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Afterimages of Art, with and through light.

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Supervisor(s):

Mihkel Pajuste
mipa@create.aau.dk
Georgios Triantafyllidis
gt@create.aau.dk

Project group no.:

Members:
Joanna Dorota Filipowska
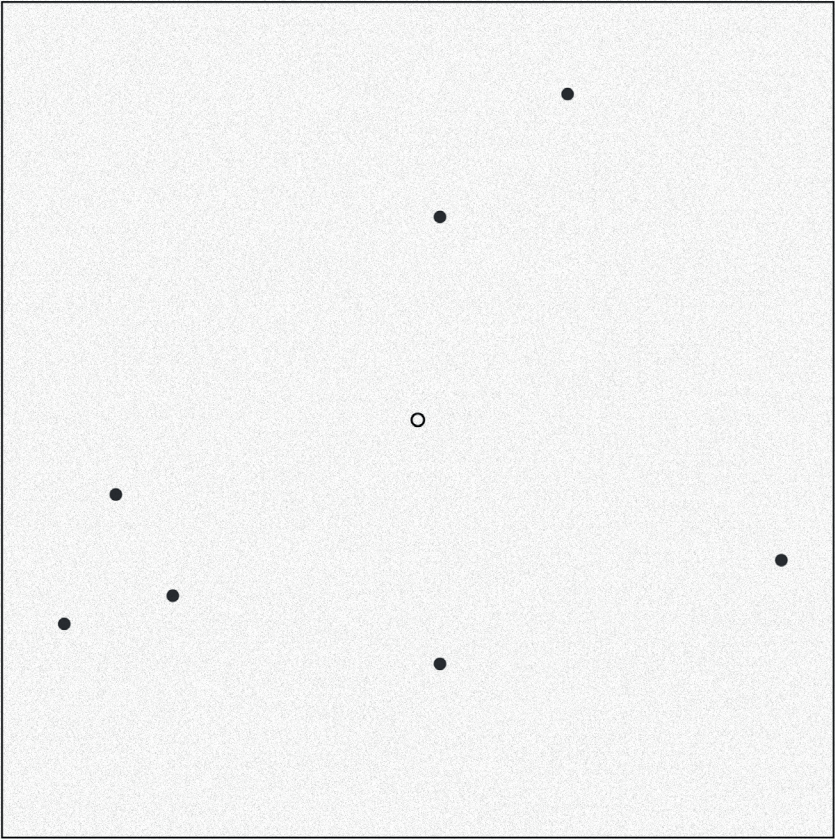jfilip21@student.aau.dk

Abstract:
This thesis is embodies interconnectedness of seeing, culture, and education, outlining shared interest in developing images and visual experiences that allow human perception to grow beyond form. Through an exploration of visual awareness, human vision, and perception interwoven with light and art, emerges an ephemeral installation on atmospheres and their afterimages - with and through light, that bridges artistic expression with inquiry. Developed lense, the testing procedure, empowers viewers to explore vision, readability of atmospheres, and phenomenon of afterimages. This work lays the groundwork for further exploration, as these topics are also vital for current ways of experiencing art in museums and exhibition spaces that are striving for immersive and captivating visual experiences nowadays.
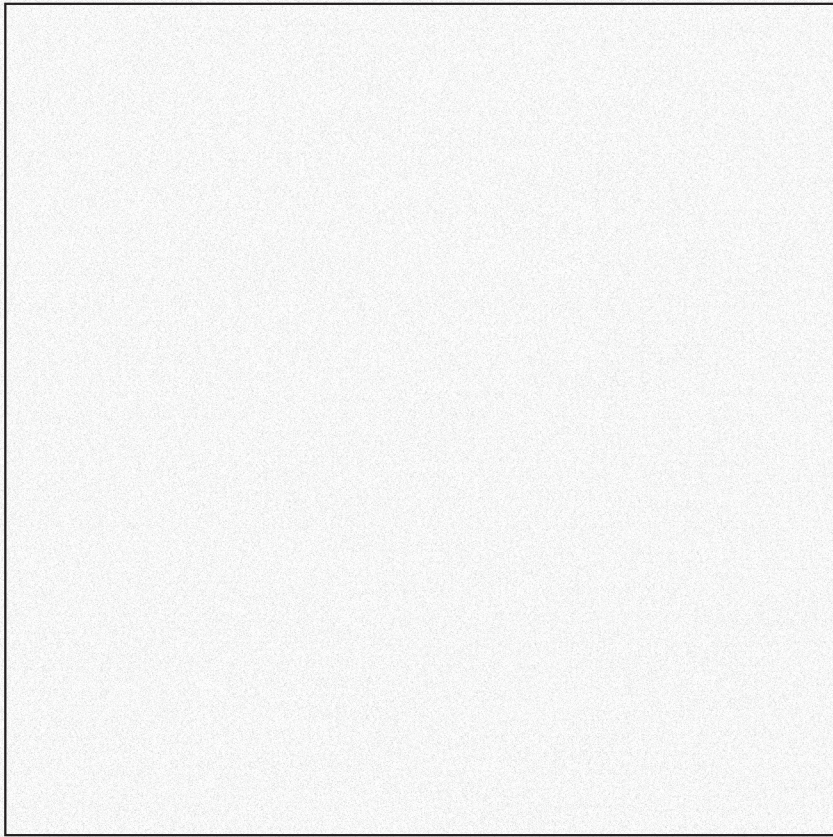
AFTERIMAGES OF ART

WITH AND THROUGH LIGHT   **BY JOANNA FILIPOWSKA**   **2023**

ACKNOWLEDGMENTS

CONTENT

1. INTRODUCTION

1.1 Initial Intentions And Inspirations

The starting point of this thesis has intertwined threads with my background and growing interest in the exploration of the dialogue between space, light, and human perception. Considered an opportunity to continue discovering the world, science, and art through lenses of lighting design, architectural design, and performative art.

All of the places I have worked or lived have had a significant impact on me. The relationships I formed with the places, and people, have always left me with a new layer of sensibility toward the world. Gathering visual images and experiences that direct us towards new viewing points, an 'afterimages' from places and experiences that remain and shape our perspectives, play a pivotal role in my inner creative processes and initiate the state of this thesis within light and art.

This combination gives me a unique perspective from which to approach the design, which has all led me to eventually arrive here. Striving to explore aspects of soft tissues through research processes in our understanding of aesthetics, readability of images, and the role of lighting design in creating diverse atmospheres. This master thesis is seen as an opportunity to delve into transdisciplinary work, reflect on 'how we perceive things?' and 'how do visual experiences create vocabulary within our sensibility?'. To discuss possibilities of transmitting sensibility into space, with and through light.

Curitiba Center, documented by Joanna Filipowska (2016)   *01*

INTRODUCTION

1.2 Introduction To Topic

'Afterimages of Art, with and through light.'
Light, space, and human vision.

This topic has its base within lighting design, and spatial design in dialogue with visual awareness.

The pivotal aspect that found this work outlined by Wladyslaw Strzeminski is the inseparable connection between the awareness of seeing and culture, education, and civilization. Human vision has not been received in a ready-made and unchanging form, and seeing is not limited to the passive reception of visual sensations. The received experiences are subjected to mental analysis and confrontation (Strzemiński & Luba, 2016).
Seen as a departure point to this research, it pointed to the aspect of shared interest in developing images and visual experiences that are allowing human perception to grow beyond form. The evolution of 'light and space' exploration, spanning from the 1960s to the present day, serves as a profound wellspring of inspiration for this endeavor. The manipulation of light to transform spatial perceptions and create immersive environments guides the intention of employing light as a key element.

The initial directions posed the question, 'how developing concepts in different fields use lighting both as a tool and language to execute artistic ideas?' led to the research upon light and space as a coherent elements in creative processes within a broad spectrum of design, theater, cinematography, and architecture. Investigating aspects such as visual awareness, human vision, and perception —- exploring their position in art, with and through the medium of light, led to shaping an idea of possible direction of research through the exhibition.

Guggenheim Museum, documented by Joanna Filipowska (2018)   *02*

INTRODUCTION

2. THEORETICAL BACKGROUND

This chapter opens by outlining the topics of human vision, the functioning of the eye apparatus, and the readability of images, followed by the theory of vision from the angle of the inseparable connection between the awareness of seeing, culture, and science. Secondly, visual awareness and human perception are coherent elements of phenomena art throughout time, grasping intergenerational conversation upon Light and Space art as an essential starting point to artistic research in the 1960s. Lastly, how lighting design can be seen both as a tool and language to execute artistic ideas, the latter draws across-section through topics that consider lighting as a common denominator in the context of stage design and installation art.

2.1 Human Vision and Readability of Images

Human vision has not been received in a ready-made and unchanging form, and the received experiences are subjected to mental analysis and confrontation. Our eye was shaped as a result of a long biological evolution from less perfect forms to what it is now (Strzemiński & Luba, 2016).

The physiology of vision

The modern understanding of the mechanism of seeing, as exhibited by the human eye, involves a sophisticated process of light reception, conversion, and transmission of visual information to the brain. (Osorio & Vorobyev, 2008). The process begins through an opening in the center of the iris called the pupil. The light enters the eye through the cornea (not adjustable) and lens (adjustable), passing converges to form an inverted image on the retina. Light from the right side of the world strikes the left half of the retina and vice versa. The retina contains specialized photoreceptor cells called rods and cones (Kalat, 2007, p. 153). Depending on the intensity of received light, rods are numerous and function well in dim light, and cones work best in bright light, enabling color vision and reading high-resolution, detailed vision. When light stimulates the photoreceptor cells, it triggers a chemical reaction that converts the light energy into electrical signals. These electrical signals travel through the optic nerve, carrying visual information from each eye to the brain Further, the signals pass through various visual pathways in the brain, including the optic chiasm and optic tracts, before reaching the primary visual cortex in the occipital lobe. In the cortex, the brain interprets and processes visual information, allowing us to perceive the view with its surroundings (Nilsson, 2009). However, the inversion of the image poses no problems for the nervous system. Therefore, the visual system does not simply duplicate the image; it represents it by a code of various kinds of neuronal activity.

The human visual system perceives colors based on the wavelengths of light. The shortest visible wavelengths, around 350 nm, are seen as violet, while progressively longer wavelengths are perceived as blue, green, yellow, orange, and red, nearing 700 nm. Different species have varying receptors for colors; for instance, birds can see shorter wavelengths, which we describe as "ultraviolet," as violet to them. Color discrimination is managed by multiple neurons rather than a single one, and the trichromatic theory suggests that our color vision relies on three types of cones, each maximally sensitive to different wavelengths. Hermann von Helmholtz proposed

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this theory based on psycho-physical observations and concluded that three types of receptors (cones) are sufficient to explain human color vision. The cones respond to broad bands of wavelengths, and the ratio of their activities determines our perception of color. However, the abundance and distribution of the three cones are not equal; long- and medium-wavelength cones outnumber short-wavelength (blue) cones, making it easier to see red, yellow, or green dots than blue dots in certain scenarios. (Kalat, 2007, p. 157) The three kinds of cones responsible for color vision are randomly distributed within the retina. Some individuals have significantly more of one type of cone than others, but this variation doesn't seem to affect their ability to discriminate between colors. The brain can compensate for these variations in input over a wide range. (Kalat, 2007) However, in the periphery of the retina, where cones are sparse, and their connections are less organized, compensation becomes more challenging, causing color blindness, also known as color vision deficiency. Is a condition in which individuals have difficulty distinguishing certain colors or may see colors differently than those with normal color vision. This condition is usually caused by genetic mutations or abnormalities in the cones of the retina, which are responsible for detecting different colors of light.

There are different types of color blindness, and the most common type is red-green color blindness, which affects the perception of red and green colors. People with this condition may have difficulty distinguishing between red and green, or they may confuse these colors with other shades. Another type of color blindness is blue-yellow color blindness, which affects the perception of blue and yellow colors. In more severe cases, individuals may experience monochromacy, where they can only see shades of gray and have no color perception at all.

Afterimages

An afterimage is a visual phenomenon that occurs after staring at a brightly colored or intense visual stimulus and then shifting your gaze to a neutral surface, usually a plain white area. This phenomenon arises due to the way our eyes and brain process visual information. An afterimage induced by prior adaptation to a visual stimulus is believed to be due to the bleaching of photochemical pigments or neural adaptation in the retina (Shimojo et al., 2001). Looking at a vivid or bright image for an extended period causes the light-sensitive cells in

the retina to become temporarily desensitized to the specific wavelengths of light that correspond to the colors in that image.

As described in "Biological Psychology" (Kalat, 2007, p. 159), Ewald Hering's 19th-century Opponent-Process Theory provides a more comprehensive explanation of color vision compared to the trichromatic theory. The proposed exercise of staring at strong light, then directing the gaze at a plain surface is giving in an outcome a negative color afterimage, where the red color shifts to green and vice versa, yellow to blue, and finally, black is exchanged for white in the vision for a short period of time. The brain perceives a contrasting image that is often the complementary color to the original stimulus. More precisely, perceived colors are paired in opposite terms: red versus green, yellow versus blue, and white versus black. Excluding consideration of each pair as possibly greenish red or yellowish blue, as the brain has a mechanism that perceives color in a continuum wat from red to green or yellow to blue (Kalat, 2007).

Afterimages are a result of the intricate interaction between the photoreceptor cells in the retina and the brain's processing of visual information. Different kinds of afterimages can be distinguished, which seem to involve cortical adjustment, such as local and global afterimages, to understand better it is necessary to dive into the more complex studies on the topic. However, the afterimages provide insights into the way our visual system adapts to different stimuli and how the brain interprets and processes colors (Shimojo et al., 2001).

Levels of Analysis

David Marr, a physiologist and neuroscientist has focused on integration of psychology, neurophysiology and artificial intelligence into new models of visual processing, mainly influencing the field of computational neuroscience (David Marr, n.d.). His departure point is treating vision as an information processing system distinguishing three levels of analysis, known in cognitive science as Tri-Level Hypothesis. First of the levels, computational level, is giving an understanding on 'what' does the system do and why. Followed by a matter of algorithm level, expanding an analysis to question 'how' the system does what it does. Lastly, analysis related to implementation from physical level questioning how the system is being implemented (Marr, 2010). This perspective can be

translated and applied directly into biological aspects of vision, or more abstract environments such as functioning of dramaturgical work in performative art, depending fully on its adaptation. Marr's Levels of Analysis is allowing a thorough cut section through the functioning of any chosen exemplar system, when the process of understanding itself is structured into tri-level layers.

Stages of Vision

As David Marr proposed, the stages of vision involve progressing from a primal sketch of a scene to a 2.5D sketch with textures and finally to a 3D model for a comprehensive, three-dimensional understanding.This framework at first overlooked visual attention, however it is highlighted in updated model, explains process of vision. The original contemporary model suggests three stages: encoding, selection, and decoding. Encoding involves translating visual inputs into neural signals, selection focuses on prioritizing specific information for further processing, and last, decoding involves recognizing the chosen signals. This model explains process of vision, and the updated version adds highlights attention's vital role in shaping our perception of the visual world (Marr, 2010).

2.2 Theory of Vision

First published in 1958 and reissued by the Museum of Art in Łódź in 2016, the work of Wladyslaw Strzemiński titled "Theory of Vision" is a long-term reflection and an extraordinary testimony to the theory on human vision and awareness of seeing. Based on the assumption that our image of the world is constantly evolving, the ways we look at it change and grow, and external conditions have a decisive influence on historical experience, cultural and social background. Explains the relationship between the evolution of society and the changes taking place in art. Reflecting on what determines the way we perceive reality (CG2, n.d.).

According to his work, seeing is not only the passive reception of visual sensations but also an active cognitive work of our intellect. Received sensations are subject to mental analysis, confronted with the corresponding segments of reality, and explain the meaning of the resulting herds of mutual relations. Recognizing sensations and positioning towards what they say about the objectively existing world. Essential is to understand the reciprocal influence of thought on seeing and seeing on thought. A thought asks questions that vision is supposed to answer. Seeing provides a stock of observations, which is further questioned and generalized in the mental elaboration process. Without letting them pass fruitlessly, the process of learning what each visual image means and subjectively to what part of the reality they correspond to. Constant correction of thoughts in relation to vision allows for improving the use of received visual sensations, and two evolutions in vision are distinguished by the author. (Strzemiński & Luba, 2016) Both processes are consequently expanding human sensibility and aesthetic values of the perceived world.

One is the evolution of our visual apparatus, the development of the eye. From the simplest forms, originally only a collection of light-sensitive skin cells, to sophisticated eyes in modern animals and a current form of the human eye. Looking at the evolution resulting in remarkable variations of an eye apparatus across different species, some animals possess unique visual adaptations, such as the panoramic vision of prey animals or the acute night vision of nocturnal predators (Nilsson, 2009). Color vision, a crucial aspect of perception, emerged in some species due to the evolution of specific photoreceptor types. For example, the eye of a mouse sees a dim image. Its vision is mainly focused on objects, but in consequence, can track a movement against the background uncompromisingly.

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Consequently, biological evolution shows that the development of vision, a skill, is paired with the development of the eye.

In parallel, the second process is related to the development of the ability to use vision and the increasing accuracy of human vision. Thought and vision both coherently develop through mutual influence. Therefore, their development does not take place in isolation from the real, shaping life conditions but on a social basis, depending on the directions and needs they are subjected to, increasing visual abilities. This process is seen as historically conditioned. As each successive social formation posing new tasks causes an increase in the ability to use visual sensations. The human eye has a wider range of interests and consequently makes a wider and more thorough analysis of received visual sensations, in comparison to an animal that would miss out on those out of lack of interest. A vision of a man sees less but provides more accurate information about the world due to corrective activity in the human mind that takes into account those components of sensations that an animal would reject as incidental (Strzemiński & Luba, 2016).

The mechanism of functioning of the human eye has remained the same over the years, yet in the process of seeing, what is important is not what the eye mechanically grasps but what a man perceives and becomes aware of from his seeing. Only what has been realized is what can be considered as seen when the remains beyond the consciousness are unrecognized and, therefore, unnoticed. Experience shows that in nature, noticeable are only those phenomena to which the attention is focused on. The human mind poses questions in advance, which eyesight is supposed to answer by gathering the range of observations to which to respond by confirming or contradicting the previous assumptions, is determined. The work of thought, cooperating with the direct activity of seeing, determines the richness and diversity of our perceptions. (Strzemiński & Luba, 2016).

Hence, the image of nature and the world is not always the same for everyone. Its boundaries are determined by the historically conditioned development of visual awareness, experiences gained over time and related to places where they occurred. Growth of visual consciousness and how specific focus our vision can develop, Strzemiński explains in an exemplar comparison of the vision of an experienced textile worker, who will notice more flaws in the fabric than the

equally efficient eye of a man, in the biological sense, from another profession. Yet, the same eye of a textile worker, when finds himself in front of a field of grain, will be unable to tell anything about the state of the soil's moisture, degree of ripening of the grain, evaporation of the air, or about the quality of the soil. The amount of mechanical visual sensations is the same in all cases, when the range of vision is different. This is because sight, guided by thought, has been tuned to receive those sensations that, in other setups or contexts, would be seen as irrelevant and overlooked (Strzemiński & Luba, 2016).

Taking this thought further, a person who has been growing up in Latin America, observing cultural dynamics, landscapes, urban elements, and colors with their intensity and contrast, as well as being exposed to a different intake of daylight over time when seeing images, in result will have a different understanding and interpretation of the same images than a person who grown up in eastern Europe. In different words, what is being understood by each pair of eyes is also directly related to the concept of situatedness. A dependence of meaning on the specifics of particular geographical, socio-historical, and cultural contexts, philosophical and ideological frameworks, as well as social and power relations. Numerous factors give diverse perspectives of social actors that are dynamically constructed, negotiated, and contested (Situatedness, n.d.). In consequence, looking at the same object or an element of nature will give individual associations and feelings from what has been observed for each pair of eyes separately, taking into account the previous visual experiences of what has already been understood and learned.

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So seeing can be distinguished in the biological sense next to the awareness of vision. Whereas the former is dependent on slow biological evolution and presumably remains unchanged over a long period of time, the latter is accumulating over the course of history (Strzemiński & Luba, 2016). Better vision historically is also allowing more precise craftsmanship, the creation of complex machinery, and advancements in science and engineering. These developments propelled societal growth and improved living standards. This thesis is partially aiming to outline the complexity of the growth of visual awareness and human perception. Both, described in the following parts, are angled as processes of reading the surroundings that expand visual vocabulary, giving a better understanding of the world, social dynamics, and communication, mirroring the process of historical development. Visual awareness is a complex subject that spans across numerous fields of knowledge – through physics, biology, psychology, and art.

2.3 Visual Awareness

Visual awareness is a complex subject that spans across numerous fields of knowledge – through physics, biology, psychology, and art. This chapter delves into visual awareness, attention and consciousness. When latter touches upon the readability of images explained through development of art.

Visual Awareness

Władysław Strzemiński elaborates on the fact that we get to know the world not only by seeing it but by thinking and knowing what each of the visual sensations tells us, assembling pieces of knowledge about the world the eye brings in, by analyzing the visual sensations, generalizing them and checking them again. The scope of our vision is determined not only by "normal" vision but by a process of work that takes place in the interrelationship and interdependence between biological vision and our thought. In this way, visual awareness is created, which determines how many elements of the world we know with the help of our eye. Shaped by the real conditions of existence, determines the scope of the amount of vision. Not a "normal" arithmetic average, abstracted seeing, but a seeing shaped by being and determined by a socio-historical formation. In consequence, the development process of visual awareness and consciousness of the society thus mirrors the process of historical development (Strzemiński & Luba, 2016).

Attention and Consciousness

Both visual attention and visual working memory using basic stimuli are subject to broad research. To understand better the relation between visual awareness, it is important to look at the nature of attention and consciousness from the psychological point of view. Attention is a selective process, where selection is necessary because there are severe limits on our capacity to process visual information. These constraints are likely enforced by the finite energy resources accessible to the brain and the substantial energy expenditure associated with the neuronal processes integral to cortical computation (Carrasco, 2011). It involves actively processing a limited amount of information from our senses, memories, and cognitive processes. It encompasses both conscious and unconscious aspects. While conscious processes are relatively accessible for study, unconscious

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processes are more challenging due to their lack of awareness. Attention allows us to manage our mental resources efficiently by focusing on specific stimuli of interest while dimming others. This enhances response speed and accuracy and aids memory. Consciousness involves awareness and its content, some within attention's scope. Attention and consciousness partially overlap. Psychologists now distinguish between attention and consciousness, as some processes occur without conscious awareness. Conscious attention serves three key roles: monitoring interactions, linking past and present experiences, and aiding future planning (Sternberg & Mio, 2009).

Visual Attention

Visual attention constitutes a process that channels a small portion of incoming information from the primary visual cortex toward higher-level centers engaged in visual working memory and pattern recognition. There are presented frameworks for conceptualizing this mechanism, in which the flow of information through the visual hierarchy is governed by dynamic control over connectivity, where the pivotal element of this model involves establishing an object-centered reference frame for both visual working memory and object recognition within a region of interest (Anderson et al.,2005).

Readability of Images Through Art

In order to discover the history of the growth of visual awareness, especially its initial states, W. Strzemiński refers to the art of primitive people on the one hand and to the vision of a child on the other, creating a bridge between the physiological aspects of human vision and readability of images in art.

contour vision
According to the author, there is a great convergence between the vision of the child and the vision of the historically primitive one, explaining the visual awareness as the range of phenomena perceived by the human eye. Firstly discussing the contour vision and outer contour of images that are recognized as seen. At this level, man only realizes that every object has an outer limit, and

expresses this object with a single contour line. Of the entire set of features of the object, gaining awareness only of the existence of a boundary line, which outlines its perimeter. This exclusive awareness of a single component of the contour, the reduction of the whole of nature to it alone, manifests itself in the fact that the contour is, as it were, called upon to express also other components of the form, not only those directly contoured. For example, to express that the entire object is yellow, its contour line is drawn with yellow instead of filling the entire object inside with yellow, as it seems natural. The color of the perimeter line indicates what color the whole object is. This type of vision is basically found in the Paleolithic. The child's drawing also begins with it. When the observation and conscious perception are increasing, the outer contour is insufficient. Due to the wider perimeter, the outer boundary of the object is broadened to the inside of the object which is called an inner contour. The interior of the object is filled with a linear drawing, a schematic and geometrical drawing appears, and it is easy to repeat (Strzemiński & Luba, 2016).

silhouette vision
Multiplying perceptions results in the emergence of a new formulation of visual content, silhouette vision. Instead of a contour filled with a linear drawing, one comes to the awareness that the entire space inside the contour is a uniform material mass, and the contour is only its outer border. The type of drawing which uniform, presenting more material of the structure, distinguishing it from its surroundings (Strzemiński & Luba, 2016).

solid forms vision
The observation aimed at extracting the means of expression that could show the convexity and lumpiness of an object initially made use of the previous experience, the experience of the silhouette and the experience of the contour within the contour, that the convexity of a solid inside a contour can be synthetically expressed by means of an appropriate line run. Such a density of the linear characteristics imposed on the silhouette can be observed throughout the classical period of Greek art (Strzemiński & Luba, 2016, p. 69).

chiaroscuro vision
An object painted by a Renaissance painter has all the objective characteristics that characterize it as a commodity. It is an object properly drawn in all

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foreshortenings, shaded on a solid and colored in its own characteristic color, distinct from the color of other objects (Strzemiński & Luba, 2016, p. 111).

full empirical vision
Renaissance solid and Baroque chiaroscuro visions were founded on the concept of three-dimensional convergent perspective. This perspective depicted distance variations, objects diminishing as they receded, and diagonal lines converging inward. Precise dimensions were derived by assuming a point ahead on our line of sight, aligned with our eye level, acting as the convergence point for lines parallel to our gaze. This geometric method allowed precise positioning and sizing of any direction or segment within the composition. The three-dimensional convergent perspective enabled accurate rendering of objects at different distances. It framed the spatial effects in paintings from the 15th to the early 19th century, seemingly grounded in mathematical principles. However, this apparently flawless perspective doesn't match our true perception. It's based on the assumption that we see the apparent reality before us in a single glance, leading to a vanishing point. Yet, our interaction with the world involves shifting gazes, dynamic vision, and diverse directions. Our vision isn't confined to a fixed framework; it's a physiological process. The convergent perspective assumes a single fixed gaze covers the entire visual field, aligning with mathematics but not our real perception. Our view emerges from shifting glances, focused on objects and directions, consolidated through thought. Thus, the image of our perceived world doesn't stem from one gaze but integrated thought. A fixed, mathematically-charted gaze doesn't match our empirical reality. To maintain the view within a fixed gaze, we must center our gaze on the composition's midpoint, aligning with the significance of objects. This central point is marked by perspective line convergence. However, empirical observations reveal we struggle to keep our gaze on this point. Our gaze roams, pausing at compositional elements. Projecting a gaze to a deduced central point obstructs apprehending the full composition (Strzemiński & Luba, 2016).

Figuers repesenting different visions from   03
"Theory of Vision" W. Strzeminski

2.4 Perception

Perception is the intricate process by which we interpret the world around us. It encompasses various components, including the actual object, sensory input, and our mental representation. Perceptual constants, like size and shape constancy, ensure that our perceptions of objects remain relatively constant even as sensory stimuli change. These constants are influenced by our knowledge about the world and the relationships between objects in their context. Our ability to perceive three-dimensional space is facilitated by both binocular and monocular depth cues (Sternberg & Mio, 2009).

Understanding the physiological attributes of the eye is essential in shaping our perception of lighting. As seeing enables perception of the space (Liljefors, 1999). When The Gestalt Approach outlines principles such as figure-ground, proximity, similarity, closure, continuity, and symmetry, which explain how we group and perceive various objects and their parts (Sternberg & Mio, 2009), Juahni Pallasmaa describes that perception is intricately tied to a multitude of senses that collaboratively shape our understanding. Our perception isn't solely reliant on vision; space is comprehended through all our senses. Explains that seeing is not solely seeing, as it is not an objective and merely an act of using visual apparatus, but rather the transmission of complex information that relates to prior sensations, emotions, experiences and expectations (Pallasmaa, 2014). It is considered as an co-operating mechanism that goes beyond hegemonic and hierarchical understanding between the senses.
In order to better understand the relationship between perception and reality that bridges realms of art and science it is important to review numerous aspects related to the perception from both physiological and phenomenological point of view, knowing that our current habits and acquired knowledge play an important role in our daily lives.

The Gestalt Approach
The Gestalt Approach in cognitive psychology is a framework that explores how our perception goes beyond simply maintaining the constancy of size, shape, and depth. Founded by Kurt Koffka, Wolfgang Kohler, and Max Wertheimer, this approach is centered on the idea that the whole is more than the sum of its parts. The Gestalt approach is particularly useful for understanding how we perceive

groups of objects or parts of objects to form cohesive wholes. According to the Gestalt law of Pragnanz, we tend to perceive visual arrays in the simplest way that organizes diverse elements into a stable and coherent form (Sternberg & Mio, 2009).

For instance, the concept of figure-ground perception demonstrates how " we tend to perceive a focal figure and other sensations as forming a background for the figure on which we focus" (Sternberg & Mio, 2009, p. 92). Symmetry is another crucial principle within this approach. Symmetrical figures, characterized by balanced proportions around a central axis or point, make sense to us more readily. Several Gestalt principles contribute to the overarching law of Pragnanz, including proximity (grouping nearby objects), similarity (grouping like objects), continuity (perceiving continuous lines), closure (seeing complete objects), and symmetry (perceiving balanced patterns).

While the Gestalt principles provide descriptive insights into how we perceive forms and patterns, they lack explanatory depth. Despite their simplicity, the Gestalt principles significantly impact our everyday perception, whether with familiar or unfamiliar figures. However, to understand the mechanisms behind our perception of forms and patterns, explanatory theories of perception are required (Sternberg & Mio, 2009).

Depth Perception
Navigating through surroundings, one constantly engages in visual exploration to orient yourself in three-dimensional space. Depth perception illustrates how our brain utilizes cues to construct our perception of reality. Looking into the distance involves perceiving depth, which refers to the distance from a surface, often using one's own body as a reference point for depth perception. This depth information becomes crucial for interaction with objects, manipulation of them, or positioning oneself within the three-dimensional world (Sternberg & Mio, 2009). Depth perception plays a pivotal role even beyond your immediate reach. In simple activities such as driving a car, vocal volume depends on perceived distance from the surroundings of the vehicle, challenging the brain to perceive depth in essentially two-dimensional images. Special neurons in the visual cortex, called binocular neurons, process information to perceive depth, however there are series of optical illusions and complex configurations with contradictory

depth cues that have to be taken into consideration. It is caused by segments and layers within the picture of each visual sensation that present different depth cues yet do not align seamlessly. Two main cues are distinguished (Sternberg & Mio, 2009).

Monocular depth cues that can be observed with a single eye, represented in two dimensional perspective, enabling to read textures, gradients, relative size understanding, as well as interposition, linear and aerial perspectives, location in the plane and motion parallax. The last one requires movement, as it can not be applied to only stationary images.

Second, binocular depth cues require input from both eyes using their relative positions. Exist binocular disparity, when the brain is interpreting the increasing difference between received images from each eye, which indicates the sense of distance. It involves turning inward both eyes as objects approach, thus the brain can perceive muscular change as a depth cue.

Important aspect is that depth perception isn't solely about physical distance. Researchers such as Proffitt together with the team, have proven that perceived distance to a target is influenced by the effort required to reach it. In different words, it means that the objects requiring more effort from the observer to reach, are perceived as farther away. This phenomenon isn't restricted only to walking, and can be experienced in numerous activities that involve movement for instance in sport, described phenomenon has significant impact on athletes performance quality. Where context and effort influence ones perception. The brain draws conclusions based on contextual cues and information to make sense of the three-dimensional world (Sternberg & Mio, 2009).

Perception Of Perception
Dawna Schuld is an Assistant Professor of modern and contemporary art history in the department of visualisation at the Texas A&M University. Her research concentrates on points of intersection between art, technology and biology, with an emphasis on how the perceptual phenomena of human experience are implemented in art.

The contemplation of historicizing perception raises intriguing questions about its feasibility and relevance. Is perception too personal and subjective for historical examination? However, recent discussions around an exhibition of lighte and space art suggest that the perception of perception has evolved over the last few decades. This shift in perception became particularly evident through attending the 'Space Shifters' exhibition in 2018, which juxtaposed art from the 1960s to the present day, framing contemporary works within a historical context and emphasizing the contemporaneity of historical pieces.

This interplay between past and present is a prevalent theme in the current exhibition as well. The dynamic nature of perception is highlighted when encountering artworks repeatedly, as our re-perception continually shapes our understanding. A juxtaposition of photographs from the Hayward Gallery underscores the transformation of perceptual experience over time. Anish Kapoor's sculpture 'non object door' and Larry Bell's 'standing walls,' both utilizing reflective materials, exemplify how viewers' engagement with art has evolved. A pivotal distinction emerges: in the older photograph, observers coexist alongside the artwork, while the newer image depicts a spectator using a device to mediate their engagement, physically present but interacting through an intermediary.

