

Shifting perception and orienting response
Short introduction to applied neuroaesthetics

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Introduction

The following discourse is an attempt at providing a cross-disciplinary definition of the driving principle behind the contemporary concept of representation, drawing upon insights from the emerging field of *neuroaesthetics*. It's a report of a perspective whose foundational ideas have been instrumental in shaping my own work over the years (and remain pivotal as it continues to evolve), which at the same time warrant a wider discussion, I believe. This conviction has motivated me to bring them to publication.

The resulting framework aims to bridge the apparent disparities in today's methods of both producing and theorizing within the artistic field. It seeks to pinpoint a unifying thread running throughout the diverse and burgeoning theoretical directions in the post-photographic age (here, I refer literally to the period following the invention of photography, not the so-called AI art sub-genre). And ultimately it strives to highlight a general communality underlying seemingly incompatible languages and modes of expression.

The primary candidate for this connecting factor will be identified in the straightforward, yet rich with consequences, concept of *orienting response*, which we will discuss in depth. A focal point of our inquiry will be the role of this understanding in creativity and communication, and its bearing on today's culture. We will touch upon its significance in shaping the modern notion of visual interpretation, and explore the implications of this concept for both art and individual experience.

We shall delve into the epistemology of visual communication definitions, examining how they mostly fall short when addressing our neurologic wiring, where perception actually occurs. This exploration will segue into core topics of our understanding of consciousness, psychosomatic functions, and their connection to human vision, informed by contemporary research in these areas.

I contend that these theoretical notions have matured for recognition within the discipline and among the broader community. I further posit that the conclusions derived from such discussions can pave the way for a more substantial argumentation in the ongoing dialogue about the role of artistic production in everyday life.

To frame the discussion, we'll first pinpoint the central issue and then chart the evolution of representation from its historical roots to its present-day manifestation, often referred to as the "conceptual" paradigm. This examination will offer historical context while laying the groundwork for delving into alternative perspectives.

1. The problem of consciousness

The initial step in comprehending the function of representation in broad terms involves establishing a context to the foundation of the term and viewing art as a means to focus one's *attention*—whether that of the creator or the observer—on a subject. A central role here will be played by intentionality, a product of consciousness. However, while the evolution of art and its intersection with our notion of cognition and emotion provide profound insights into the human psyche, our grasp on the nature of consciousness remains elusive and largely incomplete.

This incompleteness not only exposes a gap in our understanding of how we perceive the world but also emphasizes the need to consider the specific background against which this issue originates. To fully fathom the depth of this dilemma, we must juxtapose the complexities of our views on the relationship between the mind and its environment with the perspectives offered by modern discoveries.

One of the ways to conceive consciousness is the so-called “holistic” view. This perspective suggests that consciousness emerges from the complex interplay and connectivity of brain neurons. Advocates believe that the collective and integrated operations of the entire brain, rather than its isolated parts, give rise to conscious experiences. Analogously, consciousness is seen as a symphony, a product of various orchestral sections working in harmony, with no individual instrument (or neuron) bearing sole responsibility.

Conversely, the “quantum” theory of consciousness, exemplified by the Orch OR (Orchestrated Objective Reduction) theory, proposed by the mathematical physicist Sir Roger Penrose and the anesthesiologist and psychologist Dr. Stuart Hameroff, posits that consciousness originates from quantum processes within the brain's neural structures, notably within the brain's microtubules, which are components of the cell's cytoskeleton. This theory proposes that the subatomic domain, despite its distance from our everyday reality, is fundamental in spawning conscious thought. Key components of this theory include:

1. **Quantum Computations in Microtubules:** The theory proposes that microtubules perform quantum computations. These computations are thought to be “orchestrated” by synaptic inputs and memory stored in microtubules.
2. **Objective Reduction (OR):** Penrose proposed that quantum superposition, an inherent feature of quantum mechanics where particles exist in multiple states simultaneously, cannot be sustained indefinitely and will reach a threshold where they will collapse to one state or another. This specific form of wave function collapse is termed “objective reduction” (OR).

3. **Link to Consciousness:** When the quantum computations in the microtubules reach the OR threshold, they collapse. This collapse is hypothesized to be a moment of conscious awareness or experience.

