGNITIVE REPRESENTATION IN FILM IMAGE), contains as follows:

3.1. Conceptual frame structure determinations. The filmic space

3.2 Considerations on the role of composition in generating cognitive representation

3.2.1. Composition types

3.2.2. Composition primitives

3.2.3. Shape dynamic in composition

3.2.4. Visual weight

3.2.5. Center of interest - subject

3.2.6. Imaginary vectors

3.2.7. Visual rhythm

3.2.8. Proportion

3.3. The geometry of visual space in conical linear perspective

3.3.1. The distance between station point - subject and focal distance

3.4. Kinetic perspective. The camera’s anthropomorphic characteristics

3.5. The role of aerial perspective in assessing the depth of the film plane

A mechanically reproduced image is an information capsule, a visually-reflexive, codified representation of the surrounding universe and human sensibility, with a dual purpose: on one hand, at the level of perception and understanding of reality (naturally occurring or artificially built) and on the other hand, at an emotional-affective level. It simultaneously acts at two conscience defining levels, the rational and the emotional level (affective). It plays an essential role in providing the aesthetic, anthropological, social, educational and cognitive functions of feature films, being the most important means of exploring the natural and human universes. Image is not only a representation or a synthesis of the natural visual reality, but also plays a mediating role in meditation or thought processes concerning the natural or social environment.

Through the structures of its specific language and its own means of graphical expression, the mechanically reproduced image is one of the most powerful forms of communication between people, having the ability to almost instantaneously send huge amounts of information. In the particular case of film image, the aesthetic experience is the result of processing this flow of information.

What defines image as a visual art is the ability to exist as a way of accumulating information, to represent and reflect a certain reality; image creation is a value-adding human activity that quenches our thirst for knowledge, beauty and communication. As they are artistically incorporated and altered, the specific design elements and means of graphical expression included in the melting pot from which the image emerges as an art form, are transformed into an active artistic substance, with a strong aesthetic irradiating effect, transforming it into an authentic aesthetic value with superior communication skills.

Given that the creation of the image's graphic architecture is thoroughly, deeply researched and well organized, the unity of intrinsic functions becomes indestructible and gives it a homogeneous, coherent structure with orderly structures. Hence the organic character specific to art images, generating eloquent mutations of the elements on which it was built upon, enriching and transforming them. In this situation, gaining an aesthetic justification and triggering a novel way in which man relates to the universe enables the image to express rational or emotional values. It's obvious that aesthetical, educational and cognitive characteristics must take precedence in image creation as a fundamental element of communication that's part of the complex, cinema-related operating mechanism- film.

Regardless how film art falls within the theories studying art's structures and functions, on one hand, in accordance with the concept of "art for art's sake", self reporting and taken out of the social universe that generates it or, on the other hand, "trendy art ", an expression of social and ideological attitudes, it has the same purpose: to generate coherent, stable and enlightening responses in the visual reader's conscience - the spectator. First of all, film art expresses through images, just as philosophical thinking is expressed through concepts, and sciences through mathematical, physical, chemical notions. In order to be viable, the conceptual and emotional content of an image must be able to generate important cognitive significations (resulting from the execution of the processes described in the first chapter). We can speak of a certain artistic image quality only when it succeeds in transforming the concrete sensory reality in a transformative artistic element.

In this context, the third part of the thesis explores the ways in which typical means of cinematic expression act upon the mechanisms of perception and, especially, on the mechanism of cognitive representation. The effects produced in the visual cortex are analyzed through parametrization and manipulation of the structure of image perspective, framing and composition, though the graphical and dynamic character of shapes in composition, vectors associated with shapes, visual rhythms, and also those produced by manipulating colors or textures.

By compositionally arranging the contents of a frame, all building blocks, material and immaterial, are hierarchically organized, endowed with different visual weights, connected to and taking part in dialogues. Through this process, the cognitive mechanisms that scan the image are directly manipulated in accordance with the creator's interests. Alternate reality becomes part of a graphical expression, tributary to a certain theme and purpose. The current understanding is that image composition cannot be relegated to achieving goals stated and promoted for centuries in the world of fine arts, namely achieving harmony between the constituent elements. This is a far too limited perspective, as the visual harmony of a visual creation cannot be under any circumstances the reason for its existence. Before being a material object, any ideal object image (artistic product) is a mechanism generating and sending information that's as valuable as possible, similarly to a reactor feeding high level cognition processes.

The third part of the thesis contains thirteen experimental tests rigorously certifying the following hypotheses:

- the level of preference for a composition varies sinusoidally, increasing to a certain extent, in proportion to its increasing complexity and then decreasing sharply (the level of preference is low for very complex or very simple compositions and high for medium complexity compositions);
- the random set up of elements within a frame suggests an open composition and an arranged set up using the contours of a fixed shape (in this case, an ellipsis) suggests a closed

composition;

- the layout of compositional elements along the sides of an upside-down triangle suggest an open composition and a layout along the sides of a right side up triangle suggests a closed composition;
- visual weight is independent of the physical dimensions of the composing elements in relation to the dimensions of the frame;
- the visual weight of elements having symbolic or visual code value is superior to other elements within the frame, provided the symbolic value is acknowledged.
- the dynamics of shape geometry directly influence visual weight (the visual weight of elements having sharp angles or edges is greater than the visual weight of elements having wide angles or curved lines);
- the visual weight of shapes of different colors is greater than the weight of monochromatic shapes;
- visual elements located farther away from the frame's vertical axis of symmetry have greater visual weight compared to similar elements located closer to this axis;
- blurry elements lose visual weight proportionally with the increase of the degree of blurriness;
- with similar or identical characteristics, elements located farther away have less visual weight compared to identical elements in the foreground;
- the visual weight of a shape decreases in direct proportion to the decrease of a shape's brightness;
- under certain circumstances, the visual weight of a solitary shape is greater than if that shape were part of group (keeping its characteristics and dimensions);
- if there are two centers of interest having relatively similar visual weight, the mechanism of attention can lock on any of these two.