Nevertheless, both instances represent phenomenological introspection, where we perceive ourselves perceiving. Despite the consistency of sensory mechanisms, the interpretation of perceptual experiences has been profoundly shaped by technology, cultural shifts, and scientific perspectives. The emergence of 'Light and Space art,' or 'phenomenal art,' capitalized on a technophilic era marked by advancements in computer technology, space exploration, material development, and experimental psychology. This technological and scientific context influenced artists to explore new dimensions of perceptual experiences. The introspection of artists like Helen Pashigan illustrates the intersection of personal experiences with artistic practice. Her childhood encounter with

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tide pools, where she perceived light as a living entity, shaped her affinity for translucent materials and plastics. Such experiences influenced her creation of resin spheres that engage viewers by prompting closer inspection. The concept of 'just noticeable difference' in perceptual psychology is pertinent here: it elucidates the thresholds where changes become perceptible, highlighting the delicate balance between perceiving and noticing change.

The phenomenological turn in art, influenced by the writings of Maurice Merleau-Ponty, emphasizes the relation between subject, body, and the world. It urges us to make objects of our mutable perceptions to understand how objects gain significance. This shift informed American minimal sculpture and its exploration of perceptual contingencies over formalist essentialism. Artists like Dan Flavin's 'diagonal of personal ecstasy' showcase this transition, where ordinary materials become transformed through creative intervention, challenging the traditional subject-object dichotomy.

The transition from object-oriented to systems-oriented culture was underscored by technological advancements and collaborations between artists and scientists, as seen in Otto Piene's involvement with group zero. NASA's space race prompted both perceptual research and artistic exploration. Notably, the space race significantly impacted the development of perceptual psychology and light and space art. NASA's inquiries into survival and habitability parallels artists' quest to produce art from experience, both influencing each other's domains.

Fred Eversley's assertion that sculpture is a mechanism for looking through rather than looking at exemplifies the engagement provoked by light and space art. The destabilization of perceptual engagement positions observers as active participants. This practice in introspection finds parallels in social and political contexts, encouraging acknowledgment of various perspectives. This reflects Merleau-Ponty's concept of a "second openness," allowing us to engage with diverse viewpoints.

The contemporary integration of technology complicates perceptual experience, as virtual reality and immersive technologies challenge our understanding of reality. Karin Sander's exhibition "What you see is not what you get" reflects how technology transforms perception and awareness, provoking inquiries into the immersive nature of our experiences. These evolving technologies enable us to re-examine the role of perceptual reality (Schuld, 2022).
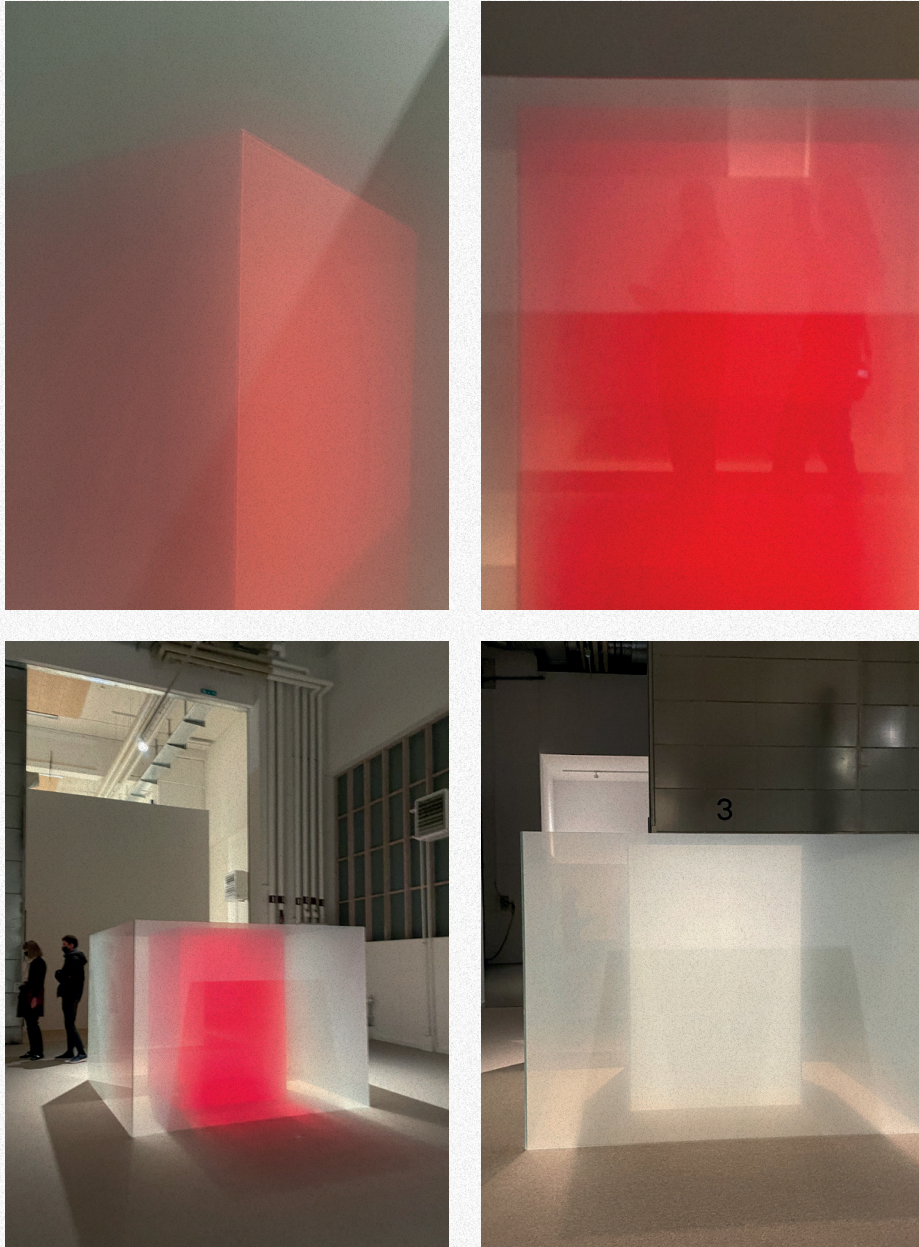
Exhibition spaces, documented by Joanna Filipowska   *04*

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Contemporaneity

"Contemporaneity refers to the temporal complexity that follows from the coming together in the same cultural space of heterogeneous clusters generated along different historical trajectories, across different scales, and in different localities" (Lund, 2019). The formation of subjectivity in time and the concept of temporality in current times poses the assumption that art can operate in the form of an advanced laboratory to investigate different processes of meaning-making and bring a better understanding within society and culture. Within this topic, it is essential to understand wide aspects, such as the issue of temporality, the development of new media and computational technologies, as well as how do artistic practices make epistemic claims (Lund, 2019).

In the last thirty years, contemporary art has taken the place of modern and postmodern art in signifying the art of our current era. This shift indicates that contemporary art is now resolutely associated with the present moment, distancing itself from being primarily a historical endeavor. Instead, it is marked by global circulation and continuity rather than by catalyzing social change. This circulation can also be perceived as contributing to the convergence of diverse temporalities and histories, forming what we recognize as 'contemporaneity', a defining aspect of our contemporary historical landscape.

Contemporaneity involves the intricate interplay of diverse cultural clusters across different historical paths, scales, and locations, all converging within the same cultural space and temporal dimension. This phenomenon is essentially rooted in an intensified global interconnectedness that encompasses various experiences and perceptions of time.

Considering Giorgio Agamben's insight that each culture embodies a distinctive encounter with time, particularly in the context of the present's constitution and shared historical segments, this interconnectedness challenges conventional understandings of time and history. Philosopher Peter Osborne aptly suggests that this signifies a shifting temporal essence of the historical present. In essence, contemporaneity signifies a profound alteration in the ways we experience time and history, brought about by the interconnection of disparate temporalities, temporal experiences, and historical narratives (Lund, 2019).

2.5 Atmospheres and Synesthesia

Atmospheres
To comprehend the intricate relationship between space, perception, and emotional response, it is beneficial to examine the concept of atmosphere—a topic that has been extensively studied and described in the fields of architecture, art, and urban planning (Böhme & Engels-Schwarzpaul, 2017; Pallasmaa, 2012; Zumthor, 2006). Pinpointing and verbalizing exactly what atmosphere is can be challenging; it is fleeting, fluctuating, sensuous, and always based on a subjective experience—nevertheless, it is always present. According to Gernot Böhme, atmospheres relate to "the emotional tone of a space or spatial constellation." (Böhme & Engels-Schwarzpaul, 2017, p. 69). Therefore, directing the focus towards atmospheres can create a more complete image of space and spatiality because, as architect Juhani Pallasmaa writes: "As we enter a space, the space enters us, and the experience is essentially an exchange and fusion of the object and the subject." (Pallasmaa, 2012, p. 20). According to Pallasmaa, object and subject, materiality and the human being, create the atmosphere of interaction and mutual influence on each other. Atmosphere is an 'in-between' phenomenon (Morselli, 2019).

Defining atmospheres is not as straightforward as defining an object based on its properties. Atmospheres are constantly changing and harder to define precisely. However, we can articulate the ways in which things are present and express themselves, and use language to express the character of atmospheres. This helps us to understand the connections between the moods of things, the atmosphere, and our emotional states (Albertsen, 2019). These descriptions pertain to character traits, or physiognomy, materials, things, and environments (Böhme, 1995, p. 55 in Albertsen, 2019). Also, traits that cause the perceiver to act or move in a certain manner can be described (Albertsen, 2019). Focusing on the combination of physiognomy—people's bodily expression—and the environmental material traits is, therefore, crucial. When atmospheres are defined and analyzed, one can say that the existence of it borders between a sensuous meaning and the semiotic and hermeneutic.

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Crossmodal perception

Both Böhme and Pallasmaa focus on how the senses are the primary entrance to experiencing the atmosphere of a place (Böhme & Engels-Schwarzpaul, 2017; Pallasmaa, 2012). This comes, among other things, from the immediate impression and experience of a place's atmosphere. The atmosphere is experienced immediately as soon as you enter a room/area. It is felt emotionally before it is analyzed or understood intellectually (Böhme et al., 2014). Also, this emotional response—which is activated through our senses—is perceived as a multisensorial experience (Böhme et al., 2014). According to Pallasmaa, our senses are interconnected, and we do not rely solely on our eyes to perceive space. Information about our surroundings is transmitted through all our senses, reaching beyond the five Aristotelian senses of smell, sight, touch, taste, and hearing. Instead, other impressions, such as the embodied existential sense, simultaneously coproduce the experience of a character of our environments (Pallasmaa, 2014). Despite this, Western culture places the most significant emphasis on our eyes, creating a hierarchical order of sensing (Pallasmaa, 2012). Nonetheless, the act of perceiving should be viewed as a collaborative process between senses that is much more intricate than a simple hierarchy or domination of one sense over others. This often results in a diffuse, peripheral, and unconscious perception of our surroundings (Pallasmaa, 2014).

Such multisensory perceiving is also covered in what Böhme accounts for as the generators of atmosphere (Böhme & Engels-Schwarzpaul, 2017, p. 119). One such generator is the synesthetic, which are qualities related to crossmodally correspondence. The phenomenon of synaesthesia has long been linked to the arts and artistic practice (Spence & Youssef, 2019). In its origin, synaesthetic experiences are defined as "the conscious experience of sensory attributes induced by particular conscious mental events, appearing in addition to any sensations that are normally experienced by most people during such events" (Grossenbacher & Lovelace, 2001, p. 36). This definition implies a neural communication that mediates an understanding of an input or event based on a crossmodally interpretation. One example is how sound can induce an experience of color (Grossenbacher & Lovelace, 2001). In other words, individuals with synesthesia may experience a blending or crossing of senses, where the stimulation of one sense triggers an automatic and consistent response in another sense. Synaesthesia is currently considered a rare condition, occurring

in at least 1 in 2000 persons (Baron-Cohen et al., 1996). When Böhme describes the synesthetic as a character of space (Böhme, 2013), it is possibly more of a crossmodal correspondence (Spence & Youssef, 2019). Here one sensorial feature is matched or associated with another feature. The concept of which, where senses are matched and blended, has been of large inspiration within the creation of art. Multi-sensorial environments, such as audio-visual ones, are one example of this, which are often used in both installation art and theatre.

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Readability of Atmospheres

As the complexity of reading atmospheres by humans spans across numerous fields of knowledge such as psychology, physiology, science and broadly understood surroundings context (space), it is vital to juxtapose it with human perception — how do we perceive atmospherers? If visual and non visual sensations, together with ones that synthesise more than one of the senses, can be considered as a catalyst to the receptive state of human beings?

State in which a person is open to receiving both, previously known and unknown stimuli, that feed off either curiosity or different perhaps tasks oriented processes. When the experiences bring an enrichment for the receiver, in spite of their character? More importantly, if categories into which they can be put, for instance, pleasant and unpleasant, educational and entertaining, thought-provoking as in, informative or abstract. Numerous compilations can be distinguished depending on the context, and the nature of the topic, yet if there are common measures to their occurrence. Thinking of the curve of the experience, and tempo-spatial perceptual sensations, how long an atmosphere should or can be experienced to achieve the desired outcome. Again, the readability of the atmospheres is an individual, and to understand the connections between the moods of things, the atmosphere, and our emotional states that can convey both in-depth information or knowledge, and content more focused on providing enjoyment, aesthetic experiences, or emotional responses.

In further stages of this report this subject plays a pivotal role when designing and installation, that aims to bring reflection-provoking sensation, when observers are asked to enter the installation with openness, and within what is possible — a receptive state of mind and body in order to participate in the testing procedure.

2.6 Light and Space Conversations

This chapter is a horizontal cut section through the "Symposium on Light and Space and Contemporary Art" at Copenhagen Contemporary in collaboration with the Department of Arts and Cultural Studies at the University of Copenhagen, that I had a chance to attend. This very accurate and compelling overview of the subject was a thought-provoking exploration of the intertwined realms of science, art, and technology, and brought brought more nuanced perspective placed in the historical context, as well as, new viewing-points to this research and topics oscillating around it. The symposium was motivated by the group exhibition "Light and Space" (Light & Space - Exhibition - Copenhagen Contemporary, n.d.) and explored the past and present of the iconic work within the subject. I was touching upon American and European Light and Space art, hosting international scholars, curators, art historian and artists themselves. Following part is dedicated to important thoughts introduced through the presentations, speeches, discussions and reflections that are incorporated into directions of the research of this report.

Director of Contemporary Copenhagen, Marie Nipper argues that the exhibition was based on the idea of presenting work by the American artists referred to as the 'light and space movement', and to diversify the group of artists that have traditionally been included in presentations of the 'light and space movement', highlighting their influence on European contemporary art scene. In comparison to East Coast minimalism that emerged in New York in the 1960's, receiving vast recognition internationally, Southern California 'light and space art' has not been equally presented, at the same time adding an important position to the shortlist of exhibition on the subject in Europe. Presenting this broader picture has entailed discovering not only artists but also works that had barely been documented and recreating them on site almost five decades after their initial conception. The American 'light and space movement' has historically been male-dominated, and it has taken years for several female artists to be recognized for their work in this field (Nipper, 2022). Artists delved into the exploration of perceptual phenomena such as light, volume and scale, and how they could challenge the spectator's idea of vision. Arising questions about the connection between perceiver and reality, while intertwining the fields of science and art.

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On 'Light and Space'

Using new materials and exploring themes of space, light, and perception, the California postwar artists contributed to a radical shift in art away from an object and meaning to bodily and spatial experience. As a departure point, they took inspiration from the philosophical tradition of phenomenology, which studies how we experience and perceive the world with both our minds and bodies. A key aim of the exhibition light and space is to diversify the group of artists that have traditionally been included in presentations of the light and space movement.The American light and space movement has historically been male dominated, and it has taken some female artists years to be recognised for the work in this field (Nipper, 2022). This core principle of light and space art has become evident in European contemporary art since the early 1990s, highlighting a strong emphasis on engaging the viewer and concentrating on immediate encounters and the psychology of perception (Nipper, 2022). "Beyond an interest in novel materials, many lightened space artists were and still are engaged in creating spatial art and in finding different ways of breaking down the barrier between art and architecture, between the tangible and the intangible, with installations that are conditioned to use Robert Irwins's term by the site in which they appear." (Nipper, 2022). Artists, from the earliest stage in their conceptual work, have taken the course to investigate forms that would explore both, spatial (physical) and (abstract) terms at the same time.

Marie Nipper explains that 'light and space' artists primarily were occupied with the physioloigcal and perceptual aspects within architecture and space itself, to which European based artists currentlyrespond to from wider angle, taking into consderations sites such as inherent politcal, cultural, economic and social significance striving to explore the potential of generating discourse and knowledge. This also means including works that show a sensibility to materials such as sand, salt, and rocks. Somewhat hardscape of architectural space is being soften using more organic layers, bringing natural materials into the exhibition space to create site specific temporary artworks. Other artist took their work into the landscape, engaging in bodily interaction with the natural surroundings. As "the artistic interest in more organic and natural materials challenges the cooler, more reductive agenda traditionally associated with minimalism, and it has often been detached from the discourse about light and space art and linked

instead to the feminist movement that emerged in Los Angeles in the 1970s", it is important to outline this wider response of corporal, textile, color and space character that were effectively integrating artistic perspectives within the realm of abstract minimalism in California (Nipper, 2022).

According to Malene Vest Hansen, who opened with her speech second day of the "Symposium on Light and Space and Contemporary Art" (Light & Space - Exhibition - Copenhagen Contemporary, n.d.) the topic can be seen as well from a perspective of an open dialogue between the US and Europe, that touches upon "bodily interaction, immediate perception, thinking with your body, haptic, non narrative illuminations, present, ephemeral, direct involvement of the viewer" as parameters, and to articulats " sensibilities to materials, experimenting, experimenting with material, site specific, openness, not about creating an object but about perceiving a space" (V.Hansen, 2022). As the understanding circulates around paying close attention to phenomena art. At that time the pioneering experiments with new materia, their characteristics and shapes, together with technologies were testing new ground within contemporary art. In consequence, the creative misuse of the technology, in a way, became a fruitful tool. Lastly commenting on the ephemeral context, when designing evocative experiences for the observers. Malene Vest Hansen rightly put in words that "these works invite, and sometimes force us viewers to think with our eyes and body movements to sense ourselves sensing and our space in the world" (V.Hansen, 2022). Coined by American artist and curator Lucy Lippard, this movement saw artists attempting to break free from the confines of traditional bourgeois visual art, departing from commodified mediums like paint and bronze. Instead, they embraced fresh perspectives, everyday materials, innovative concepts, and novel creative approaches.

In this landscape, various paths were forged, including conceptual exploration and feminist perspectives. Some artists delved into uncharted territories, investigating the profound role of art. Light and space artists, in particular, embarked on ventures that often involved unconventional materials sourced from industrial and technological realms. Their endeavors entailed experimental projects guided by observation and scientific methodologies, occasionally even engaging in direct and intimate collaborations with scientists. Seen as a groundbreaking moment where the art studios could be exchanged for labs (V.Hansen, 2022).

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Light and Space Continuum

Speaker Matthew Simms problematized the idea of a movement, explaining that it is challenging to define the light and space movement, and proposed to replace term 'movement' with 'conversation'. Original term, how historians and art critics have been relating to the 'light and space movement', is being juxtaposed now with firm parameters of defining the works related to 'light and space' art proving that it is "still alive, and it can function as a cliche in the real literal sense of the word, a proposal for canon to be actively engaged with discussed questions questioned and to be continued" (V.Hansen, 2022).

According to Matthew Simms there were two different ways in which curators were starting to think about ways to bring attention to what they were seeing and considering as 'emerging perceptual concerns'. In 1965, there were significant art exhibitions that played a pivotal role in shaping the art scene. One of the is "The Responsive Eye" , exhibition traveled extensively across the United States and concluded in Pasadena, California, where artists Robert Irwin and Larry Bell, who emerged as important figures and showed up in different shows together and were showcased alongside other notable artists such as Donald Judd, Larry Poons, and Frank Stella. This is a moment when, Matthew Simms considers, as the beginning of mediating and discussing the importance of perception work of 'light and space' art (Simms, 2022). Jumping ahead to 1960s where plastic art exhibitions that had been circulating, and followed by congealing permutations not 'light and space', but 'light and colour' in the 1970s. He elaborates further on the shared values, and shared attitude of the artists, who were not necessarily content with being wound up into the 'group' and considered as working within 'moevement' of light and space. Sharing interesting point that there are "the pros and cons of trying to bring together a movement, there's always a loss" (Simms, 2022).

As the Symposium hosted as well speeches by artists, who were exhibited in the show and currently, such as Lita Albuquerque and Elyn Zimmerman, Matthew Simms gave a fair point into the 'past and present' dissertation provoking reflections, as "they are living artists making art today, and that light and space art in particular is an art about the present. And it's about experience as it kind of moves forward. It's not about necessarily something that's fixed in the past. And this is a dilemma once again, between the artists point of view and sort of the historians point of view, the sort of different perspectives." (Simms, 2022).

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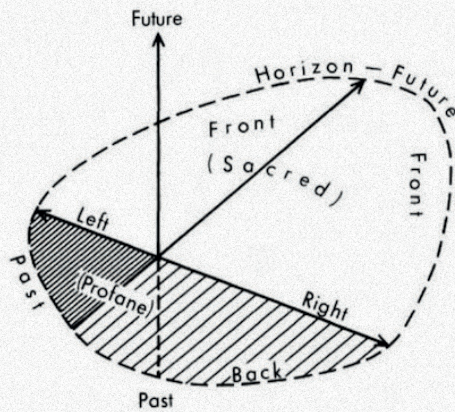
UPRIGHT HUMAN BODY, SPACE AND TIME

Figure 2. Upright human body, space and time. Space projected from the body is biased toward the front and right. The future is ahead and "up." The past is behind and "below."

Upright human body and time, by Tuan   *05*

As listening to Matthew Sims opening presentation, and his discussion upon the continuity of the 'Light and Space' art, numerous reflections came to me, on art that treats about the past, present, and future. How fleeting is to place it in one of the timeframes. How do viewers fit in this discussion from — can we ask about past, present and future when talking about experiencing - with human body, in space and time (Tuan, 2002).

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How art is mediating the concept of time and the events placed in its line. What sculptures, installations, or objects can be related to only one of the three time-related categories, as they most likely overlap, having their starting point in one (e.g., present) and pointing to the direction of the second (past/ future) fluently?

Another aspect is the materials and ways of exhibiting art, as they already influence the contextualization of art and placing it in time frames. Then trying to map out how different artists were exploring materials in a certain order. An order applied on them from available resources or technology development, but they were often testing already existing materials, both natural and artificial, from angles that, at times, material wouldn't give a response to, although testing and searching - longing for more smooth, slick, transparent, translucent qualities of materials - were imposing a demand in further explorations and development (setting directions). Longing to see more, as Robert Irwin expressed saying: "My ambition is, in a sense, to make you see a little bit more tomorrow than you saw today" (Wade, 2022).

Going further, more upon materials available at the moment, their accessibility when it comes to using the latest pioneering materials, or newest technologies. For instance, when designing an exhibition space or an installation with the newest lighting technologies will create a different quality of the room, it is more powerful in terms of executing the ideas and adapting to the needs. Art that is pointing into new directions by challenging what is here and now, in the same way as 60 years ago, In the result often crossing the materials, testing, and researching how combined elements can evoke desired effect or bring the intended outcome.

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Science and Art

Monica Bello, in her presentation, shares insights from her field and delves into the intersection of art, science, and technology, focusing on immersive experiences, material culture, and the evolving relationship between nature and human perception. Acknowledging the broadness of the term "immersive", and how it is evolving over time. She reflects on the historical context of art, science, and technology, highlighting the historical development of scientific apparatuses and the artists' response to them, showcasing how both fields contribute to our understanding of reality. The role of machines in scientific discovery and the transformation of research, drawing parallels between pioneering minds of the past and contemporary artists (Bello, 2022).

First referring to images of particle detectors and obsolete scientific equipment illustrating the connection between science, technology, and artistic expression, questioning complexity of describing and interpreting historical scientific equipment in the context of rapid technological advancements. Explains the interdisciplinary character of the explorations, where preoccupations, especially in the context of light and perception are being shared by artists and scientists. Outlining that both fields have similar concerns, such as dealing with pioneering concepts and understanding the link between spaceflight and perception.

Further delves into the experimental nature of both art and science, emphasizing how artists and scientists experiment with materials and transform them to explore new perspectives. Light at that time was a phenomena that started to be openly discussed in relation to many scientific topics, from flying to the moon and back to more mundane narratives like glasses, underlying the experience of light optics or research around it. Observation of the behaviour of light, experimenting with materials led artists to investigate different environments, escape to landscapes and look into the rocks or water. Transmitting characteristics of natural phenomena into captivating art pieces, using glass, epoxy or raisin. In a way, capturing light in them can be observed in Helen Pashgian's early works and techniques that she has been exploring.

Bello further opens a discussion on the role of aesthetics and techniques in contemporary art, as well as the shared responsibility of knowledge dissemination. Important point mentioned is the complexity of modern scientific and technological advancements, and how they shape human perception and understanding. Showing great responsibility that scientists have in developing and using these technologies, in parallel to the responsibility that lays on artists who interpret and reflect on them (Bello, 2022).

Bello introduces the idea of perceiving reality and nature and the challenges associated with it, referring to various scientific devices, such as bubble chambers, accelerators, and detectors, which highlight humanity's attempts to understand the fundamental nature of the universe. Alongside the connection between scientific subcultures, society, and culture is exploration. Pointing out that there is an urgency to establish "trading zones" where different disciplines intersect, to enhance understanding and collaboration.

As an example of artistic response and interpretation of scientific filed. She discusses work of Sigurður Guðjónsson, that among various artists, engage with science and technology, and exploits the potential of time-based media to produce pieces that rhythmically engage the viewer in a synaesthetic experience in installation and video art. The artist experiments with camera lenses, perspective, light, and motion, amplifying and observing these forms and the transformations that take place as they interact with their environment (About - Sigurður Guðjónsson, n.d.). An interesting and compelling approach of translating scientific data into artistic experiences often reflect on time, perception, and the material world. Presenting how artists bridge the gap between science and art, creating multi-sensory installations that challenge perceptions, and that artistic interpretations of scientific data contribute to our perception of reality, nature, and the universe.

"I think most people would agree that the natural world has some kind of like intrinsic beauty that we all agree on, and complexity" in simple metal shavings you can observe through the electron microscope and the fact that "the more

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understanding we get to the natural world, the better we get at, for instance, mathematically describing the patterns of growth in nature". Arguing that these are examples that make nature beautiful, the "complexity that can't be replicate by people" (Bello, 2022). Arriving to brief discourse over the Artificial Intelligence, speculating, if artists will undertake more lcuratorial role and set top level parameters, and then have machines as collaborators in the way that they produce?" (Bello, 2022).

Concluding the thought-provoking exploration of the intertwined realms of science, art, and technology, Monica Bello says that "the notion that technology, once detached, is now intertwined with human experience, urging contemplation of its multi-layered role in shaping our perception of reality".

From the personal perspective on the discussed topic, immersive experiences that involve complex technical systems provokes the reflection upon the ways in which, science and art, influence and shape our perception of the world around us. Fact that it is important to acknowledge the notion of agency in nature and the parallels between scientific experimentation and artistic exploration.

Leaving an open question - *How has the relationship between aesthetics, techniques, and scientific advancements is evolving over time? What are the afterpoints?*

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Robert Irwin and James Turell at UCLA, 1969   *06*
"Photographs of Robert Irwin," Special
Collections, Getty Research Institute, Los Angeles

2.7 Multithreaded Character of Light in Performative Contexts

Light for Art

The industry related to art presentation has gained significant prominence, where major institutions hosting themed and temporary exhibitions aim to captivate the public, in parallel to permanent shows and collections. In addition to curatorial work there has been increased interest in expert exhibitions, events where designers strive to overcome set globally standard for visual excellence in museums and exhibition spaces (Cuttle, 2013).

Museums, in fact, are facing a unique challenge in achieving effective visual communication due to the potential of new technology that supports outstanding visual sensations, building complete experiences, as "the rise of new art forms and other aesthetic ideals is reflected in methods of art communication and in the changes that exhibition concepts have undergone" (Schielke, 2020). Light, essential for exhibition of various forms of art, is playing a key role in the current exploration of designing exhibitions. Prioritizing the preventive conservation of the long-term well-being of museum objects and artistic heritage, however, aiming to achieve immersive experiences that would captivate visitors' attention. It is essential to investigate lighting practices that can at a similar level provide mesmerizing light effects within safeguarding displayed art, rather than focusing on goals and design objectives only. There is a room for collaboration among professionals to optimize the viewing experience while minimizing light exposure to objects itself (Cuttle, 2013). The inherent variety of art displays illuminated by light spans from restrained and neutral environments that convey an objective impression to vibrant and dynamic presentations that exuberantly celebrate the interaction with cultural treasures as immersive experiences (Schielke, 2020).

The purpose of displaying museum objects extends beyond meeting recommended lighting levels; it aims to create a captivating and informative visual encounter. It is also crucial to point out that art itself is constantly evolving and investigating more spacious and cross disciplinary paths, merging spatial design with lighting and broadly understood installation art directions.

The Presentation of Art

The presentation of art for viewer appreciation is a multifaceted endeavor, with lighting playing a crucial role. Lighting not only enables visibility but also profoundly influences the way artworks are perceived, impacting viewers' appreciation. While all museums aim to fulfill visitors' expectations, the focus here is on art museums where viewing expectations are particularly critical, though the discussed lighting aspects are relevant to museum lighting in general. Different approaches to presenting art are explored. One example discussed by the author is to replicate the artist's original lighting condition, aiming for directional and diffused daylight, emphasizing a strong flow of light from the left. Second, to create an abundant natural light. In this case extensive use of daylight can represent conditions in which artists such as Monet or Cezanne worked, embracing natural light often working outdoors to capture scenes under bright conditions. In the end it is allegorical, how museum displays must prioritize conservation, limiting light exposure to prevent fading and degradation, while artists intentionally worked in bright conditions to enhance colors (Cuttle, 2013). When choosing a lighting approach, three key factors come into play. One is the content of the artworks. Second, formal attributes of the image medium. As last, the spatial and temporal context in which the work was produced. By assessing the artwork's brightness, contrast, and light ambiance, curators can determine a suitable lighting strategy for both the room and the exhibit. Although, an important criterion, when aiming to achieve authentic presentation with light is the question of "whether the artist perceived the artwork in that way at the time of creating the work, whether the lighting concept being considered could lead to a falsifying of the artistic statement, and whether the lighting solution distracts from the essential reception of the art" (Schielke, 2020, p. 22).

Creating ideal conditions for viewing art involves drawing from our understanding of human vision. Essential factors include excellent color rendering, ensuring the artwork is the brightest point in the field of view with smoothly graded brightness to the surroundings, and eliminating all forms of glare, both direct and reflected. Visitors transitioning from brighter environments, like daylight, should gradually adapt to lower light levels before entering the viewing area, especially when conservation requires dim lighting. Achieving and sustaining such conditions often relies on electric lighting. While some visitors, like those

on a special trip or at a temporary exhibition, seek an unblemished viewing experience, another type of viewer, frequent visitor or the passionate art lover may value the evolving interaction between artwork and environment, whose experience is extended in time by returning to museum multiple times, seeking for calmness and visual comfort without any intensive disturbance. For these observers who revisit artworks, the interplay of changing seasons, times of day, and weather conditions becomes an integral part of their engagement. Unlike the pursuit of optimal visual conditions, these aficionados find the unpredictability of natural daylight to be the essence of its charm (Cuttle, 2013).

On Performance In Exhibition Space

Museum lighting design and theatrical lighting are two distinct yet interconnected disciplines that share a common goal. "Each method of museum lighting serves to communicate a conceptionally based approach to art" (Schielke, 2020, p. 7), aiming to enhance the viewer's experience and perception of exhibited art. While theatrical lighting is primarily concerned with creating dynamic and immersive atmospheres for live performances (Shelley, 2013). Thus both environments can share methods to some extent investigating the most effective and captivating lighting designs. Museum lighting design aims to illuminate artifacts and artworks in a way that not only accentuates their beauty but also preserves their integrity for posterity. This juxtaposition of disciplines offers a fascinating exploration of how light plays a crucial role in shaping the narrative and emotional impact of both theatrical productions and museum exhibitions.

Throughout the period of February 17th - March 19th, 2023, The National Gallery of Art (SMK) in Copenhagen hosted an exhibition combined with a performance produced by Hotel Pro Forma. The presented work "ELECTRICITY" ("ELECTRICITY / 2023," n.d.) took place in the wing of the museum that celebrates 150 years of Danish and Nordic art, implementing art pieces and series of performances into the permanent exhibition titled "Danish and Nordic Art 1750-1900" (SMK - Statens Museum for Kunst, n.d.) where I had a chance to assist Jesper Kongshaug in execution of lighting designed for the piece.

The character of the production from Hotel Pro Forma explored possibilities of lighting design that would provide light for ephemeral exhibition incorporated into permanent curatorial work, at the same time challenging the capacity of the given space bringing performance to the museum space. In search of the desired visual effect for the audience, the topic of keeping an accurate level of light in the existing exhibition when striving for an evocative atmosphere for the performance. Issues related to the security of the rooms and keeping minimal levels of light strongly challenged the set of tools that could be used to achieve the desired atmosphere in the production. Lighting designer role is to discern the visible attributes of objects and craft lighting arrangements that effectively unveil them, when for light-sensitive items, the key lies in tailored lighting that suits the object's characteristics, offering viewers a satisfying experience while minimizing light exposure. In cases of highly light-sensitive objects, degradation control hinges on limiting exposure duration rather than compromising presentation quality (Cuttle, 2013). The dialogue of light that outlines the paintings at the same time brings theatrical light on a performer, has caused room for a reflection on the topic of role of light and how challenging it is to work within theatrical art outside of the black box.