4. **Non-computability of Consciousness:** One of the foundational ideas behind Orch OR is Penrose's suggestion that aspects of human consciousness are non-algorithmic and cannot be replicated by classical computers. Instead, consciousness arises from the non-computable effects of quantum gravity.

Though labeled "quantum", the deterministic nature of the wave function collapse in Orch OR hints at an effort to unify quantum processes with classical physics principles, emphasizing that, essentially, consciousness might even just appear as a complex interplay of both. This eventuality becomes even more evident by considering other biologic quantum phenomena manifesting at a macro scale, as is the case e.g. for quantum entanglement in photosynthesis:

Quantum entanglement in photosynthesis refers to the phenomenon where particles become interconnected and the state of one particle is dependent on the state of another, no matter the distance between them, playing a potential role in the efficiency of photosynthetic energy transfer. In the context of photosynthesis, certain experiments have suggested that entangled states might be involved in the rapid and efficient transfer of energy from light-harvesting molecules to reaction centers in photosynthetic organisms. When sunlight is absorbed by these molecules, energy is transferred through a network of chromophores. The entanglement could help the system sample multiple energy transfer pathways simultaneously, allowing it to choose the most efficient one. This would mean that plants and certain bacteria might be exploiting quantum entanglement to optimize energy transfer, enhancing their photosynthetic efficiency. The possibility that biological systems could maintain quantum entanglement, typically a delicate state, at the warm temperatures of living organisms is both surprising and a subject of ongoing inquiry.

Considering the complex subtleties of the study of consciousness, and consequently attention, as exemplified, establishing a definitive framework for understanding the mind's operation from a top-to-bottom perspective proves challenging. Thus, in our pursuit to define the notion of representation in art and beyond, we must take a more empirical approach. Specifically, we'll investigate how this idea has evolved throughout history, which may provide insights into the reasons for such a transformation.

2. Art history and emergence of Neuroaesthetics

In examining the evolution of representation, the dawn of the 20th century marked a profound shift with the emergence of photography. Until that point, the responsibility of portraying things—capturing likenesses, appearances and events—fell largely on artists. The camera's advent, with its rapid and accurate ability to represent reality, prompted a fundamental change in this traditional role, necessitating a radical rethinking of creative expression and its purpose.

Artists began to delve into the unseen, emotional, and intangible realms in response to the emergence of photography. This exploration sparked the birth of modern art movements such as Impressionism, Cubism, and Abstract Expressionism. Art transcended its traditional role of representation of objectivity, instead, gaining the freedom to navigate the depths of human experience in innovative ways, inducing a philosophical debate on the nature of artistic expression and the role of the artist.

This metamorphosis of art mirrored broader shifts in our understanding of human cognition and consciousness. The emergence of Surrealism, for instance, represented an artistic response to Freud and Jung's psychoanalytic ideas. Art transitioned to become more introspective and abstract, with artists portraying not just their physical world, but also their emotions and subconscious thoughts. It's now widely accepted that our emotional reactions, influenced by individual backgrounds and personalities, are intertwined with our conscious interpretation of reality.

As our comprehension of the brain deepened, our fascination with the neural bases of aesthetic experiences grew, leading us to the establishment of the so-called neuroaesthetics field. This interdisciplinary domain, introduced by Semir Zeki, a neurobiologist from University College London, delves into understanding how the brain perceives, interprets, and produces art. Neuroaesthetics leverages tools like functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG), but also behavioral experiments, psychophysical tests, and—what specifically interests us, with our focus on creative processes—interdisciplinary approaches, to build a bridge between the realms of art and neuroscience.

The core concepts in neuroaesthetics revolve around the neural basis of aesthetic experiences, the emotional responses triggered by art, the interaction of multiple senses in perception, creativity, individual differences in taste and response, and the healing applications of art. These concepts delve into how the brain translates artistic stimuli into subjective experiences of beauty, creativity, empathy, and more.

Among the main achievements of neuroaesthetics has been leading to critical insights into the human experience of art. For example, the identification of brain regions associated with aesthetic judgments, understanding the relationship between art and emotional processing, and uncovering the neural pathways involved in creativity have

been significant milestones. The branch has also shed light on how art can be leveraged for therapeutic purposes, aiding in mental and emotional well-being.