In consequence, the multithreaded character of light in performative contexts and explained above case shows a possible direction and a common interest in further investigation, what is the role of light and possible exploration of the topic of the hierarchy between the room and light in broadly understood art projects, guiding the audience through performative scenarios. In the following part of this thesis, presented are a series of interviews carried out on this topic, where professionals from across the field have been invited to the open discussion in a form of semi-structured interview.

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Hierarchy of Light and Light As A Servant

This part is based on the conversation with Jesper Kongshaug that we would have in early February 2023. It had its place in the period of working on the exhibition "ELECTRICITY" ("ELECTRICITY / 2023," n.d.) by Hotel Pro Forma at the Statens Museum for Kunst (SMK) which is more thoroughly explained in the subchapter above.

From the memory, essential thoughts shared by Jesper Kongshaug, on the storytelling character of light in theatrical space and how it has been changing over the years. Opening the topic from the view on "The tight relation of multiple elements which builds into the experience for the audience, such as spatial design, set design, sound, and lighting design, go in parallel with performed art, event or curated exhibition. The room where the artistic action or practice takes its place gives a direct cue and foundation to the presence of the light, telling a story" (Kongshaug, personal communication, 2023).Yet, he points out the fact that "Originally light functioned as a servant. Illuminating the soloists in the opera or pointing direct spots of light on the displayed art piece on the museum wall. Consequently serving sufficient levels of light that are needed to make visible the chosen aspect, fragment or scene" (Kongshaug, personal communication, 2023). Light itself has not been considered at this point as an artistic tool, but it resorted only to a pragmatic and functional character. However, the role of the light evolves, and its importance differs. The development of new technology changes the possibilities of light, its role, and its power in the room. Increasingly lighting investigates objects on stage or actually materializes the surfaces, enabling an interpretation of the same object in new ways. Looking again at the example of "Electricity" (2023) by Hotel Pro Forma, where performative production meets exhibition space conditions, "there is a kind of discussion about whether we are entering a museum or a performance. How do people perceive that they are in a museum, watching a performance? In this point, lighting is important to show the key, its connection between reality and illusion" (Kongshaug, personal communication, 2023). The boundaries between space, creating a framework for such a peculiar blend of exhibition and performance, "showing the relationship between both the performance and the room itself. So there has always been a discussion for lighting designers, aiming to be very precise in defining the role of

light because if the lighting at the wrong moment is too strong, the audience's focus will be overtaken by technology and lighting effects. In a way distracting and creating a layer of a more mechanical character. It can cause loss of the quality of the moment observed by the audience" (Kongshaug, personal communication, 2023). For instance, he is referring to an example of an actor standing on the stage, and the lighting effect in the presented scene should represent the rain. Posing the question, "To what extent is it accurate to present the rain to viewers' eyes? What light effect is desired?". Is the literal presentation of raindrops by displaying patterns or applying a texture with the light on stage, accurate? Or whether to leave up to the audience's imagination the texture and movement of water pouring horizontally from the sky in order not to take over the focus from the actor? "Is the role of acting to bring the audience an understanding of rain in the particular moment (with certain movement presented in the body) imitating the directionality of water?" (Kongshaug, personal communication, 2023). Referring to the fact that the story can be affected if visually strong and literal lighting effects are applied on stage. Preserving or even enhancing the fantasy and imaginative reflexes in the audience keeping in mind the aspect of situatedness "as the cultural thing is, that elements of the story, such as sun or rain for me, are not the same as for you. Meaning that we all have different perceptions depending on experiences reaching even early childhood. What is beauty? How we define it, it remains very individual. It means different things to each person. At least I hope so..." (Kongshaug, personal communication, 2023). Moving on to the topic of the individualization of the moment in theatrical space and that highly important is, when designing lighting is also to be able to achieve subtle effects and balance, controlling small changes of light to guide the story. Illuminating only directions of it and preserving the processes of the interpretation for the audience and leaving room for fantasy. Outlining the challenge for lighting designers, depending on the work, to aim for subtle lighting, once well done, is no longer noticeable to the audience, and only for that reason will fulfill the desired effect. Leaving aside the temptation for lighting designers' work to be recognized and noticeable by unnecessary amplification of lighting effects, their scale, or strength (Kongshaug, personal communication, 2023).

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Jesper Kongshaug also discussed the delicate balance that lighting designers must achieve in theatrical spaces, aiming for subtlety that supports the story. He notes the challenge of avoiding excessive attention on the lighting itself, as well as the tension between standing out for survival and serving the narrative well. Reflecting on conversations with a sculptor who emphasizes the importance of concise storytelling through design choices. The role of darkness, its ability to create longing for light, and its impact on audience engagement. The moment in the theater when the performance begins on the blackout, dark venue with its audience, awaits for the first beam of light point into the stage envealing the starting point of the performance. He also recounts experiences with ballet productions, where revealing hidden performers through lighting transformed the perception of the narrative. Discusses the challenges of adapting lighting for different venues and productions, leading to nuanced decision-making.

Dramaturgy in Light

From the memory of conversations with Jarkko Lehmus held during workshops in collaboration with BNCN ("Dramatic Fields – Expanding Circus Dramaturgy," 2020) in October 2020, dedicated to dramaturgy in performative art I remember parts of these talks had significant impact on my view of design and opened my curiosity to transfer them to the design of light.

The dramaturgical approach from the realm of performative arts translated into the installation art could open new directions, here I am referring to this material, set of questions, as dramaturgical lenses:

looking at the design

what is present?
what are the elements?
what is the quality in that moment?

what changes? (how / when / why)
what experience does it create?

what does not change? (how / when / why)
what experience does it create?

what is the level of the intensity in what you see?
what is the level of the intensity in what you feel?

what is no longer there?

internal when designing
what do you want to do?
what do you want 'it'* to do?

          *where word 'it' refers to the design

THEORETICAL BACKGROUND

This perspective has been accompanying creative process, and decision making when designing and experience and installation, yet have character of internal dialogue, and shapes possible discussion curve in this project. Seen as an possible angle to speak about the installation design and research through exhibition.

Act of controlling and Trust

Jarrko Lehmus also disuss the 'act of controlling' speaking that "It is possible to control what happens on stage to some extent, but not how audience will experience it. Achieving certain intentions can happen by being aware of the relation between the elements - that are behind, and within the control of the intentions" (Lehmus, personal communication, 2023).

From my memory of a conversation with Kirsten Dehlholm, this topic is also present. She deliberated on the aspirations and constraints tied to managing audience response within the realm of a director or designer's responsibilities. She stressed that although designers cannot command the exact perception of a production by the audience, they embark on their creative voyage by aligning with elements that hold personal significance to them. Says "Human identification depends on their profession and what they want to focus their eyes and see. Depends on the audience what they going to see" (Dehlholm, personal communication, 2023). As it cant be predicted how the audience will receive the artistic work, it is important to trust in the fact that each person from the audience will leave the performance with individual layer of stimuli, sensations and emotions. Somewhat depending on their situatedness and ongoing state of mind, observers look in the experiences for what is currently of their interest. This can be appreciation of visual layers in the piece, sound or performative actions and expressions. Numerous elements in the theatrical productions within their complexity serve stimuli and interwind sensations that can be interpreted and explored by the audience.

The relationship of lighting design with all the elements in scenographic context require cross-disciplinary approach, and it would be vital - when designing

experience from different persepctives that all professionals involved (set designer, director, lighting designer, sound engineer) should strive not exclude, but rather to include each others viewing points. Explore different processes of interpretation, at the same time, keeping in mind what is the quality in the moment of the experience and what remains afterwards in the possible empirical sensations.

THEORETICAL BACKGROUND

3. METHODOLOGY

The following chapter details the methodologies employed to conduct this master thesis. Two departure points supporting the presented work are practice-based research and research through the exhibition.
In parallel, developing and applying new knowledge through design in a trans-disciplinary environment combining art and science is based on the design experiment model and iterative methodology.

3.1 Practice-Based Research

Practice-based research requires overcoming critical challenges such as unforeseen obstacles. Using this model challenges the validation and suppression of specific facets of reality while considering theory development as a complementary element of practical engagement (Fox, 2003). The structure of this thesis project consists of two interconnected components that work collaboratively, they interact and work together to address the research question more accurately. One is a creative output that allows adapting to complex but highly explorative processes of developing design and its implementation and focusing on the findings and material gathered throughout the process, but staying in the receptive state to constantly juxtapose encountered knowledge with directions of the design.

A part of the actual design and carrying out the implementation process includes selecting appropriate tools and techniques in accordance with the defined methodology. Creating frameworks for both the core and lateral elements within the design is motivated to provide the most accurate and valuable testing procedure. The second component is text, which grounds the research and enables to address the topic from diverse angles for whom light is a shared denominator.

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3.2 Towards The Exhibition As Research

As introduced above, the approach has flexible character, and can incorporate several methodologies and methods to a certain degree. The following direction of the research through the exhibition has been chosen to shape the framework of this project. Firstly, it is vital to explain a dual notion of the research, presented and collated by Simon Sheikh in "Curating Research" (O'Neill & Wilson, 2015) a series of texts on contemporary curating practice in both speculative and analytic spirit. It is essential to understand the current term of 'the curatorial' that suggests a broadening of the concept of curating, curatorial processes, and the role of curator together with its potentialities. He is relating to the expansion of the historically understood term as a field of education, where curating comes to light as a field for and of research in forms that take place both within and outside of academia, and the growth of curating as an object of study is not limited to theoretical and historical examination. It can be posited now as a specific mode of research that may take on an exhibition's spatial and temporal form, although it doesn't have to.

It is presented as something that employs the thinking involved in exhibition-making and research, not necessarily focused on artistic production and development, but positioning the art world as tools for investigating something different than art, exploring ideas, and crossing conceptual work results, presenting its discourse another form than a science, sociology, journalism or among many. Knowledge production is closely related to other formats and fields that can empower cultural environments or groups and movements.
Within its bounds, the exhibition as a research method has elements such as initial research, curatorial project, artistic and creative processes, and realization to transmit knowledge. When the final output is seen as the exhibition itself, as a form of mediation, or post-research product - it is important to outline the existence of the exhibition as well as a site for carrying out this research (O'Neill & Wilson, 2015, p. 39).

Practices related to carrying out the exhibition that crosses curating, art production, and execution of designed experience with its complexities bring a number of findings and carefully gathered data when actively decided to research through an exhibition, contributing to the overall scope of research as well as the works done before the exhibition itself. Active choice of staying open and focused for both stages can broaden and expand the role of the exhibition as a

presentation of knowledge or artistic works, giving in the final result new layers of encountered information, possibly including human response to the work carried out to produce the exhibition.

The relationship between curating and practices of research can become fluid. However, they become aligned with each other when looking at exhibitions as the main outcome of curating-as-production, going beyond exhibitionary frames. The divergences between curating, curatorial, and research practices have complex natures, yet within the given time frame of this report leaves out further exploration of the topics related to curatorial contexts, thus focusing mainly on research within the exhibition-making process and the exhibition as a research action in itself.

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3.3 Transdisciplinary Character of Design

The transdisciplinary nature of design is a hallmark of its ability to address complex and multifaceted challenges by integrating knowledge, methods, and perspectives from various disciplines. Design transcends traditional boundaries and embraces a collaborative approach that draws upon diverse fields to create innovative solutions. This transdisciplinary character is recognized as a crucial aspect of contemporary design, practice and education.

Design as a transdisciplinary practice, involves synthesizing insights from diverse fields such as art, engineering, psychology, sociology, technology, and more. This holistic approach allows designers to consider the broader context and implications of their creations. Designers often collaborate with experts from different domains, engaging in a dynamic exchange of ideas that enriches the creative process (Cross, 1982). This collaborative spirit is particularly evident in fields like architecture and broadly understood design, and art. Where often designers or artists must collaborate with scientists, policymakers, sociologists, and other experts to develop comprehensive and sustainable design/artwork. This integrative approach ensures that the outcomes, depending on a field, converge to create exceptional experiences for their audience. Across all the disciplines, the transdisciplinary approach supports developing the ability to think critically and solve problems by drawing from a diverse knowledge base (The Core of 'Design Thinking' and Its Application - ScienceDirect, n.d.).

In conclusion, the transdisciplinary character of design is a key factor in its ability to address contemporary challenges and create meaningful impact. This approach underscores the dynamic and evolving nature of design as it continues to adapt to the changing demands of society and technology. Throughout this thesis, the research and design process are striving to integrate knowledge and perspectives from various disciplines, such as spatial and lighting design, focusing on designing guided experiences for the audience by developing a complete installation executed in real scale and time.

"cross-disciplinary" and "transdisciplinary"

As the environment related to art, has been often relating to these terms on multiple occasions, a brief overview of both is useful due to the correct formulation of the content related to this master's thesis, as they refer to different approaches in the integration of disciplines within the design process. While both involve collaboration between different fields, they differ in the depth and nature of their interactions.

Cross-disciplinary design involves collaboration between different disciplines while maintaining a certain degree of separation between them. In this approach, experts from various fields come together to contribute their specific knowledge and skills to a project. Each discipline retains its distinct methods, perspectives, and goals, and their contributions are combined to create a comprehensive solution. Cross-disciplinary design recognizes the value of diverse expertise but does not necessarily seek to fully integrate or transcend disciplinary boundaries (Heskett, 2002).

Transdisciplinary design goes beyond collaboration by actively seeking to integrate and blur the boundaries between disciplines. It involves a holistic and unified approach that seeks to create new frameworks, concepts, and methodologies that emerge from the interaction of multiple fields. In transdisciplinary design, experts work together to co-create a shared understanding and language, often leading to the emergence of entirely new perspectives and solutions that transcend traditional disciplinary constraints (Transdisciplinarity: A Review of Its Origins, Development, and Current Issues | Semantic Scholar, n.d.).

In summary, the main difference between cross-disciplinary and transdisciplinary design lies in the depth of integration and interaction between disciplines. Cross-disciplinary design involves collaboration while maintaining disciplinary boundaries, whereas transdisciplinary design seeks to dissolve these boundaries and create a unified, integrated approach that leads to new insights and solutions. In consequence, the consistent and accurate use of the terms such as

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'crossdisciplinary design', 'transdisciplinary design', as well as, 'interdisciplinary design' and 'multidisciplinary' allow for distinctions within the increasingly complex domain of the contemporary design practice (Dykes et al., 2009).

Both approaches have their merits and are valuable in different contexts. Cross-disciplinary collaboration can provide diverse perspectives and specialized expertise, while transdisciplinary design can lead to truly innovative and holistic solutions by breaking down traditional silos and fostering a more synergistic relationship between disciplines.

3.4 Inductive Method

The inductive method of research is an approach to generating knowledge and understanding through the observation of specific instances or cases and then drawing general conclusions based on those observations. In other words, it involves moving from specific observations to broader generalizations. The inductive method is often associated with qualitative research and is particularly useful when exploring new or uncharted areas where existing theories may not fully apply, to inductively develop a theory or pattern of meaning (Creswell & Creswell, 2018).

3.5 Reflective Practice

Donald A. Schon dedicated his work as a researcher on organizational learning and professional effectiveness. In the "Educating the reflective practitioner: toward a new design for teaching and learning in the professions" (Schön, 1987) Donald Schön's presents a model of "reflection-in-action" that significantly contributed to the understanding of professional expertise and problem-solving. Unlike traditional views of reflection that emphasize a retrospective analysis of past experiences, Schön proposed a dynamic process that occurs during the very act of problem-solving. According to his model, professionals engage in a continuous cycle of thinking and action, where they reflect on their actions and decisions in real-time, adapting and adjusting their approach based on ongoing feedback and new insights. This concept challenges the notion that expertise is solely based on predefined rules and theories, highlighting the importance of intuitive, context-sensitive decision-making. Schön's model underscores the value of experiential knowledge and the ability to navigate complex and uncertain situations by drawing on one's own reflective practice. Professionals possess a tacit understanding of their field that guides their actions without explicit articulation (Schön, 1987). It is enabled through gathering over time the type of knowledge that emerges in practitioners from engagement with challenges and tasks encountered along the creative processes and work. It is important to outline that in the learning process, as well as in reflective decision making, highly valuable is trust in intuitive judgments and adaptation of the strategies along the design process.

By emphasizing the iterative interplay between thinking and doing, the discussed groundbreaking model of "reflection-in-action" supports embracing the uncertainty, learning from the experiences as they come, and refining expertise development through the ongoing reflective practice. Nurturing the environment a constant cycle of exploration, experimentation in rapidly changing contexts effectively. This approach has been vital for the design process and its implementation in the real world, enabling it to follow the chosen course of the research through exhibition and further design of testing procedure in a form of an art installation.

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4. RESEARCH QUESTION

Installation, documented by Muszkieta   *07*

Ongoing research, thoughts and conversations that circle around
the interconnectedness of seeing, culture, and education, outlining
shared interest in developing images and visual experiences that
allow human perception to grow beyond form.

This research led to posing following research question:

How to create memorable visual experiences,
with and through light?

5. LIGHT AS A COMMON THREAD

Lighting design serves as a pivotal common denominator across various domains of architectural and spatial design, encompassing not only architectural settings but also extending its influence to theatrical set design and broadly understood art. This essential element plays a transformative role in shaping the atmosphere, mood, and functionality of spaces, transcending boundaries between different design disciplines. Its dual character of, at times, being a silent servant outlining the artistic nature of projects and formation of the space shifts to playing a principal - or equal - role in realizations that sum up to immersive and captivating experiences in art. This, seen as an inspiring and reflection-provoking direction that could be further explored - on bridges between fields and the complexity of their blend, with and through light - is only interlacing in this report aiming to gain a better understanding of what it takes to design an evocative experience.

5.1 Lighting Design As A Tool - Interviews

Initial question 'how developing concepts in different fields use lighting both as a tool and language to execute artistic ideas' led to the research upon light as a coherent element in creative processes within a broad spectrum of artistic directions. This was a catalyst for opening conversation, in a form of semi-structured interviews with professionals from different disciplines for whom light is the common denominator.

The aim was to, firstly, map out the role of light, and - how does lighting design enable the designing of multithreaded experiences? When lateral, the person giving the interview was investigating topics such as cross-disciplinarity in their work and defining what are the elements that make up the work from across theater, performance, set design, installation art through light.

Interviews with *Matthieu Cabanes, Maxime Brunois, Jesper Kongshaug, Nadja Mattioli, Kirsten Dehlholm, Jarkko Lehmus* in chronological order are attached in the appendix, and synthesised in the following paragraphs from the angle of essential points of view that resulted from the conversations. Complete transcriptions from interviews are available in the appendix.

LIGHT AS A COMMON THREAD

Conversation with Maxime Brunois
Date: 11th of April 2023 (online)

Maxime Brunois is a Lighting Designer Working as a project manager in CONCEPTO studio with a master of the Architecture School of the City and the Territories Paris-Est and an environmental degree from Duperré Applied Art School where he is used to hosting workshops. He was an intern in 8'18", CONCEPTO, TVK, and ON offices, and he contributed to the ACE's book (Le Moniteur editions), "Places of Great Paris" for the SGP, and translated a text from Gerhard Auer entitled "Darker Living" before his participating in publication of "Lighting of the Third Millenium, 2000-2050" with Light ZOOM Lumière where he is writer.

Maxime discusses the distinct approach to lighting design in public spaces compared to traditional theatrical settings. He emphasizes the importance of considering existing elements, history, architecture, and even the mood and mindset of people who frequent the area. He acknowledges the challenges of balancing functional illumination and artistic ambiance while respecting various stakeholders' needs. He mentions the dynamic nature of lighting design and how it has evolved over time, shaped by advancements in technology, societal shifts, and changing perspectives on public spaces. Highlighting the need to adapt lighting to accommodate diverse users, including pedestrians and drivers, and to consider the evolving nature of cities and landscapes. Speaking about the importance of collaboration with architects, landscape designers, and community members to create effective and lasting lighting solutions. He notes the complexity of predicting user reactions and perceptions, given the unpredictable and multifaceted nature of public spaces. He also discusses the need to balance artistic vision with practical considerations and the challenge of designing for the long term, as projects may take years to complete (Brunois, personal communication, 2023)

Throughout the conversation, Maxime emphasizes the dynamic interplay between light, space, time, and people, showcasing the evolving role of a lighting designer in shaping the urban environment while acknowledging the inherent uncertainties that come with the territory.

Conversation with Jesper Kongshaug
Date: 13th of April 2023

Jesper Garde Kongshaug is a renowned lighting designer who navigates the realms of theater, opera, ballet, and architecture. With a creative career spanning various artistic domains, he earned acclaim for his exceptional ability to shape and illuminate spaces, evoking emotions and narratives through the interplay of light and shadow.

JJesper Kongshaug explains that his interest in lighting design developed from his background in performance and his inclination towards visual aesthetics. His initial involvement in theater led him to gradually focus on lighting due to its ability to create beauty and its connection to human perception.

When discussing the factors that guide his work with light, he emphasizes that his personal feelings and intuition play a significant role. Mentions that the process of collaboration, circumstances, and the environment influence his decisions, creating a bridge between different inputs. An important perspective share by Jesper is how lighting design serves as a language to communicate artistic ideas. He highlights the dynamic nature of lighting and its ability to interpret and change the perception of spaces and objects. As lighting's impact on ambiance and emotion is central to its role as a storytelling tool (Kongshaug, personal communication, 2023).

"I mean in all situations if the lighting is not present, the room is not present. So in general, people could perceive the lighting as a kind of a servant to the room to fulfill the room, but I think also in my work, the room and the lighting is kind of one, is complete unit, and by changing the thinking about the lighting being only fixtures, or some kind of inventory by thinking about the lighting itself, the direction of the light, the behavior of the lighting itself" (Kongshaug, personal communication, 2023). The idea of equality between the role of light and the room, its position and priority to thinking during the design processes.

Outlining that the cross-disciplinary nature of lighting design, where architectural principles can be applied to theater lighting and vice versa. Further explaining personal take on the relationship between light and space. How lighting and

LIGHT AS A COMMON THREAD

architecture are intertwined, forming a complete unit rather than separate elements. Jesper discusses how the direction of light and the behavior of lighting sources influence the character of a space, along with cultural influences on lighting approaches.

"So definitely, there's development which is also the beauty of being working with lighting for a long time is that it develops with you, if you start working with lighting now and continue working with that, for sure, it will develop a lot and that has to do also with you know, your curiosity, that one gets curious in developing this new method of working with" (Kongshaug, personal communication, 2023).

The conversation shifts to the main elements involved in lighting design such as the importance of the process and collaboration, explaining how lighting's development is shaped by the intention and context of each project and LEDs role, that provided new opportunities and flexibility, were true inspiration in his work, to integrate lighting more effectively into architectural spaces. He shares that this shift in approach led to collaborations with Japanese architects and the successful integration of lighting in architectural designs.

Conversation with Nadja Mattioli
Date: 18th of April 2023 (online)

Nadja Mattioli is a performance artist, researcher, storyteller and social activist with a strong interest in movement, text and the senses in relation to psychology, anthropology, mythology and rhizomatic relationships, currently based in Copenhagen, Denmark. Together with her artistic collaborator Nanna Hanfgarn Jensen is an artistic director of the project called "Beyond Darkness" that is being mentioned in some parts of this thesis.

In this conversation Nadja explains her exploration of darkness as a performance element, and intriguing thoughts on perception, movement, and sensory experiences within her creative process.

Firstly, she grasps that movement and the body are central to her work. She discusses how sound and light are also forms of movement and how her focus has shifted from choreography being the end goal to it being a starting point, with other elements joining in the process. She emphasizes the importance of considering the audience's experience in her concept development. Where the conversation delves into her project "Beyond Darkness". She explains that — reason in exploring darkness is to challenge the typical way how people "watch" performances and to investigate the effects of complete darkness and low light levels in perceived visual sensations in the performative work. She discusses the phenomena of afterimages, hallucinations, and the brain's response to darkness. She also elaborates on her work involving darkness in a black box theater, detailing the process of light-proofing the space and the heightened sensory experiences it engenders.

Relates, from her observations, to the fact that even in complete darkness, the brain and eyes continue to engage in the process of seeing. Explaining a particular scene from their performance, where from the lowest level of the light in the given theatriacl space where the performance took place, audience that has been in the process of adjusting their vision to the dark environment suddenly is exposed to the scene of dancers - wearing colorful overalls - are performing movements and shaping forms are lit with stroboscopic light. The observations and feedback from phenomenological point of view shown that this particular combination of dark enviroment of the space, immediate and shortly displayed bright strobospoe light and colorfully dressed performers created effects of

spinning and moving afterimages in the viewers eyes. Sharing further how the intriguing sensation of heightened senses and perception, including hearing and touch, in darkness are unusual to be epxlored in the performative world (Mattioli, personal communication, 2023).

For the first time I got familiar with research of "Beyond Darkness" was in 2020 during videoconversation at Living Manifesto, where Nanna and Nadja would present their artistic work and research on darkness that turned later into performance. It was fascinating to have this conversation three years after finding out afterpoints of their research - interesting and playful explorations of perceptual experiences through movement and performative work on stage - and be able to reflect more on the research presented within this report.

Conversation with Kirsten Dehlholm
Date: 18th of April 2023 (online)

Kirsten Dehlholm is a Danish artist, artistic theatre director, and the founder of Hotel Pro Forma. With a career spanning over 30 presentations, she seamlessly merges scenography and performance art using a diverse range of techniques, media, and materials. As the visionary behind Hotel Pro Forma since its inception in 1985, Kirsten's role as artistic director and stage designer has garnered significant acclaim on both national and international stages. In 2015, she was honored with the Danish Reumert Award for her lifelong artistic accomplishments. The same year, she was bestowed with "The Distinguished Artist Award" from The International Society of Performing Arts, cementing her profound impact on the artistic realm ("About," n.d.).

Kirsten Dehlholm, the founder and artistic director of Hotel Pro Forma, discussed her artistic background and her journey into working with light. Her artistic endeavors began in textile and visual art, but her interest in lighting design was sparked in 1989 with the project "WHY DOES NIGHT COME MOTHER" However, it was her collaboration with lighting designer Jesper Kongshaug on the "OPERATION ORFEO" project in 1993 that truly illuminated the power of light and space for her. This collaboration with Kongshaug continued and evolved, leading to the exploration of various aspects of light and the development of innovative technologies within the realm of lighting design. In a discussion about the role of light in her works and its hierarchy, among other elements, Kirsten Dehlholm emphasized that light has a transformative power over space. Rather than aiming for coziness or a particular atmosphere, light is employed to reshape the architectural environment and emphasize the performers' arrangements. The focus is on perception and sensory experience, and she highlighted the magical aspect of light's ability to dramatically alter everything with a single button press (Dehlholm, personal communication, 2023).

She emphasized that light occupies a crucial position within the hierarchy of production elements. This significance has been consistent in her collaborations with lighting designer Jesper Kongshaug. Their partnership has led to the exploration of new possibilities, often originating from Jesper's innovative ideas about light technologies. An example is the project "House of the double axe" in 1998, where the use of a double scroller suspended from the ceiling emerged from his conceptualization (Dehlholm, personal communication, 2023).

Kirsten Dehlholm discussed the intentions and limitations of controlling audience reception in the context of lighting design's role. She emphasized that while designers cannot dictate how the audience will perceive a piece, they begin their creative process with what resonates with them personally. Lighting design is a crucial component of dramaturgy, engaging aesthetics, beauty, surprises, and an element of magic. This involves working with unconventional ideas to offer the audience fresh perspectives and visual experiences. Kirsten highlighted two notable examples to illustrate her approach. "OPERATION ORFEO", known for its impactful spatial lighting design, toured globally and remained an influential piece. Another recent production, "ELECTRICITY", staged at the Royal Museum of Art in Copenhagen, creatively utilized lighting to shift focus and accentuate elements within an exhibition space, offering a new lens for appreciating both paintings and installations (Dehlholm, personal communication, 2023).

In response to questions about her artistic intentions, Kirsten expressed a desire to showcase the beauty of scenic art, moving away from traditional narrative theater to create unique artistic expressions. Her aim is to facilitate novel interactions between light and other spatial elements, carefully choosing each element with intuition to ensure they coexist harmoniously.

Conversation with Jarkko Lehmus
Date: 24th of April 2023 (online)

Jarkko Lehmus is a Finnish artist, producer, and director with a multifaceted background spanning martial arts, music, dance, and contemporary performance.

Jarkko Lehmus is a Finnish artist, producer, and director with a multifaceted background spanning martial arts, music, dance, and contemporary performance. Originally hailing from a small town in Eastern Finland, Jarkko's early interests in dance and movement led him to pursue a path in the arts. He attended a music and dance high school in Helsinki, embarking on a journey that would eventually take him to the vibrant arts scene of London. As an artist, Jarkko's keen sense of the intricacies of performance led him to explore dramaturgical nuances, addressing both artistic and audience-related aspects. He obtained a Master's in Dramaturgy and a Master's in Arts Policy and Management, reflecting his commitment to enhancing both his artistic expression and his understanding of cultural dynamics and management practices. In 2022, he assumed the role of Director at CIRKO in Helsinki, Finland, responsible for artistic direction and organizational leadership. Jarkko continues to engage in dramaturgical work, both for residency artists within the organization and as a freelance dramaturg. His artistic journey, spanning various disciplines and encompassing diverse roles, exemplifies his unwavering commitment to the arts and his dedication to enhancing the broader cultural landscape.

Lighting in Circus Productions
In the interview, Jarkko Lehmus discusses the role of lighting design in circus productions and its considerations. He emphasizes that the extent of space for lighting design depends on the specific production, its venue, and the context in which it will be presented. This can range from circus tents to indoor theaters or outdoor spaces, with factors like time of day, season, and geographic location influencing the discussions. Jarkko highlights the importance of addressing technicalities, especially in relation to circus skills being performed. Safety is a paramount concern, dictating the possibilities of lighting design. The direction and intensity of movement on stage play a significant role, and the lighting design must not disorient performers or compromise their safety. The goal is to eliminate risks and provide secure lighting within achievable parameters.

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He explains that at CIRKO Helsinki, the role of lighting in the creative process varies depending on the nature of the projects. For performances that are already established and brought to the venue, there may be less conversation about lighting, as the piece typically comes with its own stage design and lighting plan. The focus then shifts to adapting these elements to fit the specific venue. However, for Finnish artists and world premieres, discussions about lighting are more extensive. The lighting design is intertwined with the artistic concept, atmosphere, and spatial understanding of the piece. These discussions aim to explore how the work can be best presented and visually interpreted, considering various perspectives and creative visions (Lehmus, personal communication, 2023).

In the following part of the interview, we discussed the interplay of elements in the production and the potential for a common language to emerge. Jarrko approaches this from his role as a dramaturg, aiming to support lead artists in realizing their creative vision. He emphasizes a flattened hierarchy of elements in performance, contrasting this with potential biases that might prioritize certain aspects. He acknowledges that while lead artists might prioritize circus skills in a circus piece, he strives to balance different elements. In Nordic lighting design, he notes a focus on light's architectural role, with considerations such as color temperature and direction shaping both the visual and spatial aspects of performance (Lehmus, personal communication, 2023).

I see this response as quite insightful and intriguing, as lighting doesn't just illuminate the performers but also contributes to the overall ambiance and emotions experienced by the audience. Also, it would be fascinating to explore potential distinctions in lighting choices between various regions like central Europe, Nordic countries, and the United States focusing on the genre of circus productions, are there any patterns or strong differences in lighting design that maybe reflect circus art tradition through lighting on stage? "Yes. The use of the vertical space is very specific to the circus as a performing art." (Lehmus, personal communication, 2023).

Designing light for movement, dance, and floor work is slightly different than designing light for circus performance, as it is crucial to work in a vertical sense with different heights and involves rapid transitions within the full height capacity of the venue, such as skills presented on the trampoline or seen in aerial disciplines. This comparison opens up exciting avenues for further exploration.

Towards the conclusion of the conversation, I asked whether the concept of afterimages, encompassing residual elements and impressions of a circus performance, is a common topic of discussion. This query also explored whether there exists room for a deliberate selection to emphasize certain aspects of the broader design unrelated to the physical movements and skills displayed. Jarkko Lehmus' response indicated that such discussions are not prevalent within circus productions (Lehmus, personal communication, 2023).

Jarkko Lehmus highlighted the concept of the "Arc of Engagements", a diagram he employs to illustrate a performance's experiential journey. This arc encompasses the entire spectrum, starting from initial encounters like marketing materials and conversations, leading up to the performance itself, which leaves a lasting echo. He noted the scarcity of discussions around this echo aspect by artists. Lehmus, functioning as both a dramaturg and an artistic director, emphasized his role in discerning the artist's intentions toward the audience—how they aim to induce change through their work. He posed the question of the purpose of art if it doesn't elicit transformation and emphasized that the echo, representing the lasting impact, is where meaningful change unfolds (Lehmus, personal communication, 2023).

He emphasized the significance of light as an element within a performance's hierarchy, comparing its importance to other aspects like movement, sound, and scenography. He prompted thought-provoking questions about the dynamics of light: How does it change, and at what junctures does it change in relation to other elements? He urged contemplation on the experiential effects of these changes—what moods, qualities, tempo, and rhythms they evoke. Light's ability to influence space, visibility, and perception was acknowledged, along with its potential to evoke emotions and prompt imagination. He clarified that the importance of light varies depending on the specific production and the desired experiential outcome (Lehmus, personal communication, 2023).