Especially the notion of “functional specializations” in the brain is a crucial concept in neuroaesthetics and in neuroscience more broadly. This refers to the idea that different parts of the brain are specialized for different functions, playing specific roles in how we perceive and engage with art. Its key concepts include the localization of particular cognitive and sensory functions to specific regions of the brain, the interaction and integration of these specialized areas to produce complex behaviors and perceptions, and the adaptability of these regions in response to experience and learning. In the context of art, this may encompass the way visual areas of the brain process color and form, how auditory regions interpret sound and music, and how emotional centers connect these perceptions to feelings and meanings. The understanding of these functional specializations aids in decoding the complex neural pathways that underlie the human connection to art, bridging the gap between physical brain structure and the abstract realm of creativity. Some ideas that the concept of functional specializations introduced include:

1. **Visual Processing Centers:** Neuroaesthetics has explored how various parts of the brain (“V1, V2, V3”) are involved in visual perception. For example, the primary visual cortex is responsible for processing basic visual information, while other specialized areas handle color, motion, and shape.
2. **Emotional Responses:** Certain brain regions, like the amygdala, are linked to emotional responses to art. These areas can help explain why some artworks provoke strong feelings or why we find certain images beautiful or moving.
3. **Cognitive Engagement:** Other regions are involved in higher-level thinking about art, including the prefrontal cortex, which is associated with decision-making, critical thinking, and personal reflections on art.
4. **Multisensory Integration:** Some parts of the brain, such as the superior temporal sulcus, integrate information from various senses, providing a coherent, multisensory experience of art.
5. **Creativity and Imagination:** Areas like the default mode network are associated with creativity, imagination, and the generation of new ideas, essential for both creating and appreciating art.

Evidence that the perception functions mirror the emerging complexity of reality suggests that attention mechanisms must be equally complex and adaptive. However, these mechanisms are also founded on simpler, fundamental principles that can be understood in terms of basic neural interactions.

This concept is in line with current scientific understanding, which sees attention as a dynamic process, governed by both top-down (goal-driven) and bottom-up (stimulus-

driven) influences. For example, certain brain regions are known to be specialized for specific attentional functions, such as the frontal eye fields for eye movement (we will be discussing this aspect in detail in a few chapters) or the parietal cortex for spatial attention. These regions operate in concert with others, guided by the broader goals and context, yet their underlying function is likely based on more elementary principles of neural computation.

Furthermore, concepts such as the *spotlight model* of attention or *feature integration theory* reflect an understanding of attention that can be both nuanced and reducible to simpler terms. The spotlight model suggests a simple mechanism for selective focus, whereas feature integration theory speaks to the process of combining simple features into more complex perceptions.

The state of the art in the study of attention is highly interdisciplinary, drawing on psychology, neuroscience, philosophy, and even artificial intelligence. It's characterized by ongoing exploration and debate, and new technologies like fMRI and EEG are providing more detailed insights into how attention operates at the neural level.

Amidst the multifaceted nature of this subject, our investigation will primarily focus on the influences pertinent to the artistic work, known as bottom-up, or stimulus-driven, without venturing into more complex territories which are out of the scope of the present writing.

3. Color contrast as the building block in visual communication

Bottom-up, or stimulus-driven, influences on attention refer to the automatic and involuntary ways in which our attention is drawn to specific features of our environment. Unlike top-down attention, which is guided by an individual's goals or intentions, bottom-up attention is driven by the properties of the stimuli themselves. Here's a deeper look at the key aspects of bottom-up attention:

1. **Saliency and Contrast:** One of the key concepts in bottom-up attention is the idea of saliency. Salient stimuli are those that stand out from their surroundings due to their unique or contrasting features. For example, a bright red object in a field of green would be considered salient and likely to attract attention. This phenomenon is explained by the Feature Integration Theory, where specific features such as color, orientation, or motion capture our attention because they stand out from the rest.

2. **Sensory Processing:** Bottom-up attention begins at the very earliest stages of sensory processing. In the visual system, for instance, specialized cells in the retina and early visual cortex respond to specific characteristics of visual stimuli, such as brightness or edge orientation. These responses form the initial “building blocks” of our perception and can guide our attention towards particular elements of a scene.

3. **Neural Mechanisms:** Neuroscientists have identified specific brain regions involved in bottom-up attention, including the superior colliculus and the temporo-parietal junction. These regions are thought to act as “saliency maps”, integrating information about the visual, auditory, and other sensory characteristics of stimuli to determine what is most likely to attract our attention.