Note: These final thoughts and additional reflections from conversations with Jarkko Lehmus held during workshops in collaboration with BNCN ("Dramatic Fields – Expanding Circus Dramaturgy," 2020), dedicated to dramaturgy in performative, are embodied in the chapter above titled '2.7 Multithreaded Character of Light in Performative Contexts'.

LIGHT AS A COMMON THREAD

5.2 Installation Art

It is hard to bring one finite definition to 'Installation art' term, due to its diverse interpretations and evolving applications. Used to describe artworks that invite viewers to physically engage with them, often creating a sense of creating immersive and experiential encounters, that can be related to theatrical approach. The history of installation art is multifaceted, with diverse influences from architecture, cinema, performance art, literature, among others. It describe "large-scale, mixed-media constructions, often designed for a specific place or for a temporary period of time" (Installation Art | Tate, n.d.). However, the term's broad usage and the vast range of appearances, themes, and scales of works produced under its umbrella make it difficult to pin down a specific meaning, as it has evolved to encompass arrangements of objects in any given space, blurring the line between conventional art display and true installation art (Bishop, 2005). It has been explored across different art forms, where conceptual work is being translated into something that can be called an experience. Often situated outdoor installation, extracted from pre-known exhibition space - where assumption already implies curatorial work being done - shares its placement with more site-specific locations, known more in performative art. This genre's essence lies in the viewer's interaction with both the arranged objects and the surrounding environment. It aims to heighten the viewer's awareness of object placement and bodily response. While traditional art often prioritizes individual works, installation art treats the entire space and its elements as a unified entity. It compels the viewer to step into the artwork, addressing them directly and engaging their senses beyond vision alone (Bishop, 2005). This unified entity of space and its elements often allows a more inclusive design, rather than excluding elements in given space and closing off its parts. Something like, the element of trust is passed on the viewers, to step in and embrace the full picture, staying open for empirical points of view, and seeking to incorporate the viewer's presence into the work's completion. This strong relation between installation art and viewer seems to be opening room for different dramaturgical work, choreographing how the space can be explored.

Consequently, installation art prompts questions about the viewer's role, participation, and the kinds of experiences it offers. It feeds off psychological, phenomenological, and political models of the viewer, facilitating an arc of engagement (Bishop, 2005).
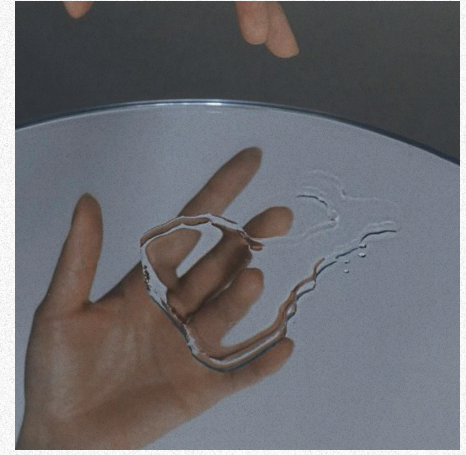
In response to the discussion around the modalities of viewers' experience in the medium that is Installation, Claire Bishop outlines two main ideas upon

Photo: Shinkenchiku-sha   08   Photo: Wolfgang Volz © 1984   09   Photo: Ziqian Liu   10

the notion activating the viewer, and the concept of "decentered subject". When first is requiring physical movement and real engagement within the designed installation, second is challenging the traditional hierarchical perspectives and embracing fragmented and diverse experiences. Here installation art seen as an immersive medium, represents a shift away from a singular viewpoint in exhibition nature. It has a strong link to how human perception is explored in art, and navigates within terms such as perception of perception and self-perception when experiencing displayed art, introducing experiential qualities. The complexity of tools juxtaposed with the shared experience concept, that comes from being in the space surrounded by other viewers often brings new viewing points, and opens multiple perspectives to what experience can occur for the audience. The pivotal role in this field is playing materials and techniques used in design or concept realizations combining different disciplines that span across architecture, spatial, and lighting design, with emphasis on audio and visual art. The engagement in installation art with viewers, is shedding light on its transformative power and the complex relationship between art, space, and those who experience it (Bishop, 2005).

LIGHT AS A COMMON THREAD

5.3 The Language Of New Media

Reflection upon what is new media introduced in this subchapter is originally coming from the relationship between cultural, scientific and philosophical lenses combined with technological development. As explained by Dawna Schuld in her discourse "Perception and aesthetic experience since the 1960s" where interesting co-dependency was presented as in the figure below.

The mutual influance on development both cultural, scientific and philosophical lenses in art and technological development is strongly visible in art field. Where the history of exhibiting throught the past years is alterating rapidly. Interactivity within exhibition spaces, art works, and curatorial practices is often related to digital solutions where technological development and advancement plays pivotal role. Key-difference in history of exhibiting are also phenomenological devices of self-perception, as the changed how viewer is perceiving (Dawna Schuld, 2022).

It can be vital to discuss 'aesthetic experiences' in exhibition art and how they change, if they remain the same? Does the developing images beyond forms, new visual stimuli in art can support improvement of aesthetical experiences and at the same time development of visual awareness and perception?

Dawna discuss existing measures of perceptual experiences that have been changing throught the time. Pointing questions such as:

- how they are mediated?
- how are being described?
- how are understood?
- how new media are used to enhance self-perceptual awareness?

Looking into broad section of installation art, performative works, art produced from experience, and boundaries of art shows how this topic itself is intertwined, and could be separately explored. However this report is only grasp on the nature of this subject and intention is to briefly explain what is considered as new media, and how new media became new.

These reflections led to grasp upon the New Media and their language, how they are being understood and mapped out? Stron reference on that topic is "The Language of New Media" by Lev Manovich, where discusses the lack of comprehensive records and theories about the emergence of cinema in the late 19th and early 20th centuries and draws a parallel to the current situation with today's digital computer revolution. He laments the absence of detailed documentation of the early stages of new media by stating that researchers are left with "a set of random and unevenly distributed historical samples" (Manovich, 2001, p. 6) and questions why theorists and historians haven't thoroughly documented the emergence of the new medium of cinema at that time. Emphasizing the importance of capturing the current "research paradigm" of new media before it becomes invisible (Manovich, 2001).

LIGHT AS A COMMON THREAD

cultural,
scientific and
philosophical lenses

technological development

Scheme by Filipowska　　　　　　　　　　*11*

Method of mapping new media

Manovich explores how new media draws on older cultural forms and languages while also breaking away from them. He examines how new media creates the illusion of reality, engages the audience, and portrays space and time. The conventions and techniques of old media, like the rectangular frame and montage, are analyzed in the context of new media.

Manovich covers various forms of new media such as websites, virtual reality, multimedia, computer games, and more. He investigates the effects on the "computerisation of culture" leading to the arrival of new cultural forms but also redefining existing forms such as photography and cinema. He uses cinema history as a lens to understand new media, and emphasizes the parallel trends between the two. Through this approach, he constructs a philosophy of new media by drawing on film theory, humanities, and computer science (Manovich, 2001, p. 8)

The author focuses on the present state of new media rather than speculating about the future. He discusses key trends influencing the evolution of new media, such as modularity, automation, variability, and transcoding. His aim is to understand and potentially offer alternatives to the existing language of computer media by comprehending its underlying logic and evolution.

In the context of understanding new media and cyberculture, Manovich discusses key terms: "language," "object," and "representation,". The author chose the term "language" to emphasize emergent conventions and design patterns in new media. He rejects using "aesthetics" and "poetics" due to potential limitations and associations. The term "object" is used to describe new media creations, highlighting their modular and industrial nature, drawing parallels with the Russian avant-garde's focus on practical design. "Representation" is examined as a nuanced concept that encompasses how new media objects construct meaning and biases, including software interfaces. Manovich presents various oppositions, such as representation versus simulation, representation versus control, and representation versus communication, to explore the multifaceted nature of new media and its relationship with culture, objects, and information (Manovich, 2001).

What Is New Media

Lev Manovich discusses the concept of "new media." and explores various aspects of new media while challenging some common perceptions. Manovich begins by examining how people often think of new media as computer-based ways of sharing and displaying content, rather than creating it. However, he argues that this definition is too narrow and suggests a broader perspective. He emphasizes that the current shift towards using computers for different aspects of production, distribution, and communication represents a significant cultural change, comparable to historical shifts like the printing press and photography.

Manovich describes how this new media revolution impacts all stages of communication and all types of media, including text, images, sound, and spatial constructs. He further delves into the historical merging of media technologies and computing, resulting in the transformation of various media forms into numerical data that can be processed by computers. He identifies five key principles of new media: numerical representation, modularity, automation, variability, and cultural transcoding. He also addresses misconceptions and clarifies that some principles attributed to new media can also be found in older forms of media. Lev Manovich's exploration of new media invites readers to rethink their perceptions and consider the intricate relationship between technology and culture (Manovich, 2001, p. 18).

How Media Became New

Manovich explores the parallel development of modern media and computing, highlighting significant moments in their history. It begins with Louis Daguerre's invention of the daguerreotype, a new reproduction process for images, and Charles Babbage's conceptualization of the Analytical Engine, an early computer design. Both media and computing were essential for modern mass societies, enabling widespread dissemination of information and data processing. The chapter discusses the convergence of these trajectories, detailing how photography, film, and other media technologies evolved alongside computing innovations such as transformation of computers from calculators into media processors, capable of handling images, sounds, and texts, leading to the birth of new media (Manovich, 2001, p. 21).

LIGHT AS A COMMON THREAD

Principles of new media

numerical representation
The text discusses the numerical representation of new media objects through digital code and their algorithmic manipulation. It explains the process of digitization involving sampling and quantization, which converts continuous data into discrete values. The emergence of discrete levels in modern media is attributed to the influence of the Industrial Revolution and factory logic, leading to standardization and replication, although modern media now leans towards individual customization (Manovich, 2001, p. 27)

modularity
This passage discusses the "fractal structure of new media," where media elements are represented as discrete samples and assembled into larger objects while maintaining their independence. The analogy is made to structured computer programming, highlighting how new media's modular nature allows easy modification and substitution of parts, similar to deleting and replacing layers in Photoshop (Manovich, 2001, p. 30).

automation
This text discusses how numerical coding and modular structures in media allow for automated operations in media creation, such as image editing, 3D graphics, and web design. It also explores the concept of "low-level" and "high-level" automation in media generation, along with the increasing automation of media access and searching. The text highlights the shift from creating new media to efficiently accessing and reusing existing media materials through computer-based technologies (Manovich, 2001, p. 32).

variability

The principle of variability in new media highlights the dynamic nature of digital content, allowing for multiple versions and customization. It contrasts with traditional media where fixed compositions were replicated identically. New media's modular structure and numerical coding enable automated assembly of different versions, reflecting a shift towards individuality in a postindustrial society. This concept extends to interactive choices and hyperlinks, giving users personalized experiences while raising ethical considerations for creators (Manovich, 2001, p. 36).

transcoding

This text discusses the transformation of media due to computerization, focusing on the interaction between the "cultural layer" and the "computer layer." It explores how computer structures influence cultural aspects, leading to a new computer culture where traditional media concepts are redefined by computer ontology, epistemology, and pragmatics. The author proposes shifting from traditional media studies to a new approach called "software studies," utilizing computer science concepts like transcoding and interfaces to understand this evolution (Manovich, 2001, p. 45).

Ultimately, Lev Manovich in his work foresees the same challenge for future researchers and highlights the need for theorists and historians to analyze and document this new form - the metaform of the digital computer. The author acknowledges the rapidly changing nature of the present and speculates whether the language of computer media is approaching a stable form or will undergo significant changes, comparing it to the history of cinema's evolving languages.

LIGHT AS A COMMON THREAD

6. DESIGN

Photo: Stephen White   12   *Photo: Joanna Filipowska*   13   *Photo: José Jorge Carreón*   14
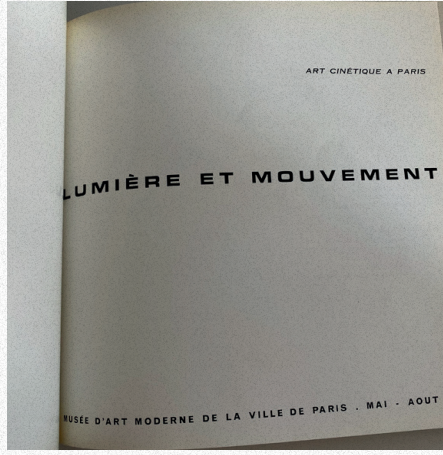
Arriving at the part of the design, with its base in all gathered knowledge from the research process and numerous aspects that it pointed this thesis to, the following chapter presents additional, supportive viewing points studied for design development and formulation of its approach. Series of overlapping processes that led to idea generation, establishing final design principles and objectives.

6.1 Designing Evocative Experiences

This subchapter traverses the intersection of supportive viewing points on perception in art, user experience, and engagement within installation art and designing an experience, aiming to illuminate the complexity of the connection between the installation design with the viewer's perception, unraveling the profound dialogue between visual art and the human experience. Further looking at the topic of evolving arc of engagement and the intricate process of deciphering audience interactions with visual creations.

The Perception and Evaluation of Visual Art

The conceptual background for the main element of art perception and evaluation is an interplay of cognition and affect serves as the cornerstone for understanding how individuals engage with visual art (Hagtvedt et al., 2008). Looking at the methods utilized to measure human perception in art, the starting point is an exploration of cognition—the perceived attributes that captivate viewers' attention. Including aspects such as art appreciation, empirical observation, and empathy theory which concludes that aesthetic appreciation is intrinsic to the artwork itself, a notion that underscores the profound interaction between emotions and artistic attributes. These attributes, intrinsic to the artwork, are also shaped by the emotions evoked in the viewer. Another point of view related to the topic is seen in the A. Gestalt theory that theory further emphasizes cognition in perception and creativity, highlighting the essential role of dynamic perception in aesthetic experiences (Hagtvedt et al., 2008). Next to it, the realm of affect, is where emotions intertwine with visual art to evoke powerful responses. It is evident that visual art acts as a catalyst for emotional reactions, with cultural artifacts contributing significantly to daily emotional experiences, where the pivotal question arises: how does an individual's emotional response contribute to the evaluation of an artwork?

Transformative aesthetic experiences

Although descriptions of "aesthetic" experiences serve as a source of inspiration for the study of art and inform its cognitive objectives, the existing model of art perception, rooted in the analytic tradition and focused on the successful integration of artistic information, falls short in fully capturing this complex phenomenon (Pelowski & Akiba, 2011)

There has been a predominant focus on "aesthetic" insight and harmonious pleasure, where existing models equate art perception to emotional alignment or cognitive assessment of an artwork's formal information, emphasizing successful assimilation of meaning. However, this approach eliminates disruptive and transformative qualities that are essential to real-life art experiences. Pelowski and Akiba discuss that the current model has its origins in the historical tradition of aesthetics and emphasizes the harmonious and pleasurable aspect of the art experience. It posits that successful art perception involves a viewer attaining a state of detached pleasure, where they align their perception with the formal or semiotic aspects of the artwork, and this alignment leads to a pleasurable and selfless state of consciousness. Pointing out that this view tends to exclude the role of disruption, emotional engagement, personal transformation, and cognitive change in the experience of art (Pelowski & Akiba, 2011). They propose an alternative model that brings an understanding of 'aesthetic' epiphany from within the experience itself, expanding the conception of art perception beyond informational assessment to include disruptive and transformative qualities and incorporating a mechanism for local growth and expectational modification, accounting for changes in viewer perception and relationship to art. Lastly, considering the role of viewer self-identity in art perception and transformation, creating a possible new approach that would shift the focus from peak moments of assimilation to an "experience-based" understanding of the viewer's relationship with art, emphasizing the process of arriving at new insights and transformative experiences (Pelowski & Akiba, 2011).

Atmosphere Metrics

Various methodologies have been used to measure affective states like mood and emotion. However, the presented method quantifies the perceived atmosphere of an environment. The perceived atmosphere of an environment, unlike mood, is expected to be more stable and is an affective evaluation rather than a direct feeling. While mood can be influenced by multiple factors, including cognition, atmosphere perception is considered a more useful concept to assess the psychological impact of environments. According to the authors, it is possible to quantify the perceived atmosphere of an environment in a form of an atmosphere questionnaire based on a lexicon of terms used to describe it. in a form of an atmosphere questionnaire (Vogels, 2008).

In consequence, a pilot method set in the test design was to create a set of terms that describe diverse atmospheres and juxtapose them from positive ones through neutral to more negative. Its final shape can be seen in the chapter related to the testing procedure.

Activated Spectatorship

Installation art's pursuit of activated spectatorship aligns with a revolutionary approach to expanding individual consciousness, involving the body, senses, and direct perceptual knowledge. The emphasis on active presence within the artwork is positioned as a means to drive political and ethical engagement, contributing to a broader discourse about the role of art in societal transformation (Bishop, 2005).

The tension within installation art lies in its endeavor to both decenter and activate the viewer, reflecting the conflict between a unified subject and an autonomous, modern subjectivity. By immersing viewers in a space contiguous with reality, it aims to prompt a deeper understanding of subjectivity and aligns with the goals of poststructuralist theory. The immersive experience is a central facet of installation art's manifesto and accomplishment. Aesthetic evaluation in installation art is often based on how well the philosophical model of subjectivity aligns with the viewer's literal encounter (Bishop, 2005).
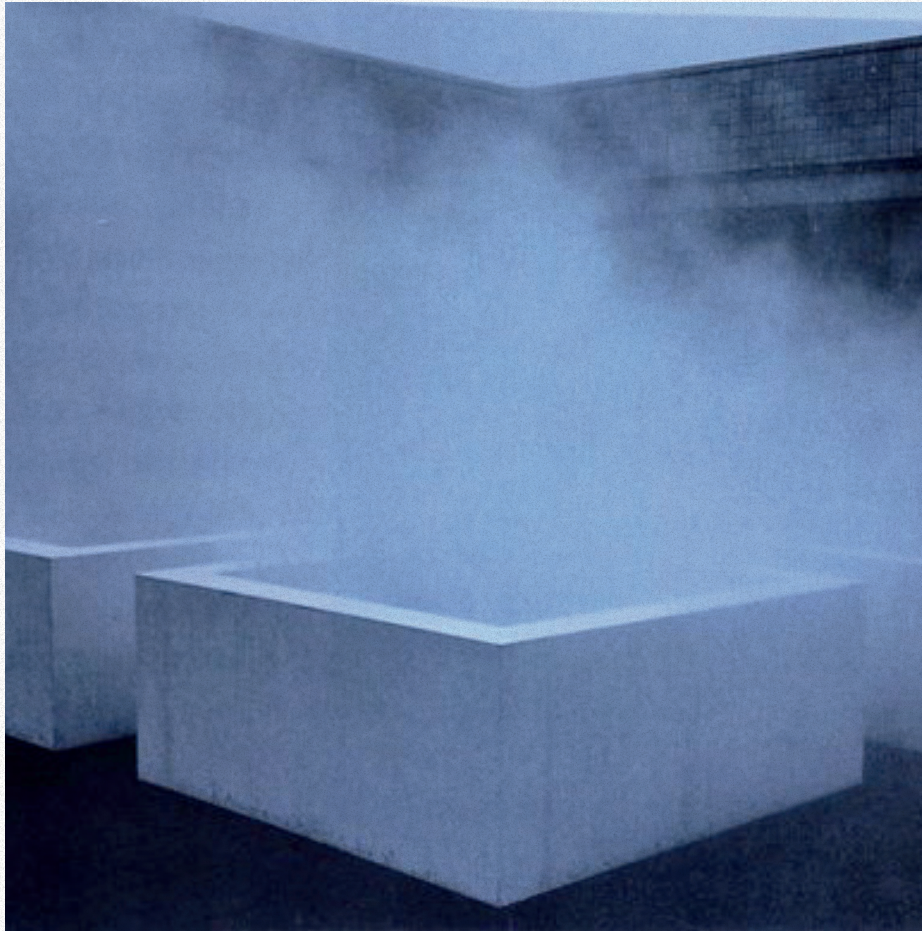
Square Fog © Processart Inc.   *15*

DESIGN

Arc of Engagement

The engagement arc narrates the dynamic interaction unfolding between the artist and the audience. This narrative commences when an individual decides to partake in a gallery, exhibition, or performance, initiating a journey of escalating anticipation. Progressing through stages of contextualization, marked by intensifying preparation, this journey culminates in the pinnacle of artistic exchange. The engagement arc is the artistic exchange, a pivotal juncture characterized by the transfer of emotions and meaning between the artist and the public. Emotions are transposed from art to audience, propelling subsequent phases of constructing significance (Making Sense of Audience Engagement, n.d.)

Often, this phase represents the sole interaction for an audience member. The supporting audience's understanding can be manifested throughout the stages. Frequently it is through curtain speeches and real-time interpretive content delivered through mobile devices. Museums prominently focus on this juncture, as it aligns with visitors' presence within the physical space. Following the artistic exchange, a phase of post-processing and meaning-making ensues. In this part, viewers engage in post-event discussions and artist receptions as well as request feedback, which plays a significant role in nurturing audiences' critical reflection. When the impact of the artistic exchange lingers, it can endure for varying durations—days, months, or even a lifetime—creating what we term the "impact echo" (Making Sense of Audience Engagement, n.d.).

The presented on the right curve of engagement can be translated and embodied into various experience-based events, setting an overview of conscious experience design and its implementation. The presented scope is a valuable point and a small guideline for the installation in this research through the exhibition, as it outlines valid stages of audiences' engagement during the intended experience.
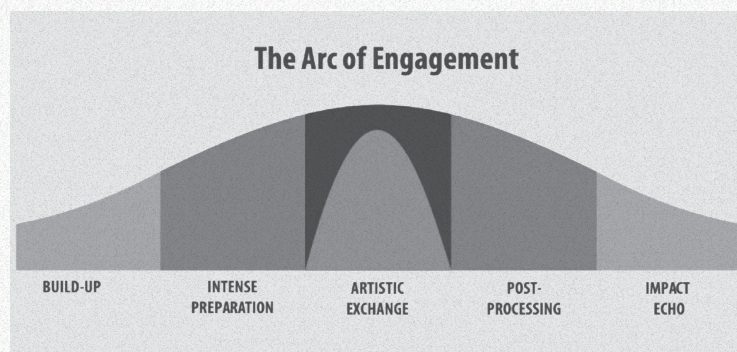
Scheme by Gosh   *16*

6.2 Design Research

This subhapter gives an overview of the initial process and iterations through the design process. Including methods, approach, techniques, and location scouting for the desired test design. Presentation of the original design and set of objectives for the final design. It is gathering essential points of view for the intended pilot research described in the following part of the report.

scientific scope   artistic
etical background   research

writing and   conceptual
analysis   test design
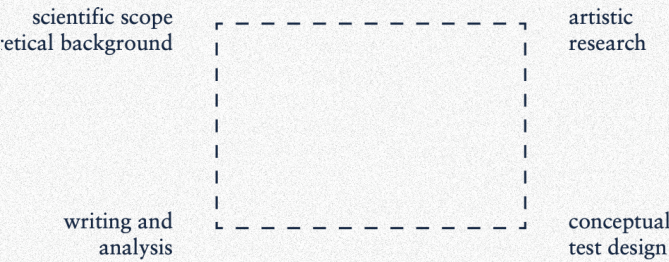
Scheme by Filipowska   *17*

Inspirations and departure point of research

The initial idea, which can be seen as a departure point, was to reflect upon "how do developing concepts in different fields use lighting both as a tool and language to execute artistic ideas?", and led to the research upon light as a coherent element in creative processes within the broad spectrum of artistic directions. In order to have an overview of how immersive installations are being designed, what it takes to create an engaging experience with light, and about light for the observers, decided to first narrow research the very core of the subject in the direction of the physiology of the eye, optics, and human vision, arriving to visual awareness and human perception, that is building the theoretical background of this report.

From the very early stage, the guiding and deeply inspiring point of view that was accompanying the trajectory of this research was the point of view presented by Władysław Strzemiński in "Theory of Vision" Human vision has not been received in a ready-made and unchanging form, and seeing is not limited to the passive reception of visual sensations. The received experiences are subjected to mental analysis and confrontation (Strzemiński & Luba, 2016). Outlining the inseparable connection between the awareness of seeing and culture, education, and civilization. Showing a shared interest in developing images and visual experiences that are allowing human perception to grow beyond form. This brought ongoing research to its final base within lighting design, spatial design, and designing experience in dialogue with visual awareness and exploring measures of human perception.

As a result, the former part of the thesis is related to scientific research, latter is to design an installation in order to implement the research question. Test design in real scale, volume, and time, allowing to prioritize users interaction and collect feedback. Seen as possible research through the exhibition. A helpful way was to structure work around four categories - scientific scope (theoretical background), artistic research, conceptual test design, analysis, and writing.

DESIGN

Through the literature review, conversations in the form of semi-structured interviews with professionals across the fields of theater, art, and design started to shape the idea of a testing procedure that would invite observers to participate in the experience, at the same time, actively observing the mechanism of vision. Another objective of the research process was to map out the role of light, looking from the perspective of cross-disciplinarity and to negotiate how all the fields go together. Researching as well artists related to light, art, space, and movement. How did they use the phenomena art with light and explored its characteristics?

lighting design
human vision
optics/physics

dance lighting
set design
technology

performance
dance
theater

human preception
materiality
visual awareness
sensorial experiences

antropology
psychology
dramatugy
art history
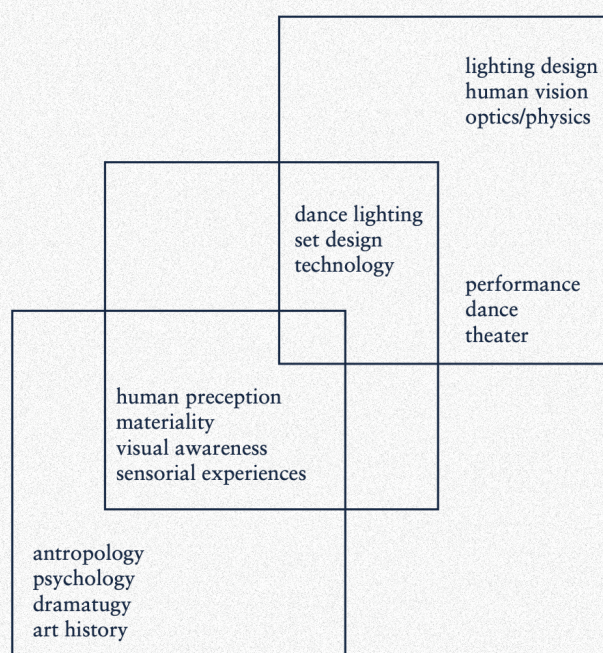
Scheme by Filipowska   *18*

Painting by Eric Blum   19   *Design by Ohashi*   20   *Photo by Filipowska*   21
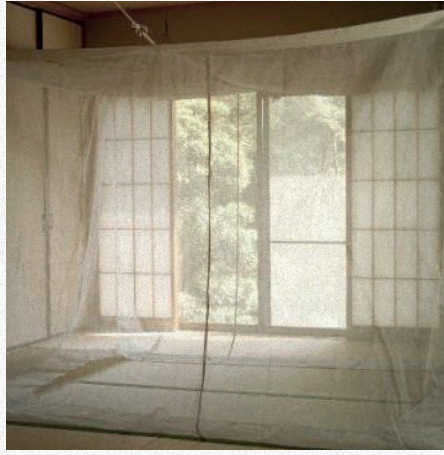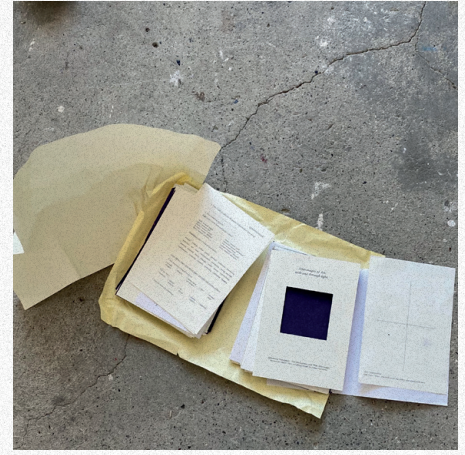
Further, taking a close look at the installation art, ephemeral design characteristics, and what are the ways to measure human perception, if it can be crossed with a scenographic approach to lighting design where observers could be testing lighting scenarios that create different atmospheres in the exhibition space. Reflecting upon the words of (Schuld, 2022) quoted below. This led to establishing a research question that reads as followed:

how to create memorable visual experiences, with and through light?

DESIGN

"Art that does not communicate the message, but rather a direction us towards awareness of new view-points."

D. Schuld
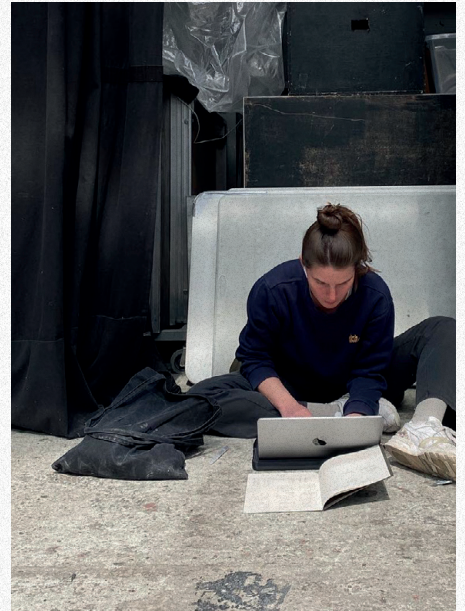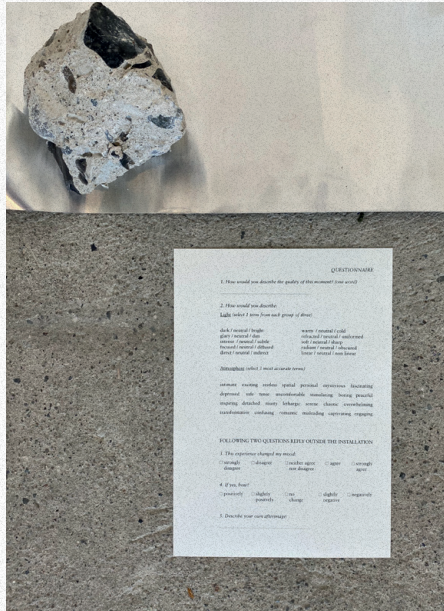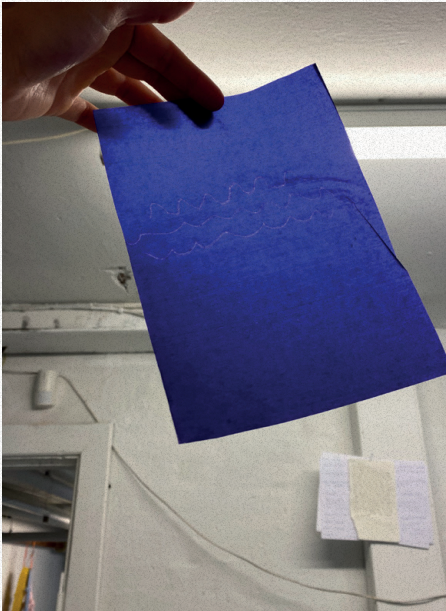
Imagine if lighting design tools could enhance _weatherism_ to hook with _emg through_ the new experiences

bring new stimuli from across disciplines to reflect whilre experieretp via lighting design?

32 – 46

TOWARDS THE EXHIBITION AS RESEARCH

Simon Sheikh

visual ———— sensings
atmospheres ————
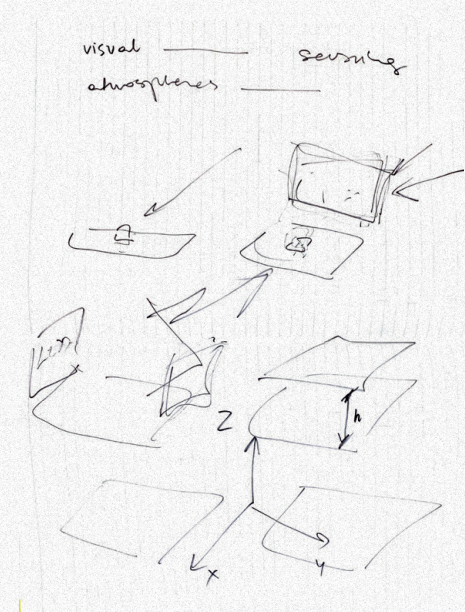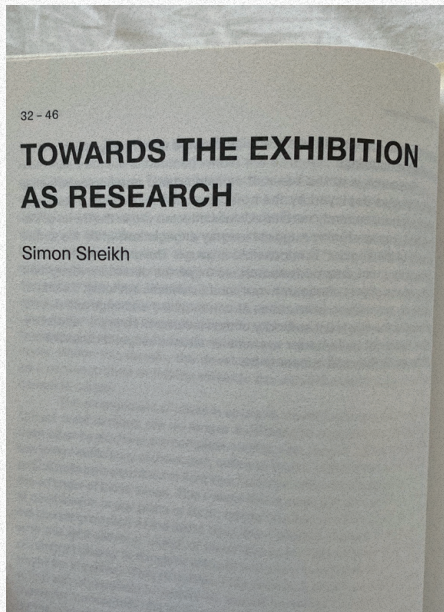
Design iterations and further research

Forming the first iterations of the test design, strongly inspired by scenographic light in stage design and its evocative character. Starting from simple, visually well-known scenarios of light that bring a spot to the center point. Exploring further iterations and different variants of lighting, angles, and positioning in terms of proximity, and height. In parallel, scouting the location for the possible installation and gathering lists of necessary equipment for the production. From quick handmade sketches, explaining the idea to more advanced 3D model in Rhino set ups were shaping their final form. In order to clearly communicate the idea, it was important to juxtapose the isometric view of each setup with a reference image, which would somewhat bring a closer understanding of the desired visual effect built with light. This is the moment where the conversation about creating atmospheres began. From the simple idea of testing different scenographic lighting set ups, from simple to more elaborated ones, the design proceeded towards building scenarios of different atmospheres.