Especially the first topic's components here interest us:

1. **Saliency:** This refers to the quality of a stimulus that makes it stand out from its surroundings. It's the feature that attracts our attention to something, even without conscious effort. In the context of visual perception, saliency might be related to color, brightness, or any other visual attribute that makes an object distinguishable from its neighbors. The brain's mechanisms for detecting saliency allow us to rapidly identify and react to important elements in our environment, a critical ability for survival and navigation.

2. **Contrast:** Contrast refers to the difference in luminance or color *that makes an object distinguishable from its environment*. It's a fundamental concept in vision and plays a crucial role in defining the features of the perceived. Contrast aids in edge detection, which is essential for recognizing shapes and forms. High contrast often draws attention more easily, while low contrast might cause the object to blend in with its surroundings.

In their relationship, it is important to point out how salience, a fundamental concept in both art and visual perception, can be seen as inherently linked to contrast. At its core, salience refers to the quality of an object or feature that allows it to stand out from its surroundings, capturing attention. Contrast, whether in terms of color, luminance, or other visual attributes, is always the underlying mechanism that enables this distinctiveness.

By creating differences between an object and its background or between various elements within a composition, contrast heightens the salience of those elements. Thus, contrast can be seen as a primary tool through which salience is achieved, acting as a bridge between the physical properties of a visual stimulus and the perceptual experience it creates. Whether it's a bold color difference or a subtle variation in luminance, contrast serves to define and accentuate the salient features, and in essence, it could be considered a key aspect of the concept of salience itself.

Viewed from this perspective, one final obstacle stands in the way of our quest to discover the singular principle that governs human attention. Let's talk the distinction between "luminance" and "color" within the broader concept of contrast:

Luminance contrast can be considered a specific aspect of color contrast, but not vice versa. Luminance contrast is concerned solely with variations in brightness, while color contrast encompasses variations in hue, saturation, and brightness.

In other words, *all luminance contrasts are a form of color contrast* (specifically related to brightness), but not all color contrasts are luminance contrasts, as they may also involve differences in hue and saturation.

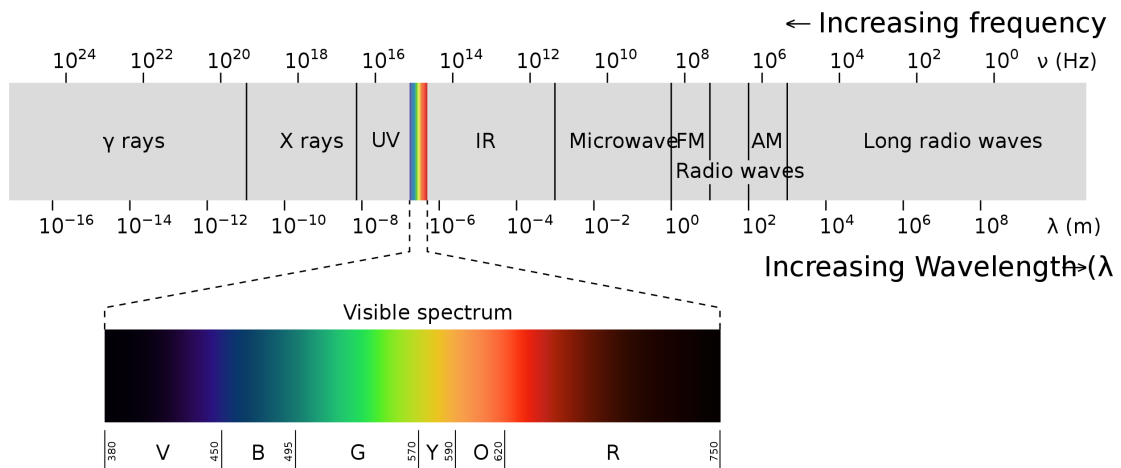
Specifying this connection between luminance and color is essential to provide a unified driving principle for the function of attention in perception. To reiterate, it's about the change in composition of chromatic values. It is from this foundational understanding that we can begin to unravel what is actually occurring when our attention is drawn to something in our surrounding world. This unique principle not only clarifies attention mechanics, but also serves as a critical starting point for a broader exploration of how we interpret and interact with the world around us.