After defining a set of scenarios, it was crucial to start the conversation about the curve of the experience that potential observers could explore within the installation. Researching the user experience and art of engagement in performance is stated to be vital for this experiment to structure it around two equal points - the research question that is forming the testing procedure (1) and the user experience curve (2) of how the installation will be explored by the participants. Delving into the method of research through the exhibition, the first draft of the testing procedure was presented at the second PIN UP presentation at Aalborg University for feedback, where the complete presentation of the initial installation design and the procedure was discussed with the professors. In consequence, received comments and new viewpoints on the topic were introduced, which helped to continue the research. At this stage, the crucial part was to turn the directions of the research into clear principles and objectives for the design. Translate the inspirations and intuitive viewpoints into actual solutions that would enable the design to work. As seen in the methodology of Practice-Based research, find a way for the creative output that allows adapting to complex explorative processes to develop the design and proceed to its implementation. Keeping the focus on findings and material gathered throughout the process of the testing procedure.
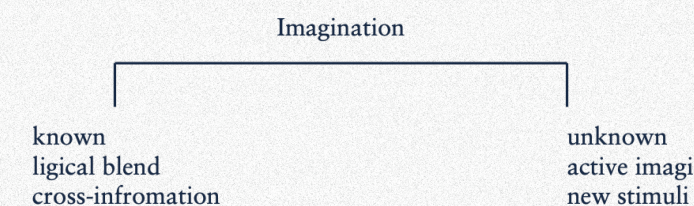
DESIGN

Recognition of the methodologies

When designing the testing procedure in the form of installation, I used the methodology of Donald A. Schon, briefly described in chapter 3., where the model of "reflection-in-action" significantly contributed to achieving clear directions based on the experience gained from architectural practice and personal experience on stage as a performer. Mapping out the possible user experience, who would step into the installation and speculate on the trajectory of the experience, reflecting on the actual advantages of the design that is combining spatial design and exhibition-making through lighting setups. A continuous cycle of thinking and action supported decision-making in real-time, allowing adaptation and necessary adjustments coming from the capacity of the venue and challenges encountered along the production of the installation. Taking the position of the participant and going through the procedure numerous times, looking for improvements, and striving to eliminate problems that would pull the focus of the actual intentions in the design. Throughout this period, it was important to discuss the uncertainty of several situations and their probability as well as build, to a certain extent, the ability to navigate in the margin of error. In consequence, using the inductive research method, I was able to formulate general principles for the analysis of observations gathered from potential participants. Finding a way to collect the data that could subsequently identify recurring patterns in their experience and related to its feedback.

Looking at the relationship between the room and lighting. How to navigate through both logical blends of known visual stimuli and create a room for unknown, new stimuli that feed off the active imagination. If participants will be able to relate themselves to encountered scenarios, how they can associate the visual sensations with previous knowledge or experiences related to art and exhibition design?

Reflect upon what are the ways of measuring perceptual experience. How such experiences can be produced, experienced, and later described or mediated? Considering the perception of perception, when an observer enters the installation space, how will he explore it? Looking for models of engagement, participation measures, and grasping topics related to the behavioral, spatial exploration of the space.

Presented in further sections, the design is synthesizing insights from diverse fields such as art, engineering, psychology, sociology, and technology and has a transdisciplinary character. This complex creative process supported the formulation of the pilot research in a form of an Installation that assembles different lighting scenarios and becomes a tool to create diverse atmospheres, giving memorable visual experiences. Where collected data - documented, drawn, and captured in real-time is being further analyzed. Its intention is to investigate — ***how to create visual memorable experiences?***

DESIGN

Imagination

known
ligical blend
cross-infromation

unknown
active imagi
new stimuli

Scheme, by Filipowska inspired by   *23*
"Beyond Darkness" scope of reseach.

6.3 Design Iterations

Presented iterations are showing complete number of set ups, further called chapters, that were primarily designed for the installation. Their formulation allowed setting possible scenarios that build with light. When chapters 1-4, and 8 are using mainly lighting as a dominant element, exploring light characteristics and its potiential according to positioning, different light distribution in the room or intensity, chapters 5-7, and 9 are incorporating supportive elements or materials that play with light in order to create more immersive and captivating effect. Intentionally diverse character in the designed set ups is aiming to evoke different visual experiences for the observers and map out, their feedback as it is very individual topic, how each can and will be perceived, aesthetically evaluated, or to what level can enhance the engagement. Visible object on the schemes presented in eachof the lighting scenario, plays an important role, yet is further described and argumented in the description that presents final design. In this stage, intentionally overlooked, in order to focus on the discussion and interaction of light, used only as referential point to the space bringing sense of scale between: observer, lighting scenario and the venue.

Chapters 1-2

Croquis 01   Inspiration
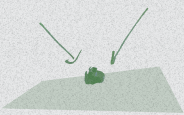
Set Up 1
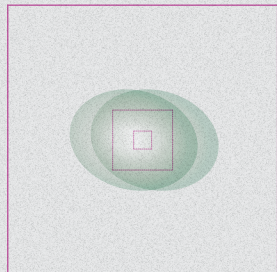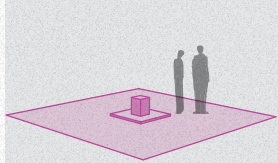
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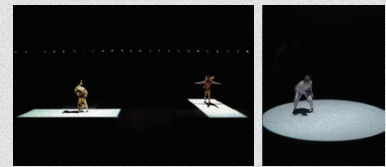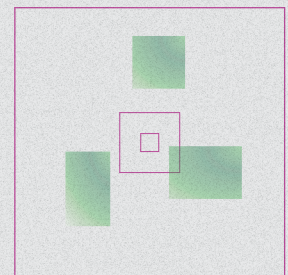
Set Up 2
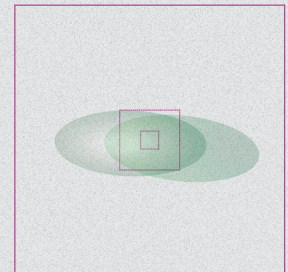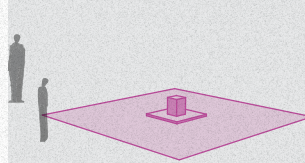
Chapters 3-4
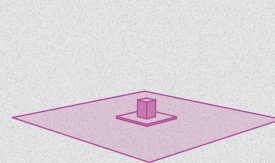
Croquis 03   Inspiration
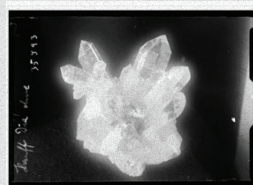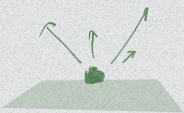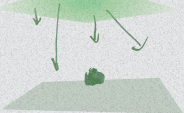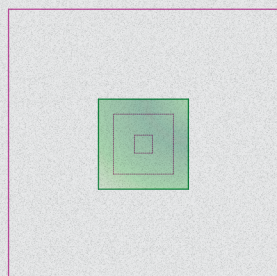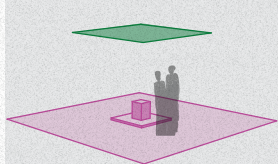
Set Up 3
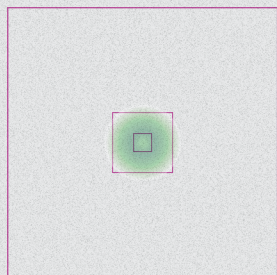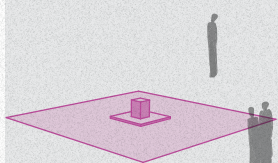
Croquis 04   Inspiration
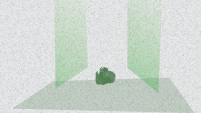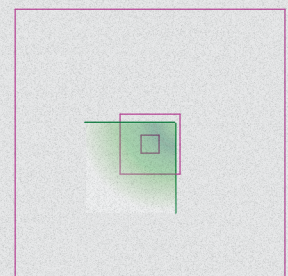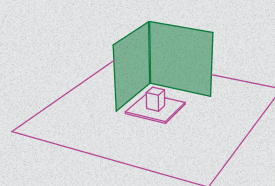
Set Up 4

Chapters 5-6

Croquis 05   Inspiration

Set Up 5

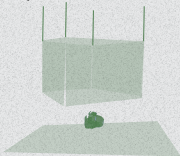Set Up 6   Inspiration

Croquis 06

DESIGN

Presentation of the setups, by Filipowska   *24*

Set Up 7

Inspiration

Croquis 07

textie + light + object + observer
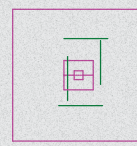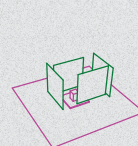
modular panel positioning

Set up creating visible geometrical form out of four panels. Each consisted of wooden frame combined with semi-transparent mesh bright material attached to it freely hanging from in the bottom.

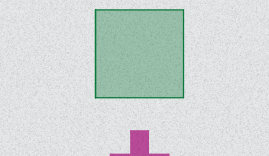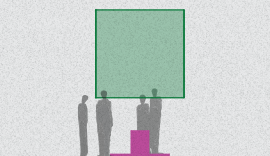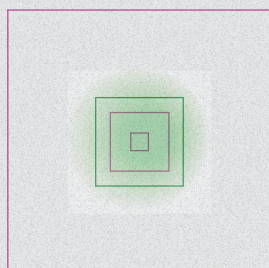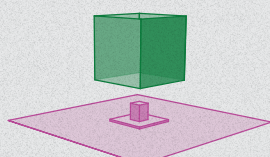Aiming to bring more organic and soft element to the space that with its translucent property is diffusing projected light creating gentle light above the central element, which is a reference point. Panels originally assembled into a square might also hang in couple or singular set up as presented in previous scenarios.

Observers are welcome to move around freely throughout all the scenarios. Intention of this setup is to bring more air to the space, feeling of dimensions and encourage people to step inside the geometrical form.

Bottom edge hanging 150cm from the floor surface.
Dimensions of the square: 3x3m.

DESIGN

Set Up 7

Inspiration
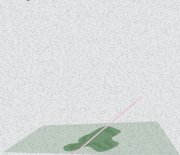
Croquis 07

(led stripe crossing the venue,
when ice almost entirly melted into water)

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Presentation of the setups, by Filipowska

25

Final Set Up

Set Up 7

+

Inspiration

Croquis 07

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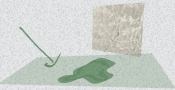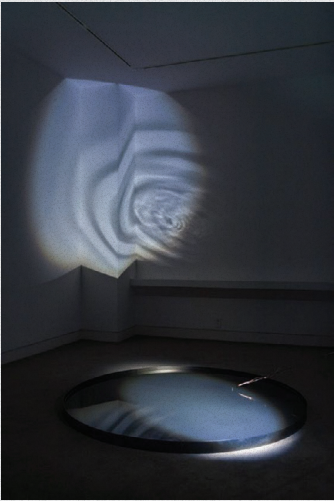

Presentation of the setups, by Filipowska　　　　　*26*

DESIGN

6.4 Research Approach

The chapter serves as a comprehensive compilation of essential viewpoints, establishes objectives, and provides an overview of the design principles to be explored. At its core, this chapter aims to address the complex interplay between design theory and practical application.

Drawing Inspiration from Theoretical Frameworks

The pivotal aspect that found this work outlined by Wladyslaw Strzeminski is the inseparable connection between the awareness of seeing and culture, education, and civilization. Seen as a departure point to this research, as there is a shared interest in developing images and visual experiences that are allowing human perception to grow beyond form. Investigating aspects such as visual awareness, human vision, and perception and exploring their position in art, with and through the medium of light, led to shaping an idea of possible research through the exhibition and developing a design that could test how to create visual experiences that become memorable.

Our mind, as it were, poses questions in advance, which our sight is supposed to answer, where the range of observations to which we are to respond by seeing, confirming, or contradicting our previous assumptions is determined. This is how the work of thought, cooperating with the direct activity of seeing, determines the richness and diversity of our perceptions. In the process of seeing, what is important is not what the eye mechanically grasps but what a man perceives from his seeing (Strzemiński & Luba, 2016)

The exploration of 'light and space' from the 1960s til the current moment has been a significant source of inspiration for this work. The emphasis on manipulating light to transform spatial perceptions and create immersive environments has guided the intention to use lighting as a pivotal element, as well as focus on engaging viewers through sensory experiences. Somewhat supporting the objective of designing described below installation, where lighting contributes to shaping atmospheres that provoke emotional responses. Altogether, keeping important sentence from the discourse on perception where she comments on

works and art that does not necessarily communicate the message but rather a direction for us towards awareness of new view-points. (Dawna Schuld, 2022). As the testing procedure aims to point viewers to directions within the topic and give new viewing points.

Overall, the interplay of light and space, appreciation of temporality, and the fusion of diverse elements from installation art's legacy have collectively influenced the design approach, driving the creation of environments that engage, provoke, and resonate with viewers on both aesthetic and emotional levels.

DESIGN

Objectives

The complexity of this approach lies in its dual character interlacing various challenges, where designing an installation as a testing procedure that will provide certain visual experiences - aesthetic challenges and execution of an installation, and at the same time transmit objectives of the research - ensure collection of material and data, that can be further analyzed. Where the goal of achieving a cohesive whole, blurring the lines between disciplines, has encouraged a transdisciplinary mindset of this design.

This work is a combination of two directions that emerged from the research process, forming the following objectives. They are being developed in parallel, mutually stimulating possible outcomes.

DESIGN

(1) Following the spirit of the research through exhibition sets an objective to design and installation that has the ability to investigate posed questions through engaging viewers and testing:
viewers' evaluation of light and afterimages characteristics, readability of atmospheres, their reflections on experienced atmospheres, pointing directions for vision to explore them, finding out what remains instantly in our eyes, and how different presented lighting scenarios can influence mood.

Inspired by the mechanism of seeing and its role in expanding visual awareness, it focuses mainly on incorporating the testing procedure in the installation following objective number two.

DESIGN

(2) In parallel, the second objective reflects directly on the research question posed —- 'how to create memorable visual experiences with and through light?', and exists only because of the first objective. Is to map out what elements and support design components are crucial for designing an evocative experience with and through light.

Find out — if the executed installation had an impact on the viewers. What elements enhance viewers' participation and engagement?

Where an additional important perspective here is to stay open for viewers' interpretation of the designed experience, as in performative arts, where theatrical pieces observed by the audience will provide for each viewer's individual experiences and leave with diverse layers that enrich their sensibility.

Here actual knowledge is to be gained from incorporating diverse materials and elements central to installation art, embodying elements that support audience engagement, and building the installation itself. Further carrying out the testing procedure, observation from a phenomenological point of view, its impact on the viewers, and lastly, evaluation, if set measurements and execution of the installation brought desired outcomes.

This process requires looking at the complete work carried out within this thesis - research, creative processes, reflections, observations, and feedback from viewers - and investigating if it is possible to conclude guideposts that would support creating memorable visual experiences.

This approach involves experimenting with materials, architectural elements, and sensory stimuli to craft spatial narratives that transcend traditional boundaries, ultimately fostering immersive and captivating experiences.

Delves into developing new stimuli (visual experiences) that are allowing human perception to grow beyond form. Exploring them through experiencing the installation, embodied atmospheres in it, and tasks introduced to the viewers (testing procedure). Altogether, can be considered a coherent goal.

Support questions and aspects

As the complexity of the subject is touching upon various fields, throughout the process of research, numerous open questions and thoughts were valuable to pin down supporting the process of achieving set objectives and implementing knowledge into the final design. When some of them are left open, few are finding their place influencing and shaping the design.

> — *How to investigate the readability of atmospheres created,*
>   *with and through light?*
>
> — *What are the scenographic lenses that can be used in this project?*
>
> — *How to guide the viewer through the installation,*
>   *which embodied the testing procedure?*
>
> — *What will be the experience curve for the viewers?*
>
> — *How to translate the arc of engagement from performative art into installation art?*
> — *How long is the curve of the experience in the given space?*
>
> — *Are there any perceptual challenges for the viewers in the installation?*
>
> — *What are the images that remain in observers?*
>
> — *Where was the center of gravity in space?*
>   */vertically, horizontally, where there any shifts/*

Essential throughout the design process were thoughts on how the dramaturgical approach from performative arts can be transmitted in design and installation art. Referring to it as dramaturgical lenses following set of questions is being posed:

Dramaturgical Lenses

what is present?
what are the elements?
what is the quality in that moment?

what changes? (how / when / why)
what experience does it create?

what does not change? (how / when / why)
what experience does it create?

what is the level of intensity in what you see?
what is the level of intensity in what you feel?
what is no longer there?

This perspective has been accompanying the creative process and decision-making when designing a curve of the experience in the installation, yet has a character of internal dialogue and shapes possible discussion curves in this project. Seen as a possible angle to speak about the installation design and research through the exhibition.

Principal Design Principles

Participation
Activated spectatorship
New viewing points on visual awareness
Active observation
Seeing above looking
Reflection-provoking testing proc on
Receptive state in the viewers
Art that points to new directions
Creating atmospheres

DESIGN

Practical Application

Currently, museums and exhibition spaces strive to create memorable experiences and achieve captivating atmospheres for their audience. This pilot research can be seen as an exploration of this topic, aiming to find out 'how to create memorable visual experiences, with and through light'. Opening the topic of how to create a complete experience using lighting design and develop visual sensations or images that remain in the audience.

The main aim is to connect design theory with practical application, creating diverse atmospheres that captivate viewers both aesthetically and emotionally. This approach is inspired by the inseparable connection between seeing, culture, and education. Moreover, it embraces the challenge of translating theoretical inspiration into tangible design elements that go beyond simple shapes, pushing the boundaries of human vision and perception. This design aspires to bridge the gap between science and art through its diversity, and aims to create memorable visual experiences. Exploring light perception and aesthetics from different angles.

7. INSTALLATION DESIGN

Photo by Muszkieta 27   *Photo by Muszkieta* 28   *Photo by Muszkieta* 29

The installation, driven by the spirit of research through the exhibition, delves into the realm of artistic exploration while simultaneously investigating complex questions pertaining to atmospheres, visual perceptions, and the profound impact of light. It assembles different lighting scenarios, which become tool to investigate different visual experiences embodied in built setups. Strive to directing the viewers into new viewing points on human vision and perception of light. Explores different ways to discuss light, space, perceived atmospheres, and their afterimages.

The inclusion of the term 'afterimage' within the installation's context is deliberate and holds a purposeful significance. It serves as a conduit, inviting visitors into a realm of active observation and reflective engagement. This strategic choice stems from a recognition that the genuine afterimage phenomenon's complexity might not be fully realized in the confines of a simple experiment. However, its inclusion carries an indirect invitation for visitors to embark on an experiential journey of focused exploration. It reveals the curiosity standing behind the true afterimage phenomena and translating it, more metaphorically, to the fact that each visual experience and encounter with art brings enrichment to human vision and expands the visual vocabulary of one's perception. Outlining

the important process of learning what each visual image means and subjectively to what part of the reality it corresponds to. Where constant correction of thoughts in relation to vision allows for improving the use of received visual sensations —- gathering and expanding vision consequently expands human sensibility and aesthetic values of the perceived world (Strzemiński & Luba, 2016). In consequence, the term 'afterimages of art' is relating to the broad context of perceiving art, which leads to expanding human sensibility. Refers to soft layers of visual sensations that remain in viewers and shape their understanding of complex experiences.

This installation consists of a multi-phase testing procedure, where viewers enter into a receptive state angled for light and space around them. Moreover, it adopts a playful and open-ended stance, mirroring the concept of 'leaving things up to chance.' This approach aligns with the installation's broader ethos of allowing each participant's unique perceptions and interpretations to shape their experience. When the test is pointing viewers to different perspectives of light and atmosphere, the experience itself is based engage and participate differently with the presented experiment, gaining an individual layer of stimuli, visual sensations, and reflections from a presented installation that will remain in them for a certain period of time, an echo representing the lasting impact. An interplay between visual perception, cognitive response, and creative output.

Afterimages of Art, with and through light.
Afterimages of Art.

Master Thesis Installation. The direction in Lighting Design at Aalborg University.

Akademiet For Utæmmet Kreativitet, Copenhagen 2023.

INSTALLATION DESIGN

Afterimages of Art, with and through light.
Ephemeral Installation - On Atmospheres and Their Afterimages. Softening Layers of Sensibility.
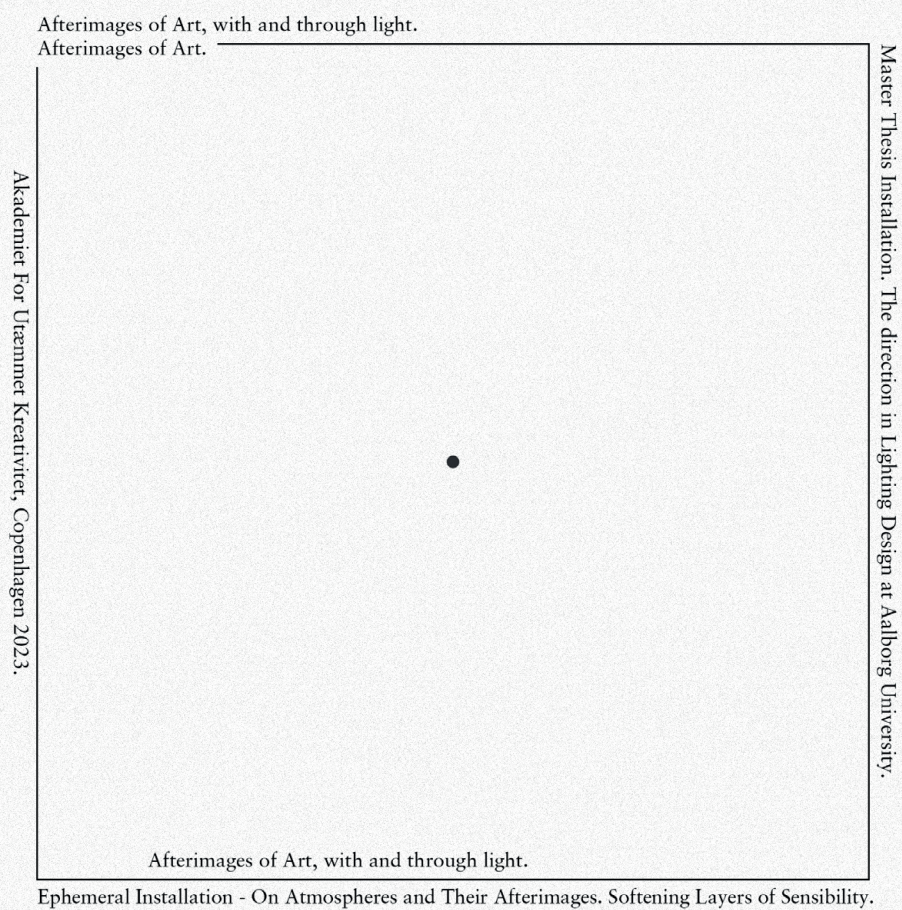
*AFUK Theater Hall, documented by Filipowska*

7.1 Location

Characteristics and qualities

Presented above space, the theater hall at Akademiet For Utæmmet Kreativitet (AFUK) is situated by Enghavevej 82 in Copenhagen, Denmark. Principal performative space is also used for diverse events throughout the year.

A hall of 700 m2 with 9.5 meters in the highest vertical point to the ceiling, with maximum capacity in the hall estimated for 500 people.

Selected locations already have existing truss systems and lighting equipment that were partially incorporated into the test design. The main objectives in looking for the location were spaciousness and the possibility of achieving a minimal level of light coming from outside. A major part of the hall is finished with black paint and has installed black Molton curtains when on the opposite side part of the hall is light grey. The concrete floor enabled the implementation of natural elements to the installation, such as ice, which slowly melted into a large puddle of water. Skylights visible in pictures are optional, as controlled shutters allow them to black out the space. A small challenge appeared from the windows of the balcony during the installation, as it was a surface hard to hermetically close off, yet without significant impact on the carried-out

INSTALLATION DESIGN
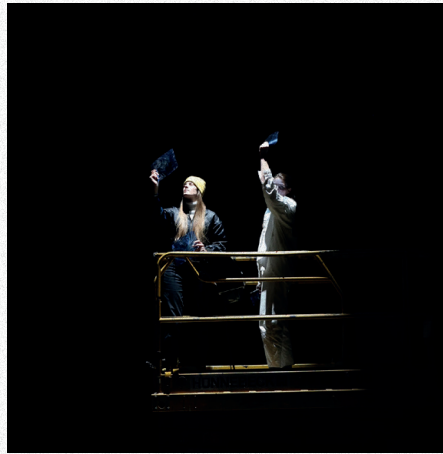
design. Great facility coming from existing rigging points allowed to bring to the space designed pending elements as well as a montage of both fixtures and projector on the beams. AFUK hall has a direct connection to kitchen production, where for a particular time in advance, ice blocks were being prepared. As the performative space was adapted for this installation, the primary access to the venue was used au face in order to separate it from the communication used by the school.

The principal advantage of the presented location was the hospitality of the hosting institution, and spaciousness, as well as the lighting and rigging conditions, enabled testing in advance in order to achieve the desired design and, at the same time, accurate atmospheres for the observers.

INSTALLATION DESIGN
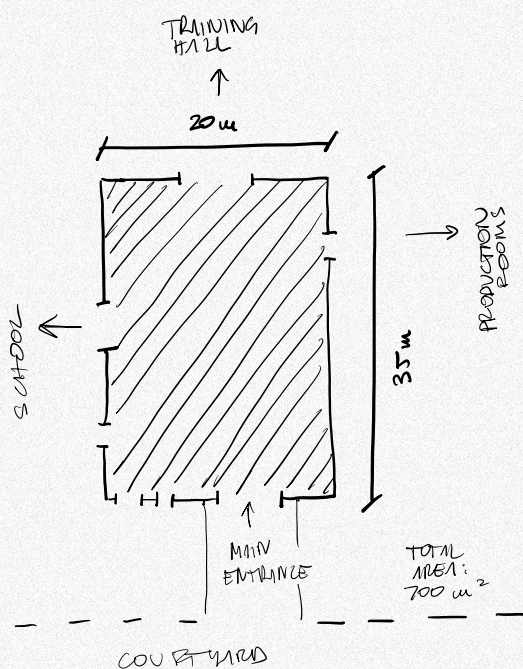
Plan of the hall, by Filipowska   31

7.2 Elements

Temporality and Atmospheres

From the early stage of this project research and creative processes related to it, the light has been considered as the principal context. As read in a title - with and through light. Its role has been placed in the position of both executing intended atmospheres through light and finding out ways of measuring perceived sensations with light. The concept of finding out tailormade solutions in order to evoke diverse atmospheres using light embodied in the exhibition space has built this case and allowed the objective allowed to create the pilot research in a structure of test design.

When reflecting on an experience that viewers would step into it was intuitional that chosen location and its theatrical character can be transformed into an exhibition space, where the capacity of the venue to use stage lighting and achieve a vast, spacious room was adequate. A room where visual and non-visual sensations can become catalysts for presenting different atmospheres, with and through light. Aiming to provide a spatial set that enables the viewer to enter his receptive state and observe. Staying open for receiving both previously known and unknown stimuli that are built into the set ups.

INSTALLATION DESIGN
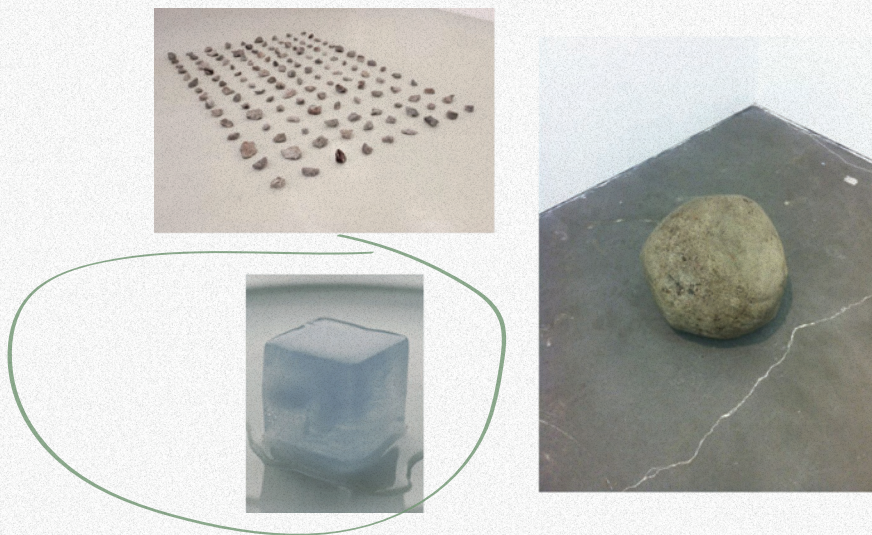
Collage, by Filipowska   *32*

Light — Space — Time

Inspired by different directions of what this installation could be, what it would test, and pure curiosity - how powerful is the role of light in such a setup, it was an active choice to use the minimal amount of additional elements, yet aiming to provide reflection-provoking sensation for along the testing procedure, focused on the diversity of possible visual images. Remove the performer role from the performative space. Narrow the elements to essential and only ones that can emphasize the desired atmosphere. Although the element of performance has been removed, the urgency to center the room and bring a soft presence to it that would not destabilize the position and role of light has been there. Originally searching for natural elements that will be present in the space, developed a thought upon representing the ephemeral character of this work and how fleeting the moment that can be perceived is registered when being in the room. Striving for a piece of nature that can tell a story feeding the feeling of time passing, yet silently entering its centering role.

The selected object has a special character and dual function. It centers the attention in space towards its place and displays different textures. Embodying important aspects that are in dialogue with time, and durability in the installation, by placing an element of ice. That melts during the opening time, outlining first frosty and sharp (texture, edges). Later expose its smooth and shiny (melting process) character, decreasing its size, and leaving the stage. Finally, when it turns into its final very organic, playful texture – a puddle of water from melted ice that becomes a reflective medium for light -- it presents a play of brilliance.

Ice production, documented by Filipowska   *33*

INSTALLATION DESIGN

7.3 Implementation Aspects

Venue
The installation took place in the theater hall of Akademiet For Utæmmet Kreativitet (AFUK) in Copenhagen, Denmark. A hall of 700 m2 with 9.5 meters in the highest vertical point to the ceiling, with a maximum capacity in the hall estimated for 500 people, turned into a testing laboratory and exhibition space at the same time.

Time and Opening Hours
Designed installation was displayed for the viewers for four days (4-7th of May, 2023) between 14:00 and 22:00, as vital for the final set-ups was to achieve minimal lighting conditions inside of the venue, ensuring no additional light entering the room from the balcony and entrance of the installation. Participators were invited to step into the installation.

Schedule
Primarily designed schedule to display the set ups was chained with the decision to display each of them separately without transitions that would be visible to the viewers. The chronology derived from the interplay of melting ice and lighting scenarios that were expanding in their advancement, as well as from the practicality of additional elements, such as haze, that were designed to play a role only in the three final set ups, which to achieve the desired effect the room of 700m2, required a significant amount of fog, most of the time choreographed and maintained over the displaying time.

Time
Set Up 1 / 14:00-14:30 (30 min)
Set Up 2 / 14:30-15:00 (30 min)
Set Up 3 / 15:00-15:30 (30 min)
Set Up 4 / 15:30-16:00 (30 min)
Set Up 5 / 16:00-16:30 (30 min)
(break)
Set Up 6 / 17:00-17:50 (50 min)
Set Up 7 / 18:00-18:50 (50 min)
Set Up 8 / 19:00-20:20 (80 min)
Set Up 9 / 20:30-22:00 (90 min)

The scenarios, seen as chapters that present different lighting scenarios to the viewer, were expanded starting from the simpler ones to the most elaborated ones. Anticipating the fact that in the first ones, technical break for changing the setup and adjusting the fixtures wasn't taking a significant amount of time, the last four were more challenging in terms of rigging elements or placing multiple fixtures in pre-defined positions, as well as starting up the software and running different programs.

Previewed Capacity
Originally the estimated number of participants, taking into consideration the duration of the event, was between 100-150 people. Striving to achieve enough replies for each of the scenarios, in consequence, be able to analyze a wide range of the gathered material and enable collecting valuable feedback.

When the total preview capacity was roughly estimated at 25-35 visitors per day, the distribution of both time and date of the visits was left up to the natural (not scheduled by appointment or by invitation) order, opening the doors of the installation every day for 8 hours.