4. Color as wavelengths within the visible spectrum

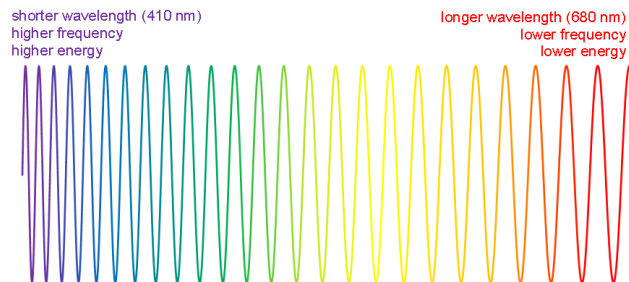
Here's a quick reminder of what colors are from a more formal standpoint:

Color is the property possessed by an object of producing different sensations on the eye as a result of the way the object reflects, absorbs, or emits light. The nature of this reflection, absorption, or emission is governed by the physical structure of the object, which determines how specific wavelengths of light interact with it. These wavelengths correspond to various colors in the visible spectrum, and the precise manner in which they are reflected, absorbed, or transmitted by an object leads to our perception of its color.

Below is a graphic representation of correspondences between colors and wavelengths:



In simplified terms, the variance in frequency, respectively of the wavelengths, is the direct expression of the energetic amount carried by the light.



These differences in energetic values, which present a hierarchical structure reminiscent of color being deeply interwoven into the very fabric of universal logic, play a pivotal role in understanding vision. They act as triggers in the process of translating color information from photons to electrical stimuli in the visual cortex. Here's a description of the process:

1. **From Photons to Electrical Impulses:** When light, which consists of photons, strikes the retina, it's absorbed by photopigments in the rods and cones. This interaction causes a chemical change, leading to a chain reaction that produces an electrical signal. This electrical signal is then processed and sent via the optic nerve to the brain.

2. **Energy Transformation:** The wavelength of the photon determines which type of photopigment it interacts with and how it changes that molecule's structure. The energy from the photon is absorbed and transformed into a chemical and then electrical change within the cell.

3. **Information is Carried Forward:** These neural signals carry information about the light's properties, such as its intensity and wavelength. This information is encoded in the pattern and rate of neural firing of the electrical impulses.

4. **Brain Processing:** Once the electrical impulses reach the brain, they're interpreted by the visual cortex and other associated areas. These regions decode the patterns of neural firing to recreate the visual scene, including discerning colors, shapes, movements, and more. The perception of color is a complex process that involves multiple areas of the brain. The primary visual cortex (V1) is just the starting point for the processing of visual information.

Colors are not merely properties of objects; they manifest through active processing by the brain, underscoring the subjective and inherently dynamic nature of perception. Expanding our comprehension of colors from static chromatic values to dynamic neural shifts provides a clearer framework for interpreting our responses to visual stimuli in our environment.

5. Psychosomatics, neuroplasticity and art

The study of the visual cortex has made extraordinary strides in understanding how vision operates on the neural level since its inception. Particularly noteworthy is e.g. the groundbreaking work conducted by the Gallant Lab at the University of California, Berkeley, with a landmark study that utilized functional Magnetic Resonance Imaging (fMRI) to monitor brain activity as subjects viewed movie trailers. The resulting data enabled the creation of a computational model that could predict neural responses to visual stimuli, thus allowing researchers to reconstruct what subjects were seeing solely based on brain activity. This research not only demonstrated the potential to “read” visual experiences directly from brain activity but also opened doors for future innovations such as neural prosthetics and sophisticated brain-computer interfaces.

The decoding of visual experiences from brain activity represents a significant milestone in neuroscience. However, its implications extend far beyond the initial observation of transient neural responses to visual stimuli. Specifically, it lays the groundwork for understanding how these effects connect to triggers for emotional or psychological responses that may eventually manifest as physical symptoms or changes. In essence, it reveals a common ground between perception and a phenomenon known as *psychosomatics*.

Psychosomatics refers to the study and understanding of physical symptoms that originate from or are influenced by emotional or psychological factors. This field emphasizes the interconnectedness between the mind (psyche) and the body (soma), highlighting how emotional and psychological stressors can manifest as, intensify, or prolong physical ailments. Psychosomatic disorders encapsulate conditions wherein mental states play a significant role in the onset, severity, or duration of physical symptoms.

In this context it's also important to recognize the brain itself as a subject of transformations influenced by psychosomatic interactions. This adaptability of the brain is often termed *neuroplasticity*, which denotes the brain's ability to reorganize itself by forming new neural connections throughout life. Neuroplasticity enables the brain to adjust its activities in response to new situations or changes in the environment, which can include emotional and psychological stressors, thus intertwining with the principles of psychosomatics and revealing the presence of *autopoietic* principles at the neural level.

While brain imaging research unveils groundbreaking insights into short-lived neural reactions and specific visual experiences, the exploration of psychosomatics and neuroplasticity delves into the more enduring facets of brain function and adaptability. Together, these investigations reveal the lasting imprint that fleeting phenomena like emotions and specific thoughts leave on the brain's structure and operation. They allow us to track the way ephemeral neural activity, mapped through brain imaging, translates into persistent physical symptoms or adaptive changes within the brain. This

contributes to a deeper, more temporally nuanced understanding of the mind-body relationship.

At the same time, we're basically assisting to is the introduction of the temporal dimension into issues related to perception and, by extension, representation. This assessment is paralleled by another significant achievement of the avant-garde—the fundamental shift in how temporality was represented in visual art. More precisely, the initial endeavors to address the temporal facet of perception, a groundbreaking revelation we'll explore in the subsequent chapter.

Breaking away from traditional static depictions, these movements explored innovative techniques that suggested fluidity, dynamism, and change. They deconstructed singular perspectives and linear narratives, implying a multiplicity of viewpoints and the passage of time within a single piece of work. In doing so, they depicted objects as transformed by perception over extended periods, an approach that essentially embodies the principles of neuroaesthetics in the light of psychosomatics and neuroplasticity.

While tools like fMRI provide a glimpse into the aforementioned internal processes, there's also a technological avenue, especially suited for deciphering our interaction with visual stimuli, which is often more accessible. Additionally, this method distinctly addresses the time dimension directly.

6. Eye tracking and the study of attention

The human visual system is an intricate arrangement that involves the eyes, optic nerves, and the brain. Light enters the eye through the cornea and passes through the lens, which focuses this light onto the retina. The retina, located at the back of the eye, contains photoreceptor cells called rods and cones. These cells detect light and send electrical signals to the brain, which then processes the information and produces what we perceive as vision.

You can think of these receptors as "bio-pixels" that capture and process the light information. Their density in the retina (particularly in the fovea, the central area of sharpest vision) determines our visual acuity. The more densely packed these cells are, the finer the detail we can discern, similar to how an image with more pixels tends to have better clarity and resolution.

When examining the temporal aspect of our vision, it's reductive to see our eyes simply as "openings" looking outward. It's crucial to also factor in the retinal acuity. Comprehending the implications of this phenomenon is key to fully understanding the role of the visual perception mechanics.

Unlike visual acuity, which pertains to the functioning and errors of refraction, this property of the eyes underscores the uniqueness of human sight. It's defined by the centripetal distribution of receptors: cones, concentrated in the center and sensitive to detail and color, and rods, more prevalent in the periphery and attuned to movement and low light. This distribution necessitates our eyes' continuous active scanning of the environment, focusing on specific points in rapid succession. This underpins the existence of the eye's micro-movements. Through ongoing adjustments, this mechanism lets us interpret our surroundings, framing our vision as a constantly evolving and constructive process over time.

The underlying mechanics of eye-movements' dynamics are straightforward: the brain directs the eyes towards captivating objects initially identified by the peripheral zone of the fovea. However, the implications are far-reaching. "Resolution" now denotes not only the clarity of a visual depiction but also visual data, based on the specific region of the retina that registered it. The visual data isn't processed uniformly, but has areas of distinct importance.

Micromovements of the eye thus become as essential to the idea of understanding visual information as visual acuity and the perception of color. Let's break down quickly the concept.

There are several types of eye micro-movements, however, we're specifically interested in those that occur independently of broader body movements and pertain solely to the act of observation. They are:

1. Saccades:

Saccades are rapid, ballistic movements of the eyes that shift gaze from one point of interest to another. They are the fastest movements produced by the human body and are essential for directing the fovea – the part of the retina with the highest density of photoreceptors – to a visual target. During a saccade, visual intake is reduced, which means we're mostly blind during these quick jumps. Instead, we rely on the visual information we gathered just before the saccade. This phenomenon is part of what's known as "saccadic suppression."