INSTALLATION DESIGN

Production and Design Execution

Written from the retrospective, as tasks planned beforehand were juxtaposed with lots of new aspects encountered on the go. After approving the possibility of building an installation at its full capacity and scale, first, it was crucial to settle dates when the venue could be available, choosing the slot of 9 days, counting 4 days for building up, 4 days of the installation, and one to strike down. In parallel to the process of securing dates, it was important to reach out to several parties for lighting equipment that could lend or rent lights to be used during the test design. Approaching different professionals for consultancy and possible support, such as rigging or lighting montage, controlling, and making cues.

Pivotal roles were playing supervision with Mihkel Pajuste and Georgios Georgios Triantafyllidis throughout the design process and formulating testing procedure. Additional conversations and discussions on technical aspects of the installation and its execution were supported by Jesper Kongshaug, as well as Kristin Wichstrøm, who shared insights related to visual art and projections. Production of the setups required several elements that were secured and gathered from various hardware stores and more specific companies such as film gear rental companies, lighting rental companies, and Manufakturet of the faculty of Media Technology at Aalborg University. The total list of the equipment is wider yet, narrowed down to the main elements that were crucial: fixtures, projectors, tripods, rigging gear, butterfly, GoPro, analog camera, additional computers to run projection, fog machine, and sound system.

Along the production process, crucial support was coming from Jamie Swan, who provided rigging of one of the set ups, allowing fluent transitions between set ups. Lastly, Maia Cherry, who works closely with AFUK as a lighting technician, supported the process with hands-on tasks and additional knowledge about lighting in the house. As later described, in a chapter titled 'post-installation', equally important was to document the process and complete the testing procedure. In consequence, two photographers and one cinematographer have been invited to join this project and document essential aspects throughout the production and installation periods. Complementary to two cameras that were used in the testing procedure, time-lapse and Go Pro, that were documenting a

major part of the installation in order to provide material for spatial analysis (see below in section 'name of the section'). Thanks to the courtesy of AFUK, part of the lighting equipment, part of the rigging gear, the sound system, and the lift were available to use on-site, as well as access to the kitchen production in order to use freezers.

The production started on the 30th of April from securing the lighting, positioning fixtures, and adjusting the light levels as well as rigging the elements. Significant time in advance of the process of freezing ice has been already on, to understand the best way of achieving desired element and time out the melting process in the venue. In following, building and testing set up by set up, allowed to verify the chronology of the displayed lighting scenarios and the routine in between that had to be highly efficient also from the aspect of carrying out most of the tasks in personally or in a team of two.

Important was also the aspect of mediating the opening of the installation, its purpose, and duration. The complete info related to the installation in advance, communication of the topic to the audience was multi-staged and this topic is described more broadly in the section 'post-installation'.

INSTALLATION DESIGN

7.4 Atmospheres

Presented in this section scenarios, called chapters were built and available for visitors throughout the whole period of the installation, presenting diverse lighting set ups, in consequence, different atmospheres.

INSTALLATION DESIGN

Chapters from the Installation, documented by San Danilowicz   *34*
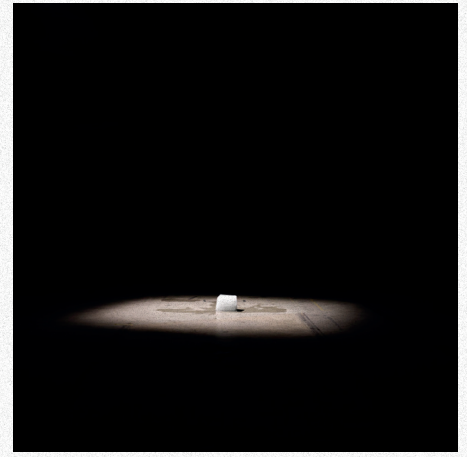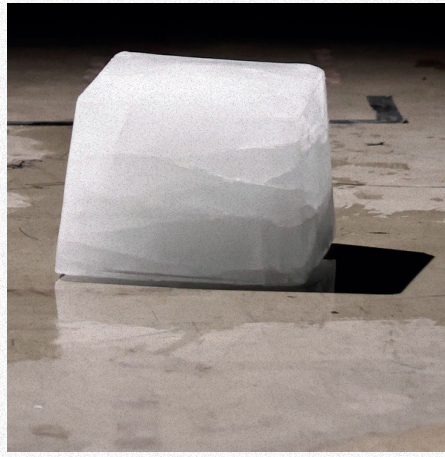
INSTALLATION DESIGN

Setup 1

The initial arrangement consisted of a single lighting fixture, specifically a Fresnel type. A theatrical Fresnel, known for its gentle and gradual light boundaries, possesses the ability to smoothly transition between a concentrated spotlight and a broader floodlight. This versatility is achieved by altering the positioning of the lamp in relation to the internal reflector. In this instance, the fixture's settings were calibrated to produce a spotlight distribution. This particular illumination choice effectively directed attention towards the primary focal point, namely the ice cube.

Elements: single fixture, ice cube.
Light distribution: spot light

132
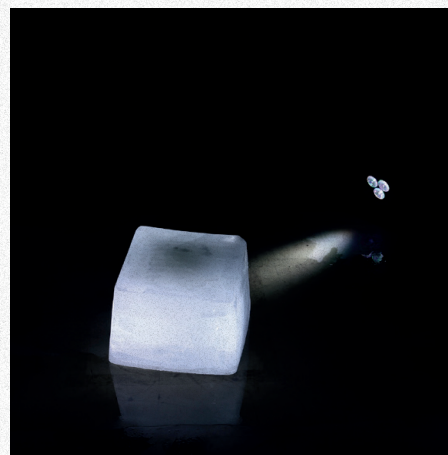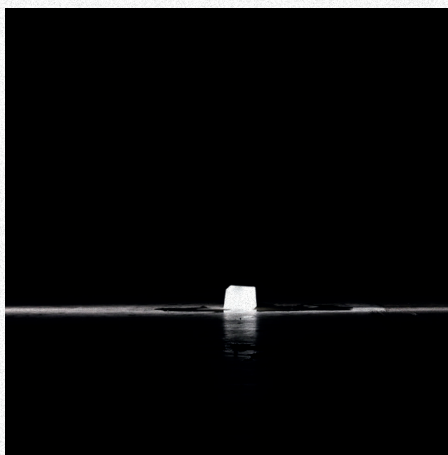
Chapters from the Installation, documented by San Danilowicz   *36*

Setup 2
The subsequent arrangement came to life through the placement of a pair of "Look Up" light fixtures. Distinguished by their distinctive design, these fixtures were characterized by their ability to project a focused and narrow beam of light. Positioned to cast their glow in a downward trajectory, the directed beams of light extended their reach beyond the focal point, heightening the ambiance of the surrounding area.

Elements: two fixtures, ice cube
Light distribution: narrow light

INSTALLATION DESIGN
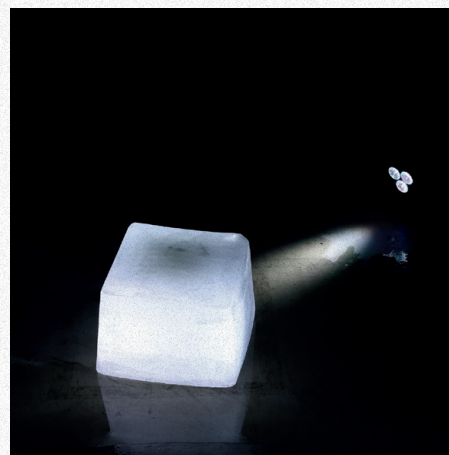
INSTALLATION DESIGN

Setup 3
The third arrangement consisted of four Astera Triple PAR light fixtures positioned at each corner of the ice cube, maintaining an approximate distance of 40cm. These fixtures emitted a focused light beam, creating a distinct glow effect that enveloped the central element. This lighting technique not only accentuated the ice cube's features but also cast an enchanting ambiance, leaving the surrounding area shrouded in shadows, adding an air of mystique to the entire scene.

Elements: 4 fixtures, ice cube
Light distribution: narrow light beams

Chapters from the Installation, documented by San Danilowicz   *38*

Setup 4
The fourth configuration encompassed a trio of ETC S4 Jr 50° Profile light fixtures. Characterized by their cone-shaped light dispersion, these fixtures were randomly placed throughout the scene. The interplay between layers of haze and the illumination gave rise to an enchanting ambiance. The bubbles of light formed by the fixtures downward-facing orientation, only added an aura of mystery but also contributed to the overall ethereal quality.

Elements: 3 fixtures, ice cube, haze
Light distribution: cones of light

INSTALLATION DESIGN

INSTALLATION DESIGN

Setup 5

The fifth arrangement boasted an assembly of seven Astera Triple PAR light fixtures. These narrow spotlight fixtures were positioned in an artful dispersion across the scene, maintaining an approximate distance of 4-5 meters between each unit. The deliberate randomness in their placement added an element of spontaneity to the ambiance. What truly distinguished this setup was the low placement of these fixtures, which created rays of light that danced through the room, gently lighting the main element. This interplay of light and shadow transformed the room into a canvas of visual depth and intrigue.

Elements: 7 fixtures, ice cube
Light distribution: narrow spot lights

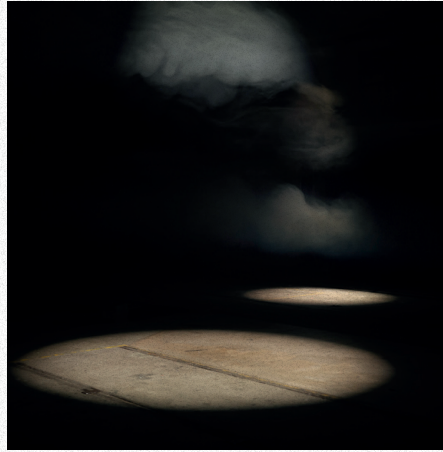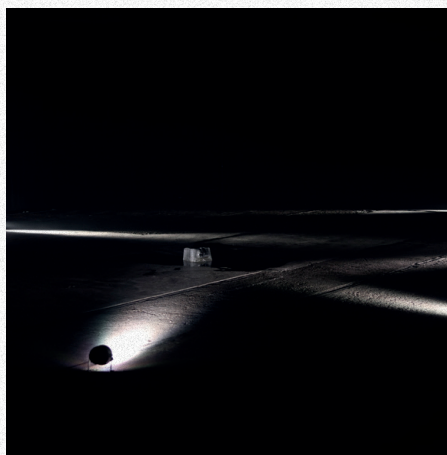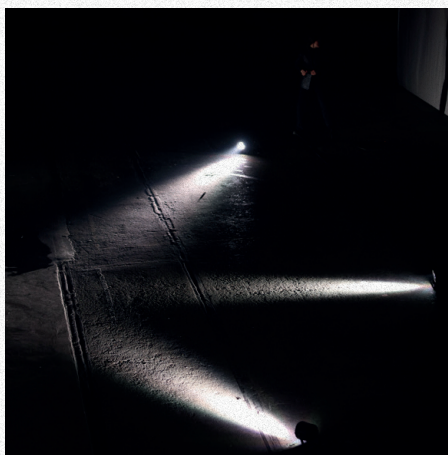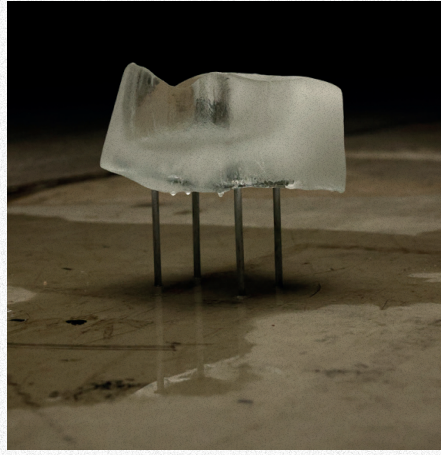*Chapters from the Installation, documented by San Danilowicz*   *40*

<div style="text-align: right">INSTALLATION DESIGN</div>

Setup 6
The next arrangement featured a pair of Fresnel light fixtures, calibrated to emit a focused and slender light beam, were strategically positioned directly above a spacious 3x3m softbox. This setup allowed the emitted light to be diffused by the softbox, resulting in a gentle and enveloping illumination that caressed the contours of the ice cube. In this arrangement, the softbox transcended its role as a mere modifier and emerged as a radiant source, becoming a pivotal focal point within the scene.

Elements: 2 fixtures, ice cube, soft box 3x3m
Light distribution: interplay of soft light on the ground and illuminated suspended surface
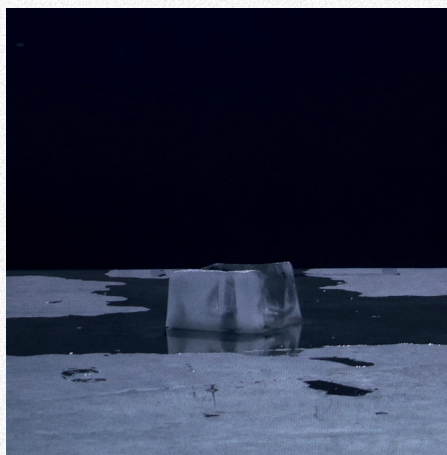
INSTALLATION DESIGN

Setup 7
This arrangement took shape through the use of a single projector, crafting an illuminated enclosure. The diverse layers of haze engaged in a captivating dance with the projector's luminance, ultimately creating an immersive three-dimensional chamber of radiant illumination. This spectacle invited observers to be enveloped in a captivating interplay of light and mist, transforming the space into a mesmerizing realm of visual enchantment.

Elements: single projector, ice cube, haze
Light distribution: defined trapezoidal shape of light displayed on the floor

Chapters from the Installation, documented by San Danilowicz   42

Setup 8
The final configuration materialized as an ensemble of 13 LED stripes integrated within sleek aluminium profiles. These profiles were arranged in a semi-circle along a designated expanse of the room, imparting a sense of delineation and intrigue. As they stood, these profiles did more than physically partition the space; they crafted a threshold to wonder. The convergence of their luminance with the ambient haze created an enchanting atmosphere, evoking a sense of magic that embraced the surroundings.

Elements: 13 fixtures with tripods, ice cube, haze
Light distribution: multiple linear stripes of light

INSTALLATION DESIGN

7.5 Test Desing

Designed testing procedure is impartial and devoid of any influence from factors such as age, gender, politics, or profession. It ensures a fair and unbiased evaluation, focused solely on the merits of the subject under examination. The presented procedure is aiming to collect and gather in a most accurate way material for further analysis, and its intention is to respond to the objectives of research through exhibition. It consists of a questionnaire and two tasks intended to be replied to both during and after the test when stepping out of the exhibition area. This combination in its final form is structured by questions related to characteristics of the light, atmospheres, and open questions which allow for a more expressive way to communicate observations.

This section is presenting each step of the test separately for clarity and to emphasize their diverse angles and directions, yet share interest in testing aspects related to the experiencing atmospheres, with and through light.

Folder is an A4 sheet folded in the middle, where the cover page is communicating general information about the installation, and the back page is presenting a complete guideline.
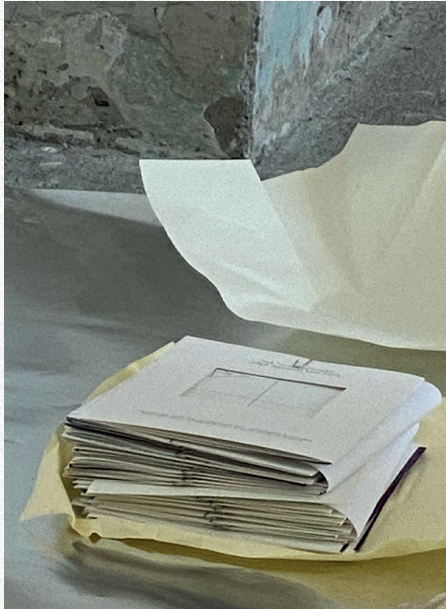
Photo by Filipowska　　　　　　　　　　　　　　　　　　　*43*

7.5.1 Procedure

The aim was to clearly communicate multi-phase procedure, where the viewer will be able to wayfind himself and be able to distinguish different phases - introduction and explanation, exploration, testing and feedback, complementary.

Installation Guideline
'Afterimages of Art, with and through light' assembles different lighting scenarios that become a tool to evoke different atmospheres, aiming to investigate — how to create memorable visual experiences?
Phase 1   (introduction and explanation)
At the entrance - introduction to the space and testing procedure.
Here visitors receive paper folder with questionnaire, plan and a pen.

Phase 2   (exploration)
Invitation to step into installation space presenting one of the setups, according to the schedule and explore. Time lapse camera from the balcony documents their engagement and movement in the area.

Phase 3   (testing and feedback)
Test consists of three steps, to reply in the installation room:
        — answer the questionnaire
        — mark on the plan with individual technique:
                (A) their position in space
                (B) area in the room that they felt is most captivating
        — draw shapes that stayed with them visually (on carbon paper)
Phase 4   (complementrary)
At the exit area, there is a video projection showing all the setups that are presented throughout the installation - to share with the audience the complete work.
Everyone is welcome to enter the space multiple times, see various setups, and stay as long as they feel.

Note: Exhibition space is recorded with a time-lapse camera to track the movement and observers' behavior in space.

INSTALLATION DESIGN

Photo by Muskieta   *44*

7.5.2 Questionnaire

Complete questionnaire consist of 5 question related to the topic. The opening question of the questionnaire, and three closing ones, are related to dramaturgial aspects of the visual experiences.

However in this section only one - related to light and atmosphere characteristics will be elaborated as the remaining questions are specifically dedicated into a seperate category of intended material collection. The question presented below is two-folded. First, observers were asked to select one word from each row, presenting a selection of 10 terms with their antonyms related to lighting in order to describe their perceived light characteristics.

Focused on gathering specific information related to the light qualities, following words were juxtaposed:

How would you describe:
Light (select 1 term from each group of three)

dark / neutral / bright
glary / neutral / dim
intense / neutral / subtle
focused / neutral / diffused
direct / neutral / indirect

warm / neutral / cold
refracted / neutral / uniformed
soft / neutral / sharp
radiant / neutral / obscured
linear / neutral / non linear

Further in similar process to is to select 3 most accurate terms that describe the perceived atmosphere of an environment (set up that has been presented). Here, relating to an atmosphere, as a phenomenon. The selection of atmosphere terms is intentionally crossing the connotation between negative, positive and neutral was inspired by terms presented in "Atmosphere Metrics" by Vogels (Vogels, 2008, p. 3).

Atmosphere (select 3 most accurate terms)

intimate / exciting / restless / spatial / personal / mysterious / fascinating / depressed / safe / tense / uncomfortable / stimulating / boring / peaceful / inspiring / detached / musty / lethargic / serene / chaotic / overwhelming / transformative / confusing / romantic / misleading / captivating / engaging

The remaining questions are explained and presented in the section "7.5.6 Dramaturgical Approach" as natural was to elaborate on the explain following two sections beforehand.

INSTALLATION DESIGN

7.5.3 Horizontal Plane

The idea behind this and following task is to find ways to understand how viewers perceive displayed images, read the atmospheres, and self-oriantate in space - active observation, and active seeing that summed up are considered an active cognitive work. In consequence, partially testin the visual awareness of the viewers.

An essential foundation for this part of the testing procedure emerged from "Theory of Vision" , explained in chapter 2.2. As received sensations are analyzed in mind, later confronted with the corresponding segments of reality and explain the meaning of what's being seen. Intention is to relate to the part of recognition of the visual sensations and positioning towards what they say about the surroundings (Strzemiński & Luba, 2016).

The influence of thought on seeing, and seeing on thought - as a thought pose a questions that vision is supposed to answer. There are infinitely many ways of formulating questions that will impose on the visual apparatus certain action, that would point into direction or specific focus. Questions, commands, tasks - to look at something, comprehend and reflect (mental analysis), and further form a response or feedback on a topic.

Here questions were related to:
  — position of the viewer in space
  — the area in the room that focuses the attention the most

and simplified into graphically marking with (dot) the position of the viewer, and (line/cross/loop) area that is gathering the focus. Using a simple cross that serves as a modest architectural plan here, that gives an opportunity for the viewer to provide information in the horizontal plane.

As in architectural design and drawing, often we refer to planes / views / surfaces. The approach of dividing solid forms down to pieces. One image that is three dimensional can become a couple of two-dimensional images (drawings). It can be used either to explain something in a more detail-oriented manner or the other way around, when having an complex form to analyze, deconstructing it into simpler smaller drawings helps to gain a better overview of the structure. Analyzing images with planes.

Here, feeding these two essential points of view, analyzing reality and surroundings in two, horizontal and vertical planes, combined with posing accurate questions have resulted in this testing method. Second task related to the vertical plane is described above.

INSTALLATION DESIGN
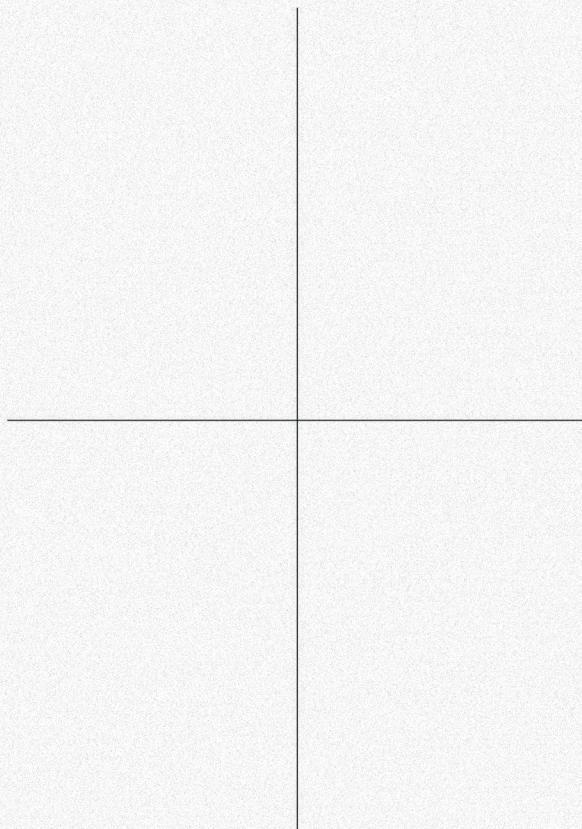
(dot) - your position
(line / cross / loop) - area in the room that focuses your attention the most

7.5.4 Vertical Plane

Task related to the vertical plane was designed in a few elements. The first element is more abstract and supportive, was an invitation to look through the cut out window of the front cover in the received folder. Lift it and hold in front in order to frame perspective, shaping smaller image from a broad vision that we have when observing the surroundings. Interplay of a cutout and short commands.

"Look through."

"Frame your perspective."

Look through.

Frame your perspective.

On the right side, this piece of carbon paper is your canvas.
If you focus your eyes on light and space, then close them.
What image remains?

Afterimage N°_____
Time: _____

INSTALLATION DESIGN
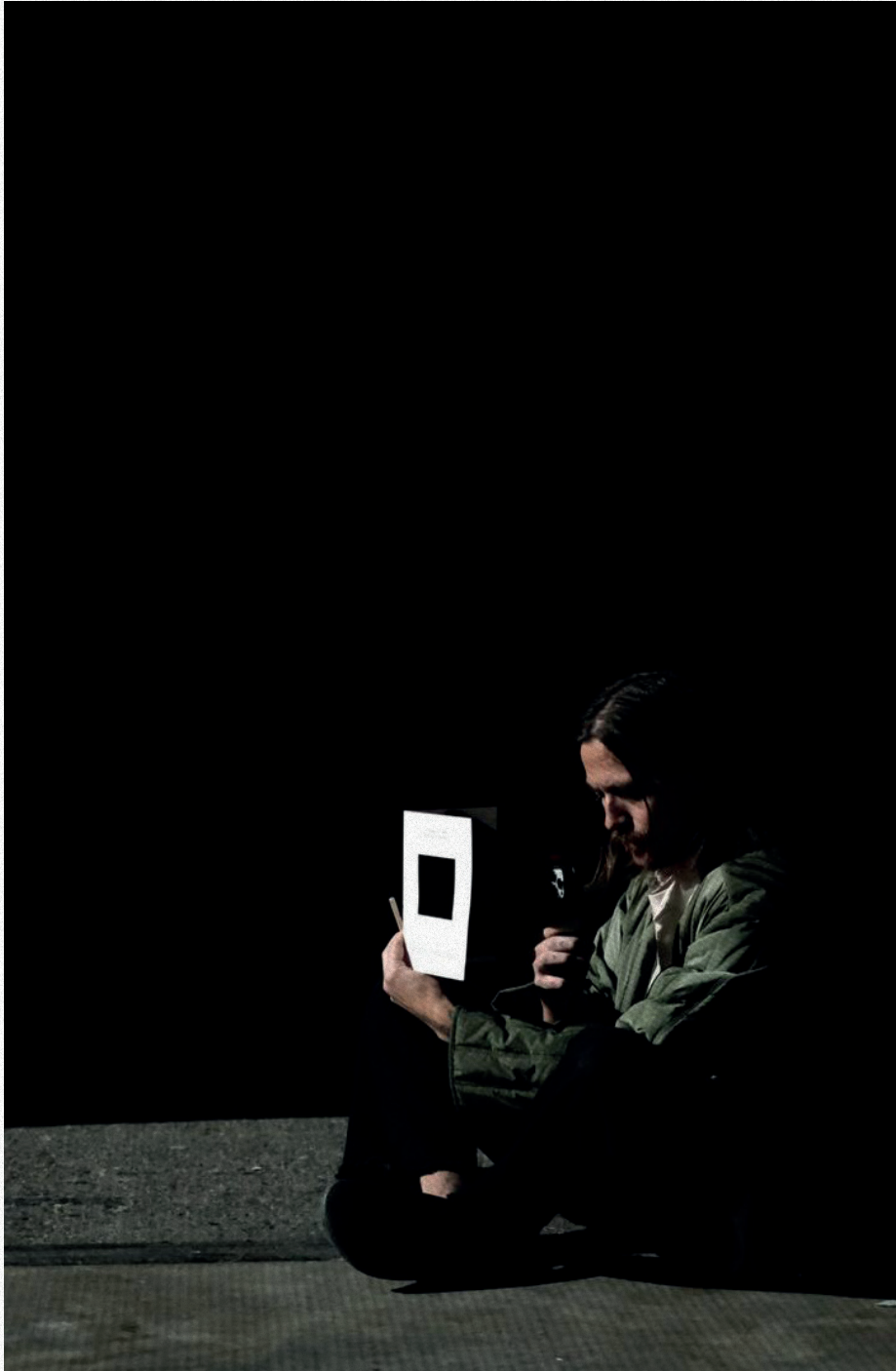
This element has been inspired by tools that painters often use when painting and observing landscapes.

When at the bottom of the same page of the cut-out window, was explained:

On the right side, this piece of carbon paper is your canvas. If you focus your eyes on light and space, then close them. What image remains?

The second task is to focus the eyes on seen images, light, and space, stare for a longer moment, then close them in order to discover what afterimage, shape, and glimpse will remain in the eyes. Afterimages

Final task in 'scanning the horizontal plane with eyes' was to draw on the right side of the open a drawing that represents the image that remained in the viewer's eyes. An open invitation, where any attempt of graphically representing is valid and accepted.

The violet carbon paper layer plays a pivotal role in the drawing task, as its function is to get around the issue of potential hesitation of drawing an abstract image without being professional / related within the design or art field or simply possible discouragement of having a 'white empty blank page' that can be overwhelming when a person is being asked to draw something. Despite if it is an abstract drawing from a memory or what a person sees, anonymously or not, to draw something - knowing that will be further analysed, seen by other pair of eyes, and possibly judged - is challenging.

This is the reason for applying the carbon, covering, and overlaying the page, yet the drawing is instantly translated into the bottom white page. A person who is drawing does not see the drawing immediately in real-time - only after lifting up the carbon paper layer is able to see what has been drawn.

7.5.5 Spatial Exploration

The presented above approach to testing comprehensive visual abilities in both horizontal and vertical planes that emerged due to this research, introduced in consequence, an additional aspect of going one step further, and combining it with another objective in the testing procedure, finding out – how viewers explore the space? How are they self-orienting themselves during the testing procedure? If across different set ups, their engagement changes, and if yes, why?

Possibly also finding out what are the perceptual challenges formed to the audience - how they can explore the space, what is breaking the fluidity of the communication in the room.
This led to positioning two cameras that were used in the testing procedure, that were registering a major part of the installation in order to provide material for spatial exploration analysis.

Taking into consideration that it is still a very subjective and phenomenological point to be analyzed, yet one that can give an overview of how viewers self portray themselves in the space, their behavior, and engagement, angled from the point of engagement level and participation. Look as well at the self-perceptual behaviors. How close they will dare to approximate themselves into the beam of light, to the natural element of melting ice? In what ways they will explore the space capacity, and where their focus will be gathered the most? If the exploration is static or active, what viewing points and from what height will they observe selected fragments of the atmosphere and room itself?

7.5.6 Dramaturgical Approach

The opening question of the questionnaire, and three last ones - are carrying a role of mapping out more dramaturgial aspects of an experience, from all-inclusive angle considering encountered set up, as well as the time spent inside the installation.

First, question intentionally open, that possibly can bring soft answers and bring more imaginative responses - correlations in brain and associations, that can be assigned later to the presented selected set up. Looking at what people will assign to the designed setup and not giving the pre-assigned characteristic words related already to feelings or descriptive perimiters.

> *1. How would you describe the quality of this moment? (one word)*
>
> _____

(This question was asked to be replied inside the installation, during the explorative part)

If refers to the broadly understood idea of where the viewer place himself and what overtakes his observation when looking for descriptive term of the movement, a glimpse that consist from being in space, and actively seeing it. Highly abstract angle to allow person who replies create quick, short correlation - to what would this be compared? What this reminds? Is it directly or indirectly familiar moment, with something that can be associated, or named.

Furthermore, on the way, when stepping out from the installation space, were posed two more questions:

> *3. This experience changed my mood:*
>
> ☐ strongly   ☐ disagree   ☐ neither agree   ☐ agree   ☐ strongly
>   disagree   nor disagree   agree
>
> *4. If yes, how?*
>
> ☐ positively   ☐ slightly   ☐ no   ☐ slightly   ☐ negatively
>   positvely   change   negative

Lastly, very widely angled question related to the afterimage - here metaphorically used term, and complete formulation of the question, imply personal, free, imaginative, abstract take, on what it is the afterimage of this experience and what one compares it with?

5. Describe your own afterimage:

_____

Asking to describe the afterimage, it was partially intended to instead of asking for feedback (as it is not addressing truly the objectives of this test design) yet still implement an element at the final stage, that can provoke a thought or reflection upon the global, complete aspect of coming to the installation, being a part of it, and now leaving with - what?

Relating to the arc of engagement, this final question plays a role of 'post-event' part described in the chapter above, that could be nurturing for audiences' critical reflection, securing full curve before the part where the experience is remembered, and endures creating the "impact echo" (Making Sense of Audience Engagement, n.d.).

INSTALLATION DESIGN

8. EVALUATION

This chapter consist of evaluation of the test design, outlines the challenges and essential outcomes from the analysis of the gathered material. Where the latter is presenting aspects related to the post-production of the final design and additional points of view on the complete process.

The installation took place in the theater hall of Akademiet For Utæmmet Kreativitet (AFUK) was availble for visitors to participate in the testing procedure during fours days from 4-7th of May, 2023. Through this period 101 visitors visited the installation. Presented above 8 setups were displayed for the participators to step inside and observe created atmospheres. However due to aspects unrelated to the designed procedure, material from 5 scenarios are being a subject to the analysis, as remaining 3 are considered as inconclusive because of insufficient number of replies. Complete number of 8 setups was documented, and all gathered material from testing procedure is included in the appendix.

8.1 ANALYSIS

The material gathered from four days of testing procedure, has been documented in various forms. Firstly, from folder, presented in chapter above, that each visitor received individually. It consisted of a cover, layer of carbon paper for drawing, and additional sheet with questionnaire presenting orientation plan of the space. To each folder has been assigned number and time, when person were replied to it, enabling tracking replies from different days and to different setups. As testing procedure has been devoid of any influence from factors such as age, gender, politics, or profession, these aspects are overlooked both in analysis and discussion. Secondly, the installation space has been registered with videocamera recording time-lapse during the testing procedure aiming to analyse spatial exploration by participants, as well as their engagement with presented set ups. Lastly, through conversations and exchange of thoughts small inputs were registered from the phenomenological point of view, that had its place during the full period of the test design.

Due to encountered challenges with distribution of the visitors across each designed set up, the number of replies to each hasn't been even and aiming for the most accurate analysis process - five set ups has been selected to be subjects of the analysis. Set ups that have not received enough replies are intentionally left out from the analysis process. Selected set ups are nubmer: 1, 3, 6, 7, 8 (see chapter above).

The technique used is grounded theory data analysis, where processing collected data is allowing construction of hypothesis and theories, emrbacing inductive reasoning, in contrary to the conventional approach of predefined theoretical frameworks (Urquhart et al., 2009).

EVALUATION

The light quality was considered sharp, bright, cold, glary, intense, and nonlinear, producing distinct and well-defined edges in the illuminated surface.

A radiant effect was noted, implying that the light spread out from its source in a noticeable manner, and the direction of the lighting was direct, illuminating specific areas without diffusing extensively.