2. Fixations:

After the rapid movement of a saccade, the eyes 'fixate' on a new location for a brief period, usually for about 200-300 milliseconds. During a fixation, the eyes are relatively still, and information is captured and sent to the brain for processing. Most of our visual intake occurs during these fixation periods.

3: Microsaccades:

Even when our gaze is fixated and seems steady, our eyes are still making tiny, involuntary jerks called microsaccades. These minute shifts help refresh the image on our retinas and prevent fading, given that constant, unchanging visual stimulation can lead to sensory adaptation and a decrease in responsiveness of the photoreceptor cells.

Considering that any fixation is preceded by a somewhat “automated” exploration of the visual space (bottom-up stimuli driven attention), it becomes clear why the understanding of eye movements is foundational. It gives insights into how attention functions generally.

From this foundation, the research discipline of gaze tracking, also known as eye tracking, emerges. This field specifically studies the micro-movements of the eyes, recording the point of gaze or the eye's motion in relation to the head. This technique can determine a person's gaze direction, identifying specific areas of interest within their visual field, and is applied in fields such as psychology, marketing research, and human-computer interaction.

Eye-tracking consists in recording the paths such movements follow as we explore our surroundings. By examining our gaze patterns and subtle eye movements, researchers can connect with the neural processes that underpin our ability to interpret visual cues. These minute motions reveal more than mere focal points; they shed light on our selective attention to specific elements within our visual field, offering insights into cognitive behavior and attentional mechanisms. Gaining an understanding of these aspects is vital for a comprehensive view of how we perceive and interact with the world around us.

The movement of the eye is considered to be a very valuable type of parameter, in that it provides insight into what constitutes probably the most sought after information human beings can reveal about their attention centers—their interests.

7. The introduction of Interest and Data-driven economies

The technical definition in psychology of our reaction to centers of interest is *orienting response*.

Orienting response is a fundamental aspect of attention that involves shifting focus towards a new or unexpected stimulus in the environment.

The orienting response is an automatic reaction that helps organisms adapt to their surroundings by noticing changes and potential threats or opportunities. It's a basic and essential part of perception and attention, helping us navigate the world by drawing our attention to things that are *new, different, or significant*.

In psychology, the study of the orienting response is often linked to concepts like novelty detection and salience, where attention is drawn to stimuli that stand out from the background or that represent a change from what was previously occurring. It's part of the complex system that allows us to focus on what's most relevant or interesting in our environment at any given moment.

The idea that our attention is drawn by change (or the lack thereof!) is especially poignant in an age where global interconnectedness and burgeoning internet technologies usher in a shared ecosystem of tracked and directed interest, as hinted to in the conclusion remarks of the previous chapter. Essentially, what we're witnessing is the emergence of so-called interest and data-driven economies.

This concept refers to the unprecedented scale of connectivity facilitated in our world particularly by the hand of the global management of data (mostly via digital technologies). The controlled character of these interactions imparts them a deterministic quality, enabling us not only to identify specific cause-and-effect relationships, but also to get them projected indefinitely. Interest tracking thus transcends its immediate character, ascending to a cultural cornerstone in our evolving landscape. One clear example is the growing inclination of companies to integrate eye tracking technologies into their services, causing considerable public concern.

By investigating the profound relationship between representation and the systems governing our perception and response, we reach a deeper understanding of how visual arts engage with and shape our world. This, in turn, equips us with the insights necessary to navigate the challenges and opportunities presented by our increasingly interconnected and data-driven global landscape.

One idea to consider is that, due to the autopoietic nature of our attention, there could be principles guiding our understanding of representation that transcend archetypal domains. It appears in fact that the notion of representation contemplates mechanisms of a purely biological, intrinsic to the perception order. This suggests a need to discover new tools to probe these mechanisms.

Beyond their tangible qualities, we might begin to view things from the perspective of a dynamic process of acquiring and losing information that defines them in perception. Our attention is not merely influenced by the subjects of our interests; these interests may themselves be components of the system steering our attention. This system propels our focus towards balancing elements that may not bear any direct ties to the physical world from which they originated.

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