The atmosphere of the surroundings in the presented setup was vividly described using the term "peaceful." When remaining two characteristics of the atmosphere span across intimate, tense, captivating, and detached.

bright   **glary**   **intense**   **inconclusive**   **direct**

cold   **neutral**   **sharp**   **radiant**   **non linear**

CHAPTER ONE

Atmosphere

intimate exciting restless spatial personal mysterious fascinating
depressed safe tense uncomfortable stimulating boring peaceful
inspiring detached musty lethargic serene chaotic overwhelming
transformative confusing romantic misleading captivating engaging

intimate

tense

peaceful

captivating

detached

————————— equal amount of replies

⬭ words mostly replied

Atmosphere *(7 replies)*

intimate	2 (28,6%)
exciting	0 (0%)
restless	0 (0%)
spatial	1 (14,3%)
personal	1 (14,3%)
mysterious	0 (0%)
fascinating	0 (0%)
depressed	0 (0%)
safe	1 (14,3%)
tense	2 (28,6%)
uncomfortable	1 (14,3%)
stimulating	1 (14,3%)
boring	0 (0%)
peaceful	3 (42,9%)
inspiring	1 (14,3%)
detached	2 (28,6%)
musty	0 (0%)
lethargic	0 (0%)
serene	0 (0%)
chaotic	1 (14,3%)
overwhelming	0 (0%)
transformative	1 (14,3%)
confusing	0 (0%)
romantic	1 (14,3%)
misleading	0 (0%)
captivating	2 (28,6%)
engaging	0 (0%)
no reply	0 (0%)

0   1   2   3

characteristics of light

radiant

cold

sharp

direct

non linear

intense

qualities:

moments
quiet
relaxed
super bright
abandonment
ice melting
landscape

glary

bright

peaceful

description of the atmosphere

description of personal afterimage:

/ loneliness /
/ sky /
/ border between dark and light /
/ ice shining /
/ I see dark outside world, night /
/ shine /
/ like looking at a tiny ice landscape with
a cave and lake /

characteristics of light
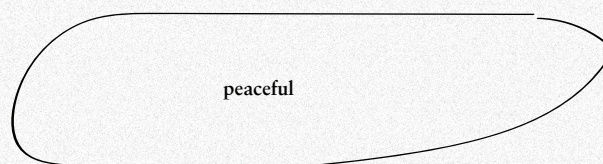
direct   sharp   radiant
       glaryi   ntense   non linear
cold
          bright

description of the atmosphere

peaceful

3. This experience changed my mood:

85,7%

14,3%

- strongly disagree
- disagree
- neither agree nor disagree
- agree
- strongly agree
- NO REPLY

4. If yes, how?

57,1%   14,3%

28,6%
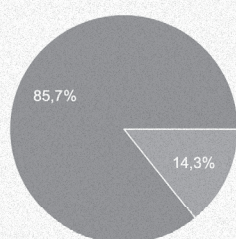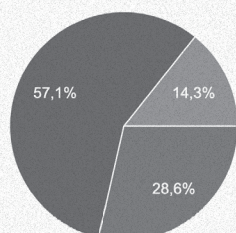
- positively
- slightly positively
- neither agree nor disagree
- slightly negatively
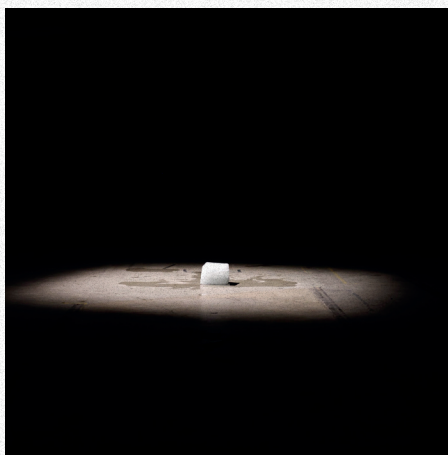- negatively
- NO REPLY

Following replies related to light characteristics and perceived atmosphere described as peaceful were juxtaposed with phenomenological results related to the qualities of the moment. Observers associated encountered set up with terms such as relaxed, quiet, and sense of abandonment. Relating to the landscape and outlined observed element of ice melting was something that gathered their attention.

This scenario has mostly altered positively (28,6%) and slightly positively (57,1%) their mood when 14,3% of viewers haven't perceived change.

CHAPTER ONE

The lighting has been perceived by most of the visitors as bright, cold. The LED fixtures brought into space very focused, linear and direct, and sharp light. That applied on the ice cube has been perceived as glary and intense, and radiant, exposing the frosty surface of the melting ice.

The atmosphere was noted as captivating and stimulating, next to multiple replies pointing to words such as intimate, mysterious, transformative, and spatial.

This setup has been presenting one of the darkest environments creating strong visual contrast with achieved low-height light from LED fixtures that were positioned in close proximity to the element, pointing to the ice cube in the center of the installation space, distributing light mainly in the close area of the element, leaving remaining space of the room dark.
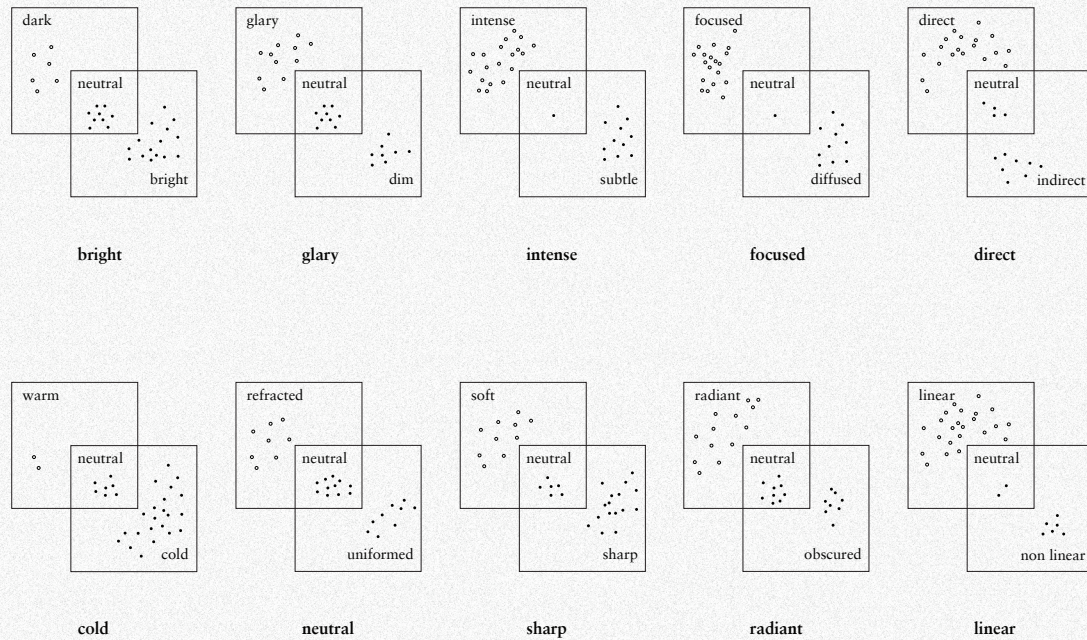
bright glary intense focused direct

cold neutral sharp radiant linear

CHAPTER THREE

Atmosphere

intimate exciting restless spatial personal mysterious fascinating
depressed safe tense uncomfortable stimulating boring peaceful
inspiring detached musty lethargic serene chaotic overwhelming
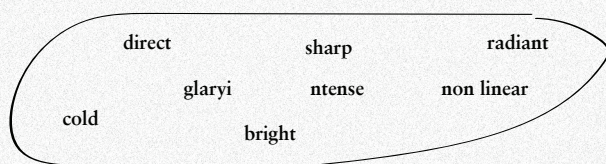transformative confusing romantic misleading captivating engaging

intimate   mysterious

                    stimulating
            captivating
                                          transformative

                        peaceful
    spatial
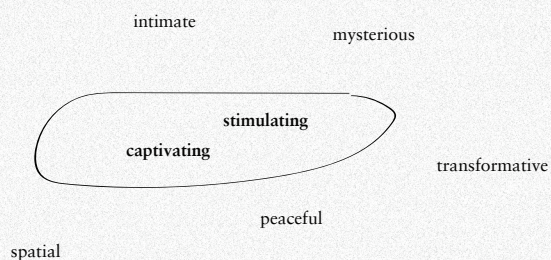
—————————   equal amount of replies

  ⬭   words mostly replied

Atmosphere *(9 replies)*

intimate	2 (22,2%)
exciting	1 (11,1%)
restless	1 (11,1%)
spatial	2 (22,2%)
personal	1 (11,1%)
mysterious	2 (22,2%)
fascinating	1 (11,1%)
depressed	0 (0%)
safe	0 (0%)
tense	1 (11,1%)
uncomfortable	0 (0%)
stimulating	4 (44,4%)
boring	0 (0%)
peaceful	2 (22,2%)
inspiring	1 (11,1%)
detached	0 (0%)
musty	0 (0%)
lethargic	0 (0%)
serene	1 (11,1%)
chaotic	0 (0%)
overwhelming	0 (0%)
transformative	2 (22,2%)
confusing	1 (11,1%)
romantic	0 (0%)
misleading	1 (11,1%)
captivating	4 (44,4%)
engaging	0 (0%)
no reply	0 (0%)

163

characteristics of light

radiant

cold

inconclusive

direct

refracted

focused

non linear

intense

qualities:

surprising
peaceful
mysterious
melancholic
transformed
wonderful
stillness

glary

bright

stimulating

captivating

description of the atmosphere

description of personal afterimage:

/ ice refracting light (cold rainbow) /
/ the moment wakes up curiosity /
/ brightness / dots / lines / fading to darkness /
/ worrying /
/ calmness, warmth /
/ radiant and spheric /
/ embracing of stillness and dark /
/ maybe I didn't see it but I needed a little more to it /

characteristics of light

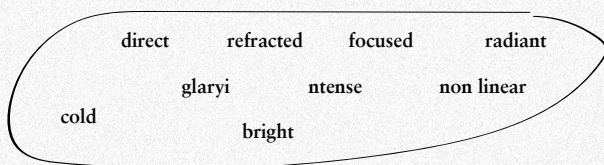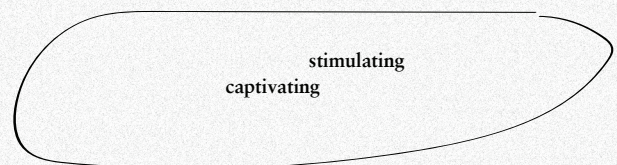direct   refracted   focused   radiant
glaryi   ntense   non linear
cold   bright

description of the atmosphere

stimulating
captivating

3. This experience changed my mood:

44,4%
11,1%
11,1%
33,3%

- strongly disagree
- disagree
- neither agree nor disagree
- agree
- strongly agree
- NO REPLY

4. If yes, how?

22,2%
22,2%
22,2%
33,3%

- positively
- slightly positively
- neither agree nor disagree
- slightly negatively
- negatively
- NO REPLY
- Opcja 7
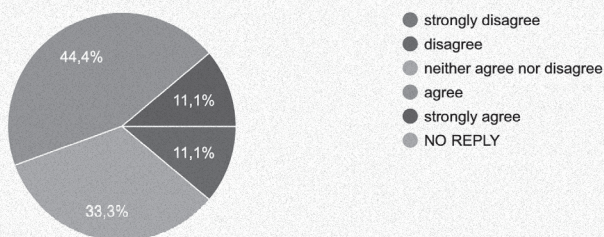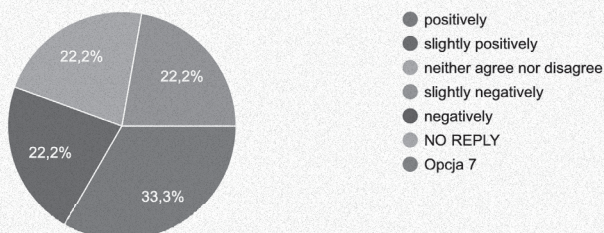
Observers associate the given atmosphere through light, despite strong, sharp, and glary characteristics, as surprising, mysterious, melancholic, and wonderful, giving the feeling of stillness and peace.

The descriptive outcomes to the question - what are your own afterimages? Were derived between 'radiant and spheric', and 'worrying', pointing to the 'ice refracting light' and 'brightness, dots, lines, fading darkness' and terms relating to 'calmness, warmth', 'awakening the curiosity' or 'embracing os stillness and dark'.

Most of the participants stated the alteration of their mood throughout the exhibition in a slightly positive way, yet (22,2%) stated that is was a slightly negative change.

CHAPTER THREE

The lighting achieved in this setup has been described as warm, subtle, and linear when for most of the terms, replies were pointing to neutral replies. Observers perceived light as direct and focused, which is a surprising result due to the fact of elements that were used in the setup. Diffusive material hung above the audience was in fact, closing off the direct view of pointing down two fixtures that were illuminating the surface of the floor, where a square pendant soft box turned into to radiant, bright surface.

The atmosphere was perceived as intimate, safe, and engaging.
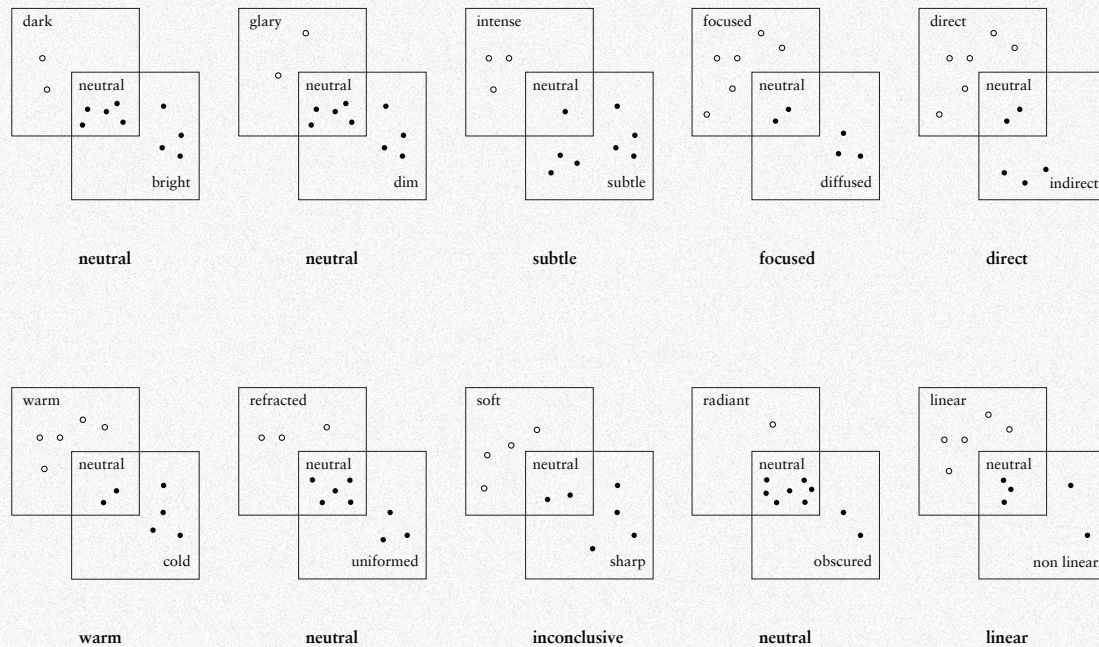
dark / neutral / bright	glary / neutral / dim	intense / neutral / subtle	focused / neutral / diffused	direct / neutral / indirect
neutral	**neutral**	**subtle**	**focused**	**direct**

warm / neutral / cold	refracted / neutral / uniformed	soft / neutral / sharp	radiant / neutral / obscured	linear / neutral / non linear
warm	**neutral**	**inconclusive**	**neutral**	**linear**

Atmosphere

intimate exciting restless spatial personal mysterious fascinating
depressed safe tense uncomfortable stimulating boring peaceful
inspiring detached musty lethargic serene chaotic overwhelming
transformative confusing romantic misleading captivating engaging

intimate   engaging
              safe
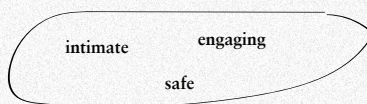
—————— equal amount of replies

⬭ words mostly replied

Atmosphere *(11 replies)*

- intimate
- exciting — 0 (0%)
- restless — 2 (18,2%)
- spatial — 1 (9,1%)
- personal — 1 (9,1%)
- mysterious — 3 (27,3%)
- fascinating — 2 (18,2%)
- depressed — 0 (0%)
- safe
- tense — 1 (9,1%)
- uncomfortable — 0 (0%)
- stimulating — 0 (0%)
- boring — 0 (0%)
- peaceful — 0 (0%)
- inspiring — 1 (9,1%)
- detached — 2 (18,2%)
- musty — 0 (0%)
- lethargic — 0 (0%)
- serene — 1 (9,1%)
- chaotic — 0 (0%)
- overwhelming — 0 (0%)
- transformative — 0 (0%)
- confusing — 0 (0%)
- romantic — 1 (9,1%)
- misleading — 0 (0%)

characteristics of light

warm

focused

linear

subtle

qualities:

immersive
safe
mysterious
lonely
deep
gathering
shelter
comfort zone
clarity
inviting

intimate   **engaging**

safe

description of the atmosphere

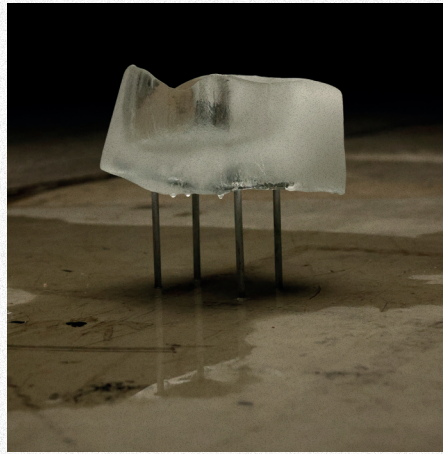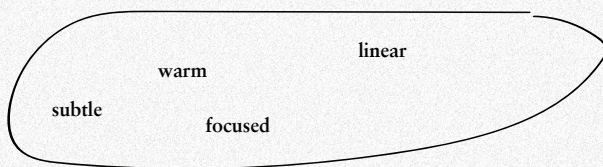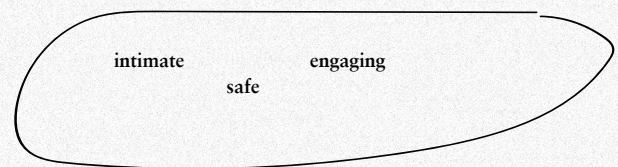description of personal afterimage:

/ peaceful and energised /
/ relaxed and safe /
/ curious and tense /
/ unsure /
/ deep and suspended atmosphere /
/ content /
/ community /
/ theatrical /
/ liquid /
/ i can see a living room, empty one. a room, where
you feel comfortable but you know you will have to
leave /

characteristics of light

linear

warm

subtle

focused

description of the atmosphere

intimate   engaging

safe

3. This experience changed my mood:

18,2%

9,1%

18,2%

45,5%

9,1%

● strongly disagree
● disagree
● neither agree nor disagree
● agree
● strongly agree
● NO REPLY

4. If yes, how?

9,1%   18,2%

9,1%

36,4%

27,3%
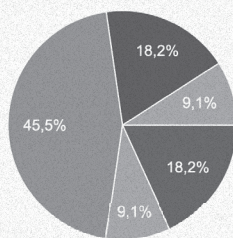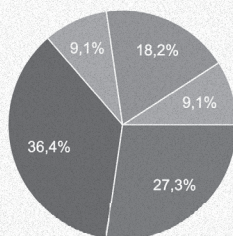
● positively
● slightly positively
● neither agree nor disagree
● slightly negatively
● negatively
● NO REPLY

The quality of the moment in the created atmosphere has been described as immersive, deep, safe, mysterious, and lonely. Associated with 'shelter' or sense of a 'comfort zone', followed by 'inviting', 'gathering', and 'immersive'. An interesting word appeared, where the observed quality of the moment was described as clarity.

To most of the viewers, this experience has influenced their mood mostly in a positive way.

CHAPTER SIX

The presented results allowed us to conclude that lighting has been described as dim, dark, uniform, soft, and subtle. Where light projected onto the floor surface has been described as direct, radiant, and focused.

As presented on the following page in the images, one of the strong visual sensations created in this setup was linearity in light, where on the sharp edge of the light beam that was cutting through the haze appeared phenomena of the cut section through the layers in the air. Outlining the border between light and darkness.

dark   **dim**   **subtle**   **focused**   **direct**

cold   **uniformed**   **soft**   **radiant**   **linear**

CHAPTER SEVEN

Atmosphere

intimate   exciting   restless   spatial   personal   mysterious   fascinating
depressed   safe   tense   uncomfortable   stimulating   boring   peaceful
inspiring   detached   musty   lethargic   serene   chaotic   overwhelming
transformative   confusing   romantic   misleading   captivating   engaging

mysterious

spatial   peaceful

Atmosphere *(42 replies)*

intimate	9 (21,4%)
exciting	1 (2,4%)
restless	1 (2,4%)
spatial	13 (31%)
personal	2 (4,8%)
mysterious	21 (50%)
fascinating	4 (9,5%)
depressed	1 (2,4%)
safe	10 (23,8%)
tense	3 (7,1%)
uncomfortable	0 (0%)
stimulating	4 (9,5%)
boring	0 (0%)
peaceful	13 (31%)
inspiring	4 (9,5%)
detached	3 (7,1%)
musty	2 (4,8%)
lethargic	3 (7,1%)
serene	7 (16,7%)
chaotic	0 (0%)
overwhelming	0 (0%)
transformative	7 (16,7%)
confusing	0 (0%)
romantic	1 (2,4%)
misleading	0 (0%)
captivating	12 (28,6%)
engaging	3 (7,1%)
no reply	0 (0%)

—————————   equal amount of replies

⬭   words mostly replied

171

characteristics of light

radiant

cold

soft

direct

uniformed

linear

subtle

focused

dim

qualities:

floating	*intense*	*dreaming*
diffused	*confounding*	*somber*
calm	*frozen*	*mystic*
meditative	*comforting*	*full*
atmospheric	*mysterious*	*peace*
esoteric	*inspirational*	*cave*
calming	*disconnected*	*nostalgic*
time	*nostalgic*	*transcendent*
secretive	*beautiful*	*strong*
wauws	*soothing*	*peace - excitement*
ethereal	*dense*	*deep*
peaceful	*gloomy*	

dark

mysterious

spatial

peaceful

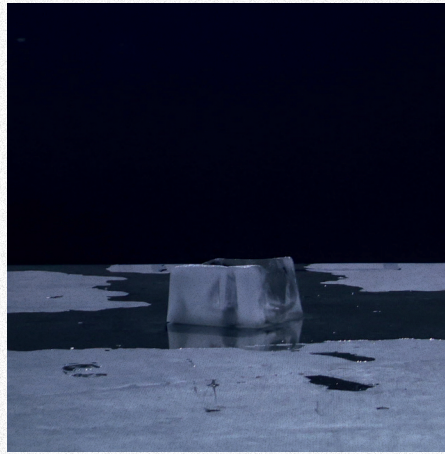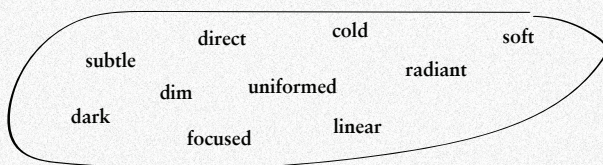*description of the atmosphere*

description of personal afterimage:

/ subtle waves from the centre of the viewpoint, dispersing towards peripheral /

/ calm and thoughtful /

/ meditative aftereffect feeling of ease /

/ spacial contrasted geometry /

/ ice / light / concrete / water /

/ hope and sorrow

/ hopefull and light

/ big threatening road

/ I learned so much by a simple but spectacular experience from wonder to reflection /

/ light lines from the sides sleek cuts of light light scares /

/ It was a vertical stratified pyramid but also with a free-like quality /

/ A spatial dreamscape with mysterious smoke that is captivated by the bright direct

lightning. a spiritual, serene image. The block of ice created many stories to the image /

/ floating squares, but spiritual like a church /

/ trip through oneiric space /

/ ocean at night

/ afternoon by the seaside, longing for light to stay longer /

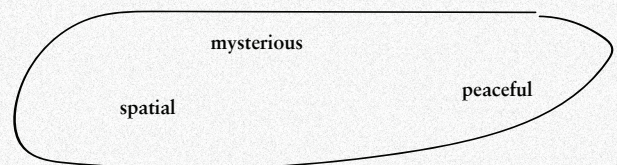/ square and fog /

/ movie setting /

/ calm, thoughtful /

/ dried out river /

/ human-shaped sparkles /

/ bright spot and dim waves /

/ I got more distant and dreamy /

/ It gave me peace and made me relax.

/ It is like a dream /

/ want to hug everyone /

/ emotional / vulnerable /

/ calm, peaceful, breathing /

/ cool and satisfied /

/ overwhelmed, happy and nostalgic /

/ reflective, almost meditative /

/ tense, drawn / alluring, sad /

/ I see this purple fog in front of me, captivating, full of noise, but only in one specific

point, cumulated.

/ chaos /

/ fussy frame /

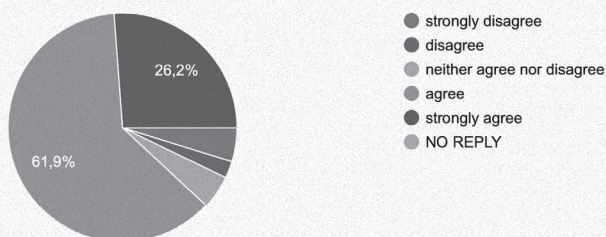/ sanctuary /

/ square holder silhouette /
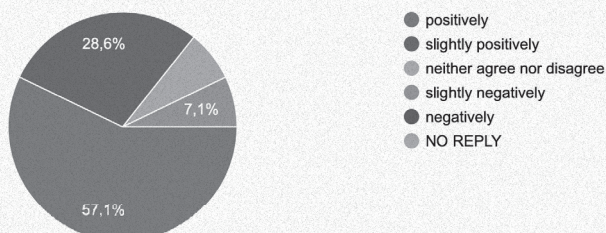
characteristics of light

subtle | direct | cold | soft | dim | uniformed | radiant | dark | focused | linear

description of the atmosphere

mysterious | spatial | peaceful

3. This experience changed my mood:

26,2%
61,9%

- strongly disagree
- disagree
- neither agree nor disagree
- agree
- strongly agree
- NO REPLY

4. If yes, how?

28,6%
7,1%
57,1%

- positively
- slightly positively
- neither agree nor disagree
- slightly negatively
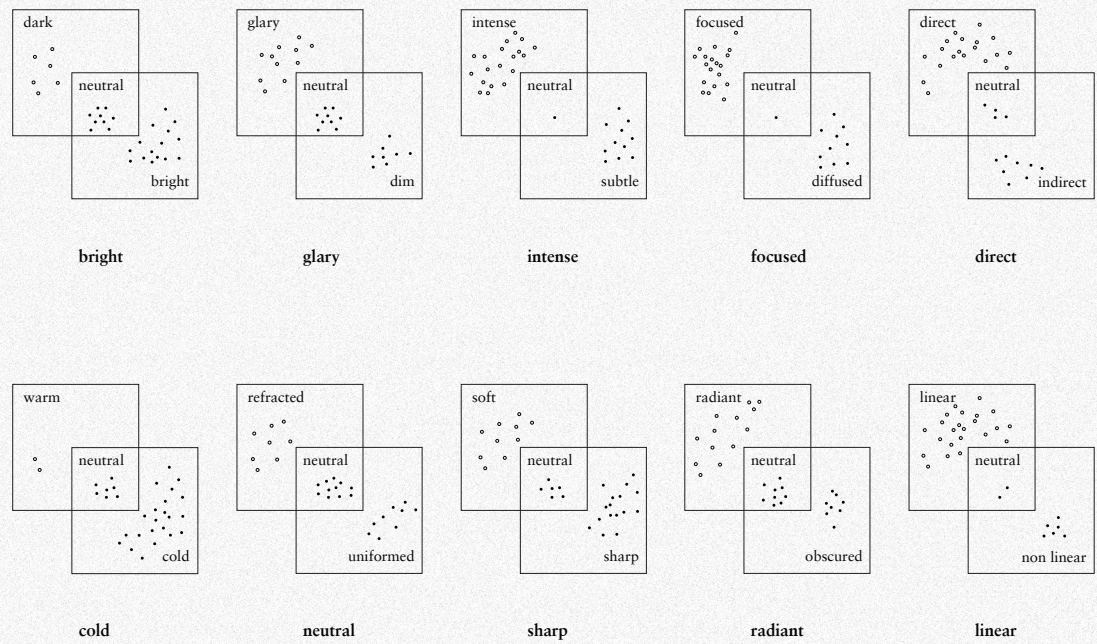- negatively
- NO REPLY

Atmosphere described as mysterious, spatial, and peaceful has been juxtaposed with terms relating to the quality of the moment, such as calm, nostalgic, deep, gloomy, transcendent, full, dreaming, mystic, ethereal, secretive, meditative, atmospheric, esoteric, calming, dense, soothing. Observers outlined characteristics such as peace-excitement, confounding, disconnected, inspirational, and strong. These terms, to some extant, are similar to descriptive terms of the atmosphere of the environment presented in 'Atmosphere Metrics' (Vogels, 2008, p. 3).

Discussed setup has been concluded as the most influenced by the viewers across the analyzed scenarios, where an experienced has been evaluated in (57,1%) as positive.
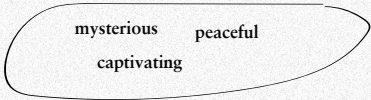
CHAPTER SEVEN

The lighting scenario and its characteristics presented in the set up above have been considered bright, intense, and radiant. Light perceived was within cold temperatures, where reflections of the projected light from LED stripe fixtures appeared vividly on the concrete floor surface, as well as the melted water from the ice cube. Sharp and linear characteristics that were created by the lighting setup are paired in the viewers' responses with terms describing light as focused and direct.

Concluded responses related to the atmosphere of the environment in the installation were narrowed to mysterious, peaceful, and captivating.

bright   **glary**   **intense**   **focused**   **direct**

cold   **neutral**   **sharp**   **radiant**   **linear**

CHAPTER EIGHT
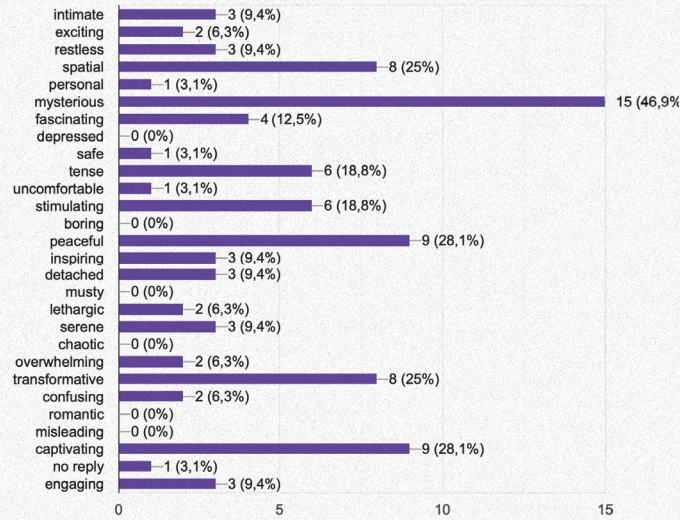
Atmosphere

intimate   exciting   restless   spatial   personal   mysterious   fascinating
depressed   safe   tense   uncomfortable   stimulating   boring   peaceful
inspiring   detached   musty   lethargic   serene   chaotic   overwhelming
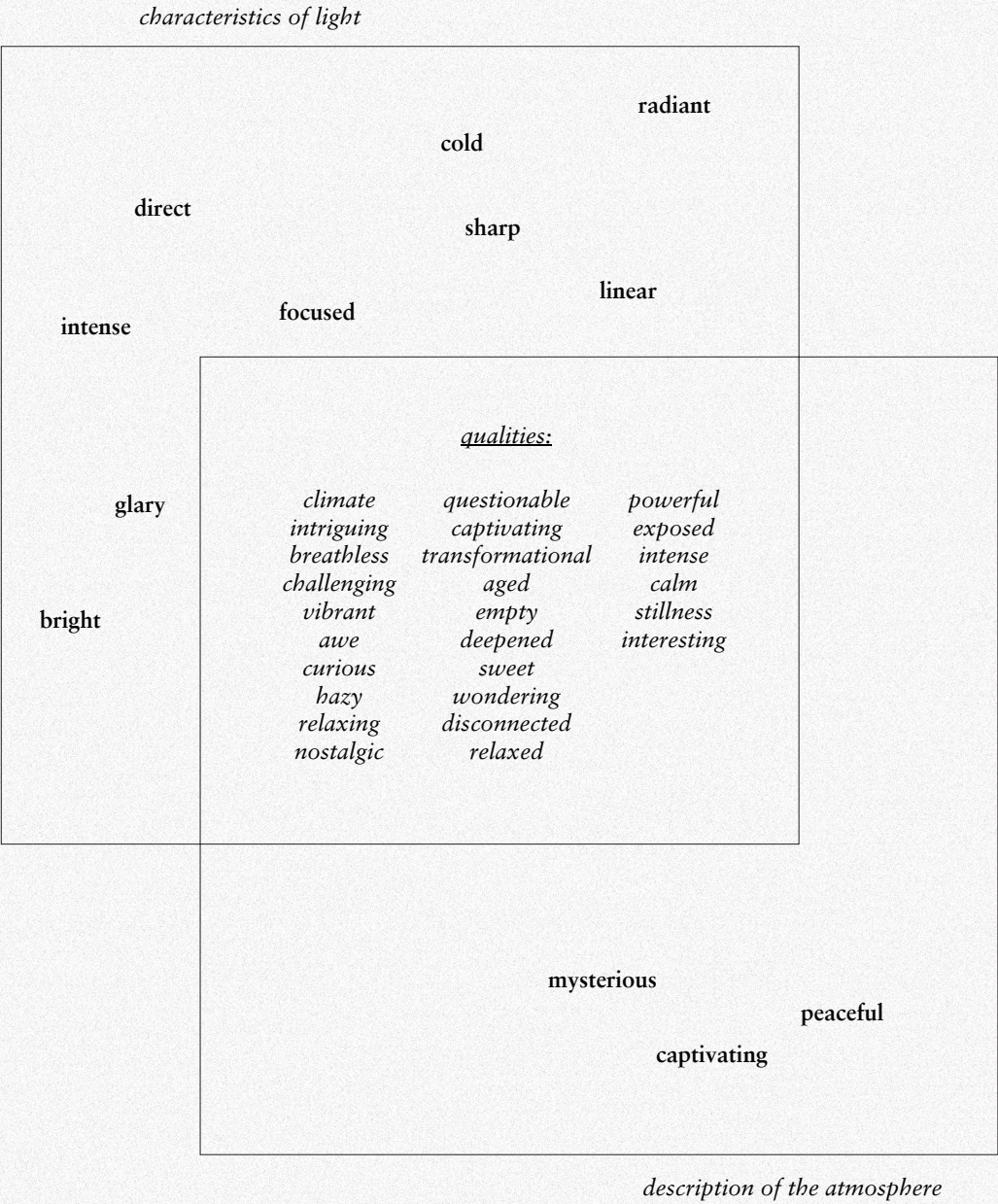transformative   confusing   romantic   misleading   captivating   engaging

mysterious   peaceful
captivating

Atmosphere *(32 replies)*

intimate	3 (9,4%)
exciting	2 (6,3%)
restless	3 (9,4%)
spatial	8 (25%)
personal	1 (3,1%)
mysterious	15 (46,9%)
fascinating	4 (12,5%)
depressed	0 (0%)
safe	1 (3,1%)
tense	6 (18,8%)
uncomfortable	1 (3,1%)
stimulating	6 (18,8%)
boring	0 (0%)
peaceful	9 (28,1%)
inspiring	3 (9,4%)
detached	3 (9,4%)
musty	0 (0%)
lethargic	2 (6,3%)
serene	3 (9,4%)
chaotic	0 (0%)
overwhelming	2 (6,3%)
transformative	8 (25%)
confusing	2 (6,3%)
romantic	0 (0%)
misleading	0 (0%)
captivating	9 (28,1%)
no reply	1 (3,1%)
engaging	3 (9,4%)

—————— equal amount of replies

⬭ words mostly replied

characteristics of light

radiant

cold

direct

sharp

linear

focused

intense

qualities:

climate	*questionable*	*powerful*
intriguing	*captivating*	*exposed*
breathless	*transformational*	*intense*
challenging	*aged*	*calm*
vibrant	*empty*	*stillness*
awe	*deepened*	*interesting*
curious	*sweet*	
hazy	*wondering*	
relaxing	*disconnected*	
nostalgic	*relaxed*	

glary

bright

mysterious

peaceful

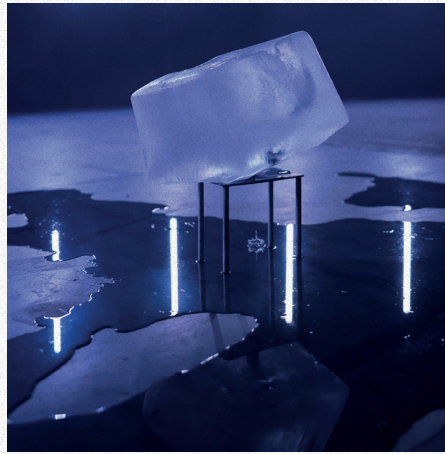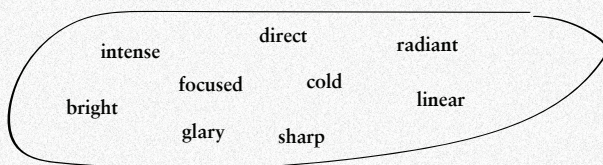captivating

description of the atmosphere

description of personal afterimage:

/ subtle waves from the centre of the viewpoint, dispersing towards peripheral /

/ calm and thoughtful /

/ meditative aftereffect feeling of ease /

/ spacial contrasted geometry /

/ ice / light / concrete / water /

/ hope and sorrow

/ hopefull and light

/ big threatening road

/ I learned so much by a simple but spectacular experience from wonder to reflection /

/ light lines from the sides sleek cuts of light light scares /

/ It was a vertical stratified pyramid but also with a free-like quality /

/ A spatial dreamscape with mysterious smoke that is captivated by the bright direct

lightning. a spiritual, serene image. The block of ice created many stories to the image /

/ floating squares, but spiritual like a church /

/ trip through oneiric space /

/ ocean at night

/ afternoon by the seaside, longing for light to stay longer /
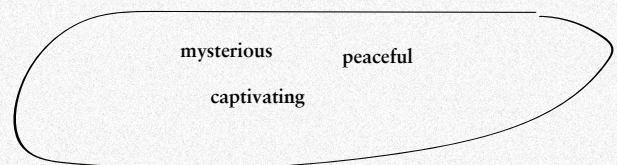
/ square and fog /

/ movie setting /

/ calm, thoughtful /

/ dried out river /

/ human-shaped sparkles /

/ bright spot and dim waves /

/ I got more distant and dreamy /

/ It gave me peace and made me relax.

/ It is like a dream /

/ want to hug everyone /

/ emotional / vulnerable /

/ calm, peaceful, breathing /

/ cool and satisfied /

/ overwhelmed, happy and nostalgic /

/ reflective, almost meditative /

/ tense, drawn / alluring, sad /

/ I see this purple fog in front of me, captivating, full of noise, but only in one specific

point, cumulated.

/ chaos /

/ fussy frame /
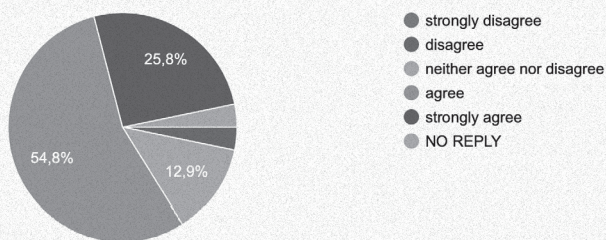
/ sanctuary /

/ square holder silhouette /
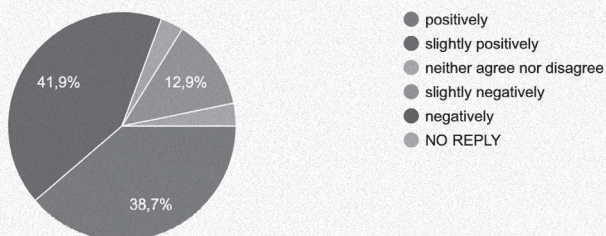
characteristics of light

intense   direct   radiant

bright   focused   cold   linear

glary   sharp

description of the atmosphere

mysterious   peaceful

captivating

3. This experience changed my mood:

25,8%

54,8%

12,9%

- strongly disagree
- disagree
- neither agree nor disagree
- agree
- strongly agree
- NO REPLY

4. If yes, how?

41,9%   12,9%

38,7%

- positively
- slightly positively
- neither agree nor disagree
- slightly negatively
- negatively
- NO REPLY

Characteristics of light together with descriptions of the atmosphere can enter into play with described by the viewers' terms related to the qualities of the experienced moment, such as intriguing, breathless, vibrant, powerful, intense, disconnected, challenging, exposed, curious, and questionable from one angle, and terms that reflect more: relaxed, wondering, calm, nostalgic, still, deepened, and curious qualities.

More than half of the participants replied that this experience influenced to some extent, their mood, and statistics on the left side show a positive impact of the change.
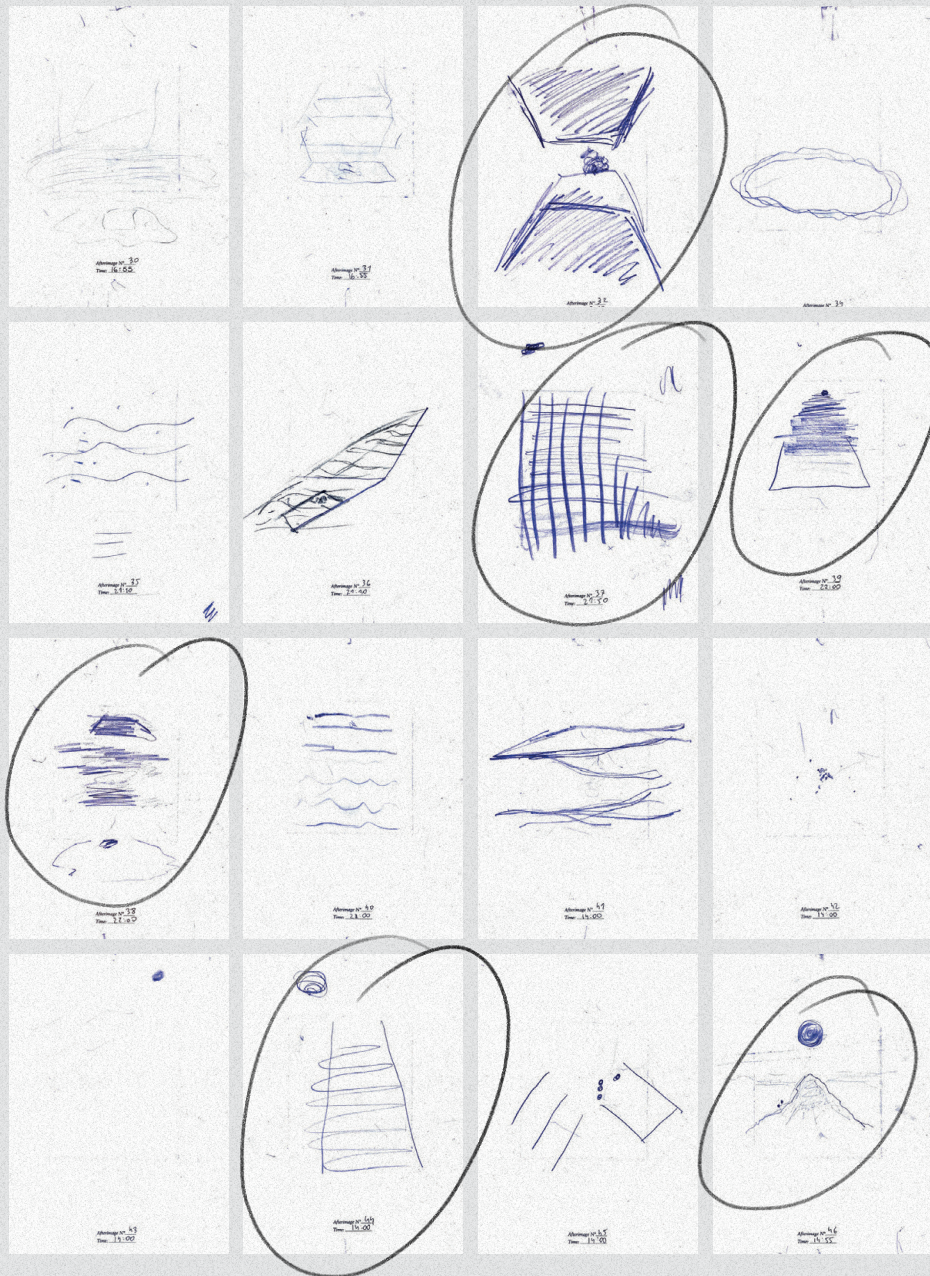
CHAPTER EIGHT

Mapping out similarities within drawing techinque.

46

EVALUATION

This compilation of the gathered material aims to outline the similarities and common ways of drawing from the visual perception of the afterimages caused by light during the testing procedure.

Outlined works are marked due to their character of drawings that represent translating the visual sensation observed during the task into - solid form, and more full empirical technique.

The graphic on the left page presents an exemplary set of drawings, and the full analysis is attached in the appendix.

Mapping out similarities within drawing techinque.   48

EVALUATION
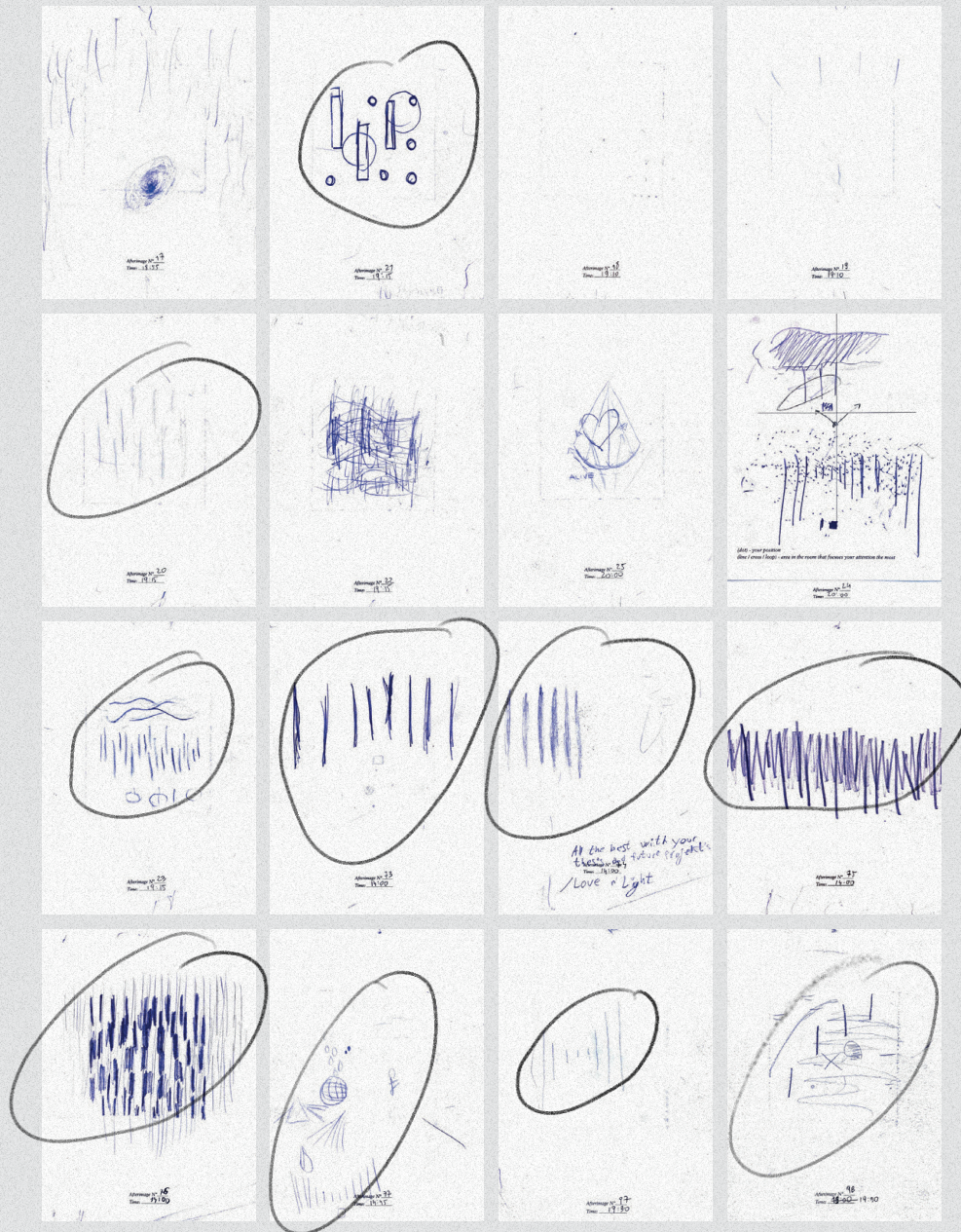
This compilation of the gathered material aims to outline the similarities and common ways of drawing from the visual perception of the afterimages caused by light during the testing procedure.

Outlined works are marked due to their character of drawings that represent translating the visual sensation observed during the task into - inner contour, outer contour, and silhouette technique.

The graphic on the left page presents an exemplary set of drawings, and the full analysis is attached in the appendix.
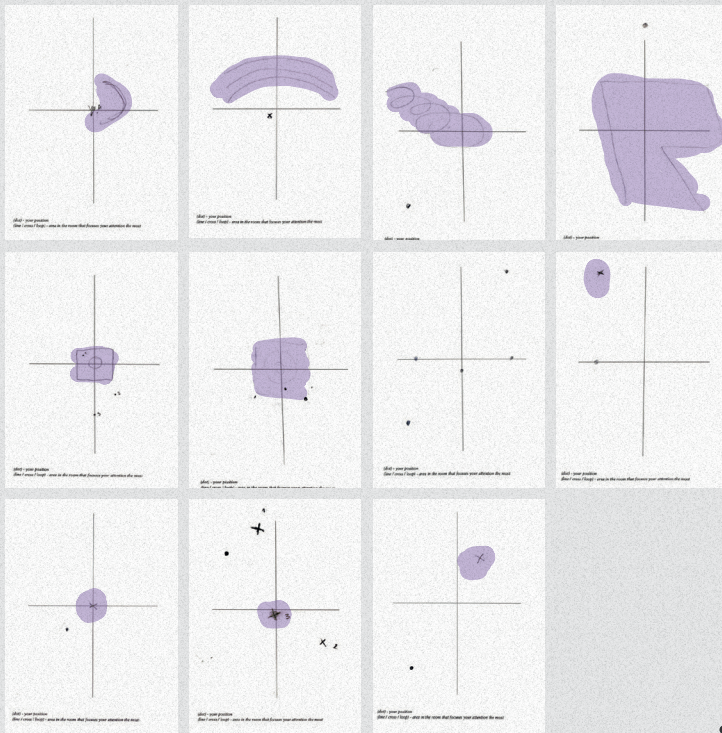
Presented above images present replies from the horizontal plane, where viewers were stating their observation point with a dot, and
the area in the room that focuses their attention the most with cross/loop/line.

Marked with the violet watermark on top outlines the 'focus areas' with the intention of looking for common threads.
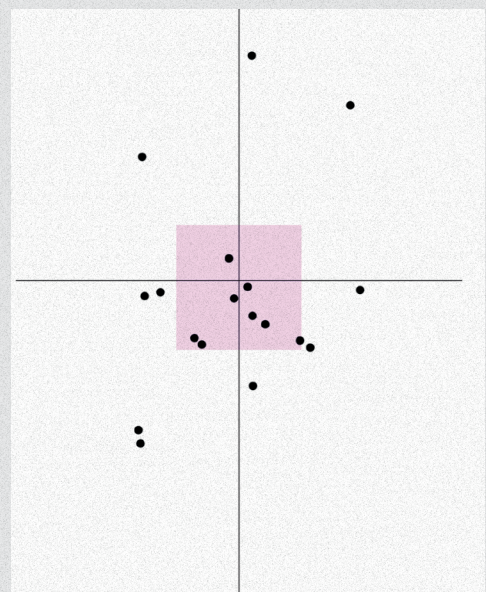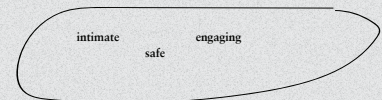
The image on the right puts into perspective findings from the drawings above - presenting a graphic with all the positions of the viewers throughout the exploration of Chapter 6, applied in one plane with a pink shape representing the distribution of the light in the given setup. Shows the proximity to the beam of light and spatial elements, such as the ice cube in the central area of the venue.

The page on the right analogically presents the same analysis for Chapter 7.
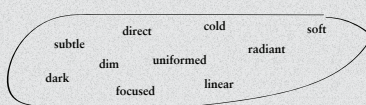
characteristics of light

warm   linear
subtle   focused

description of the atmosphere
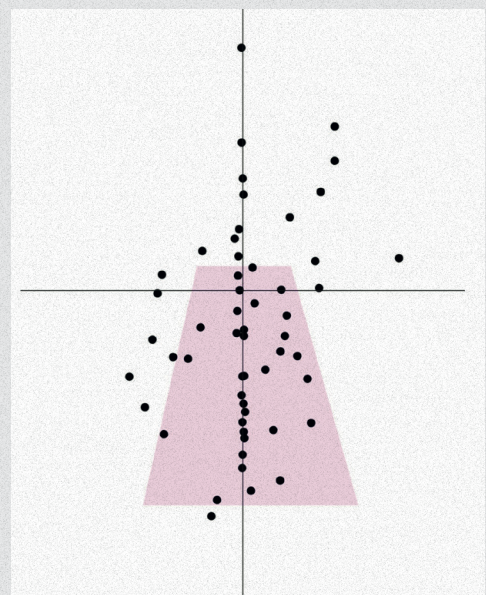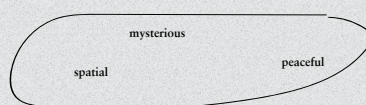
intimate   engaging
safe

EVALUATION
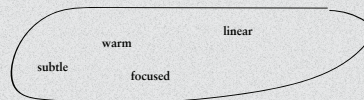
characteristics of light

description of the atmosphere

8.2 POST-INSTALLATION

This short paragraph is dedicated to reflections and observations related to the complexity of the test design and its execution. The installation in its full capacity outgrew the imagined design and expectation. Main reason for that is the element of participation both of people involved in the production as well as visitors, and their observations or feedback. The response to presented work has been an additional layer to the project, as not being a subject to analysis or can't be measured, few aspects and challenges are outlined here.

Aspects

From the organizational point of view understanding that this testing procedure had partially event character and required series of choices not directly linked to the core of testing procedure, but they emerged from the nature of the design which is the art installation held in the exhibition/performatice space.

Firstly, how to make the curve of the experience smooth, what is the complete number of aspects and components that sum up to provide pleasant experience related to installation art, and thorough testing procedure at the same time? How transparent can you be with research details not to spoil the responses?

Designing an experience from the very begin posed questions such as:
— what is there for who comes?
— is this a light laboratory or an art installation?
— how do you communicate complex topic without
    overwhelming the audience?
— how to design wayfinding for visitors in addition to proper installation?
— what is the starting point of the experience?
— who is delivering information to the audience?
    personally or does it hang?
— who collects the reply folders?
— how much to you tell to the audience before?

As well as support design such as flyers, images for social media communication and direct contact with audience, before the experience, after on the way out.

How much do you communicate to build the engagement and spark the curiosity for person to participate and explore the design?

Fact that visitors were engaging in the testing procedure through replying to open questions and drawing as well, automatically caused curiosity - where these drawings will go? what will happen to them? would they be available later?

In response to these questions, the supportive elements of the design such as website (that was communicating simple information as on a traditional poster, with link to the location, opening hours, schedule) — turned into the website of 'post-installation' allowing to share all the drawings called 'afterimages' for whom might be interested, and at the installation foyer were small cards with website address.

Challenges and limitations

Main challenge was the fact, that there was no control in distrubiting participants across the set ups throughout the days. This triggered strongly alterations of the schedule, where in the beginning aiming to change set ups had to be adapted to achieve minimum 5 set ups that will have replies. Not being able to control when people are coming to see the installation caused insufficient number of replies to three setups, that were in consequence excluded from the analysis and evaluation. It also created imbalance between the 5 set ups that were analysed, where in final outcome three had approximately 9-14 replies and two setup ups over 35 replies.

Secondly, the efficiency in changing the setups and routine of enabling smooth transitions. Another aspect is mainly stating that designing an experience with lighting design, relying on this element almost entirely requires lots of adjustments. Where in this installation the process of achieving the intended light effects, was similar as it is in lighting for theater.

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Latter challenges appeared during the open hours of the installation, when bigger groups of visitors were eager to enter - not definig the exact desired number of participants that could or should be in the same time exploring the installation affect to small extent the testing procedure. For example visible in the timelapse spatial exploration of given setup is very different if participant enters alone or with 1-2 other visitors, in comparison to group of 8-11 people who would enter at the same time, as they influence each other strongly. These aspects were overlooked at the stage of designing the testing procedure, and required simply openness in embracing the encountered situations as they were presenting themselves.

Self-perceptual devices such as phones were playing important role, as for some participators this was capturing the images with a camera/phone camera came naturally first. Another interesting aspect was when few observers explored the installation space with their own movement, dance and improvisation while recording these actions. This is when the installation setup turned momentarily into stage design for short period of time.

EVALUATION

9. FINDINGS

In order to achieve the objectives, the testing procedure has been developed through a series of tasks and questions. These elements were crafted to not only facilitate observations but also encourage diverse and imaginative forms of expression. The overarching objective is to chart the pathways of perception and comprehension within the presented lighting scenarios. This process is aimed at achieving an understanding of viewers' visions, thereby providing insights into how visual experiences are perceived and absorbed.

Metaphorically named 'afterimages' that relate to what the viewer experienced and understood – meaning could relate to and distinguish some thoughts on, are a playful way of exploring the possibility of measuring the qualities of created atmospheres with installation art, with and through light.

All the achieved setups' designs consisted of different light distribution, position of the fixture, and levels of light in terms of vertical and horizontal planes, yet none of the set ups presented the light pointing up. Through setups 1-8, the lighting was exploring top lighting displaying light on the floor surface (from different angles) and pointing horizontally parallel to the ground. There were significant differences in character of the light aiming to present diverse scenarios following lighting characteristics used in the questionnaire.

From two set ups, in which had the highest amount of replies, I find several directions that could be further explored. This is related to 1. perception of the atmosphere, 2. ways of measuring perception 3. The ambiguity of expression due to social or cultural differences of the audience. In common, they reveal the many limitations that exist when trying to describe qualities that are related to light and architecture, as the – perhaps vague – notion of the atmosphere is so entangled with emotions, situatedness, and perceptual stimuli. Further, the participant group was not targeted to one specific demography, i.e., there were no focus on having a similar age group or specific interests. Such factors could also have an impact on the large variety of answers.

It is, therefore, difficult to conclude uniformly by narrowing down to using simple words on atmospheric qualities for such complex scenario. Instead, supplementing methods should be considered that allow for both linguistic answers, as well as analysis based on other input forms.

This pilot research can point to the fact, that perceiving atmospheres and elaborating in detail on cognitive and body sensations is challenging, especially taken into consideration that our perspectives and ways of seeing are quite different based on many factors (cultural, social, etc.). On the contrary, the participants were detailed and descriptive when answering the open question regarding atmospheres. This witness that they were aware of the many nuances of how to describe atmospheres. It also gives power to the previous stated, that atmospheres are strongly subjective.

As stated above, defining, and describing atmospheres is a difficult task. This thesis' starting point grapples with the fact that studying the effects of light from the context of art is also difficult due to its environment. Studying art in-situ is less controlled than studying a specific occurrence or phenomenon in a controlled laboratory environment. In an open environment, with little given directions, such as in the installation, many parameters are present. As it intends to act as an actual scenario for viewing art, similar to a gallery or museum, many uncontrollable parameters are present, e.g., if the participant comes alone or is in company, whether other stimuli is present (like a phone) or whether the installation is viewed at all. This also contributes to the complexity of the measurement. Nevertheless, it is not to undertake that studying such environments, yet, is still important. Perhaps such a scenario cannot be compared to the ones of higher control (like a lab), but offers something different that, similarly, should be measured differently. Perhaps methods and tools beyond pure linguistics should be considered, such as targeting other senses or movement forms. Here, instead of looking at visual memory, a larger bodily memory can be considered.

Between the various setups, different patterns of movement can be found. In some scenarios, the participants move closer to the installation, whereas in others a larger area of the room is walked on. This can be due to many factors, such as the spread of the installation or the focus point. Nevertheless, some scenarios were also explored for a longer duration, such as 7. And 8. This can witness a larger sense of engagement, but there can be found no correlation between the area of movement and time spent in the installation.

How words that are trying to describe and transmit the qualities of given perceived moment in the surroundings can be challenging due to meanings of the words, approach of the viewers to its meanings and complex aspects related to the situatedness of the audiens. This shows how unexplored is this subject, or in different words - how

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limited can feel describing the quality of the perceived atmospheres by human with words as it interwinds spheres of emotions and feelings combined with visual stimuli and reflections that all together aim to conclude with one are few words such a complete experience. This pilot research through its measles designed in the testing procedure can point to the fact, that perceiving atmospheres and elaborating on received sensations is challenging, as well as often is being supported by relating to previously lived, seen and explored experiences, images — using memory of already existing sensations and feelings, correlating them and in consequence describing it from the perspective of the past experiences. In parallel, what is visible is also the aspect of imagination that plays pivotal role, where observers embarque on the journey of possible, imaginary landscapes or scenarios that could be similar to what they experienced in order to elaborate on the perceptual experience that just occurred.

Important point is to look at spatial exploration of space by the participators. Between the presented setups within the installation visitors have been exploring space differently. Looking at the video registration from time-lapse camera placed in the testing venue it was possible to grasp the movement exploration of the space

Moreover, assembling drawings that viewers created during the testing procedure folder as been analyzed through the lens of Strzeminski's distinction of types of vision — contour, silhouette, solid form, chiaroscuro andfull empirical vision. Where selected for analysis 5 set ups allowed to assembling and juxtapose received drawings to phenomenologically by simple observation of the outcomes with each other, gave an interesting threads. Most of the drawings could be categorized by two groups, drawings that represent translating the visual sensation observed during the task into (1) inner contour, outer contour, silhouette technique/graphic representation, and drawings that represent somewhat (2) solid form, full empirical technique. As these aspects are require broader knowledge and background from the physiological and psychological point of view, here are only grasping on possibility visible tendencies that emerge from as a lateral outcome to the testing procedure, yet have intriguing nature.

Interesting observation from the phenomenological point of view is the similarity in drawing visual sensation shaped in the presented lighting scenarios, as a common outcome in drawings that is visible above all is - the tendency to draw shape that responds to the shape of the fixture. In case of the Chapter 8, vertical stripes of LED are more likely visible in the drawings - with inclusion of the relation between the elements

(fixtures) positioned in space. It is possible to observe multiple lines being drawn next to each other with rhythmic gaps interlacing in central area of the spreadsheet as well as their position versus the central element - the ice cube. This tendency shows as as well in other Chapters' drawn responses to the task. As if visitors were to capture the outer contour of the light beam and shape of the source of light.

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10. CONCLUSION

This thesis, driven by a research approach that draws inspiration from theoretical frameworks and guided by the insightful observations of Wladyslaw Strzeminski, has ventured into the realm where human vision, perception, and lighting design converge to create memorable visual experiences. At its core, this work stands as a testament to the profound connection between seeing and culture, education, and civilization, laying the foundation for a shared journey towards expanding human perception beyond the confines of form.

The investigation into visual awareness, human vision, and perception, interwoven with the medium of light and artistic expression, has illuminated a path towards designing experiences that transcend the ordinary. This endeavor has led to the conceptualization of the method of research through the exhibition, culminating in the creation of an installation that serves as both an artwork and a testing ground for exploring how light can shape atmospheres and create evocative experiences. Outlined shared interest in developing images and visual experiences that are allowing human perception to grow beyond form, led to the exploration of 'light and space' art from past decades to the present, and has served as an inexhaustible well of inspiration, highlighting the transformative capacity of light to reshape spatial perceptions. This emphasis on manipulating light has directed the focus towards creating engaging environments that captivate viewers through sensory experiences, enriching the interplay between art and perception.

The dual objectives of this research, united by a transdisciplinary mindset, have paved the way for new insights. The first objective has resulted in the successful integration of a testing procedure into the installation, leading participants on a journey of exploration that probes the intricacies of how viewers evaluate light, readability of atmospheres, their reflections on experienced visual experiences, exploration of vision and what remains in their eyes pointing to the phenomenon of afterimages. Lastly, if the presented ephemeral installation on atmospheres and their afterimages, with and through light, had an influence on their mood.

The second objective has unveiled the essential components for crafting evocative visual experiences through light, emphasizing the pivotal role of viewer engagement and the fusion of diverse elements central to installation art. Through the testing procedure, viewers engaged with the installation in a manner

that would not have been possible without the carefully designed framework. This tool not only facilitated exploration but also provided a sense of control, allowing participants to delve into the nuances of vision and perception. It gave as well some sense of control as designed parameters in which participants were experiencing researched topic and the installation itself guiding their experience. This lens was pointing to thoroughly explore how the observation process and communication of perceived visual experiences in a more expressive form through drawings and thought-provoking questions.

The designed test and installation are seen as pilot research and have actually explored only one way of designing such an experience and successfully achieved creating evocative visual experiences for the viewers.

This process has highlighted the challenging nature of describing light characteristics and the qualities of experienced atmospheres, as well as the subjectivity and richness of the term "memorable." How experiences are considered "memorable" and if they can be measured.

As specific to this work is to achieve evocative visual experiences through lighting and spatial design, it is worth looking into new methods of evaluating light and art experiences - it showed a high level of engagement among visitors with the method through which they were exploring the installation in a different way than without the tool that was given to them. It awakens curiosity towards exploring vision and visual experiences, bringing insightful reflections and ending by expressing excitement from their experience of exploring the installation following designed guidelines.

In conclusion, the insights gained from this pilot research hold promise for exploring the development of new tools and methods of exploring viewers' perception that will allow expanding knowledge on designing evocative experiences with and through light.

This work lays the groundwork for further exploration, as these topics are also vital for current ways of experiencing art in museums and exhibition spaces that are striving for immersive and captivating visual experiences nowadays.

CONCLUSION

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