

Revisiting Visual Consciousness and the Sensorimotor Account of Vision

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Flashlight

This study provides an overview of the sensorimotor account of vision and visual consciousness. We retackle some challenging topics such as qualia, visual consciousness, and awareness. The pivotal role of the subjective perception of information in consciousness is discussed. It is argued that an individual, in the process of seeing, is aware of the abstract object once the object is presented to the visual system; otherwise, observers will be conscious by means of previously stored representations of objects.

Keywords:

Visual Consciousness, Sensorimotor Contingencies, Information Processing

Preamble: Let's See

Main inquires into Visual Consciousness:

1. Does an observer consciously detect an object, or is it unconscious?
2. Does the brain produce an internal representation during seeing?

Computational psychology uses mathematics to explain vision. Perception is the last step in a mathematical hierarchy that begins with external data.

Ecological theory of perception states that there is no top-down processing in visual perception and consciousness. Visual perception (and consciousness) is a direct result of sensing the world (Gibson, 1966).

Sensorimotor account of vision

- Action is a fundamental to perceiving the world (Noë, 2002, 2004, 2006a, 2006b)
- Vision is a mode of exploring the world that is mediated by knowledge.

Axioms of the Theory:

1. The brain is not the source of experiencing something visually. A detailed internal representation does not guarantee experiencing the world consciously.
2. Objects external to the individual are the source of information and must be explored by the individual.
3. Sensorimotor contingencies are the laws that govern visual consciousness (e.g., head and/or body movements modify “seeing”).
4. The sensorimotor contingencies relate to visual-attitude rather than the visual modality. As such, the environment is only truly perceived when a person actively and purposefully explores it.

Awareness and Vision

Visual awareness is not attention, nor a mental representation of an observed object. Visual knowledge is achieved when there is **active interaction** between sensorimotor contingencies and objects in the environment (i.e., behavior).

“Seeing” is a matter of degrees, and is dependent on access to the object. In other words, perception depends on how the person looks at that object (e.g., distance from object) and how an object is experienced visually.

Degree of visual experience is explained as:

1. Low-level perception and non-semantic content of observables (e.g., a scene of a theatre or a painting), or :
Inactive perception causing a person to be **unaware**.
2. High-level perception and semantic content of observable (e.g., moving a pen towards or away from one's face), or :
Active perception causing a person to be **aware**.

Qualitative Visual Consciousness

Explanatory gap:

Although visual knowledge is gained through the interaction between sensorimotor contingencies and objects, it is not possible to explain the subjective, emotional aspects of the experience in behavioral, physical, or functional terms.

Whether ‘qualia’ exist or not, observers talk about abstract (or “raw”) feelings of observed things.

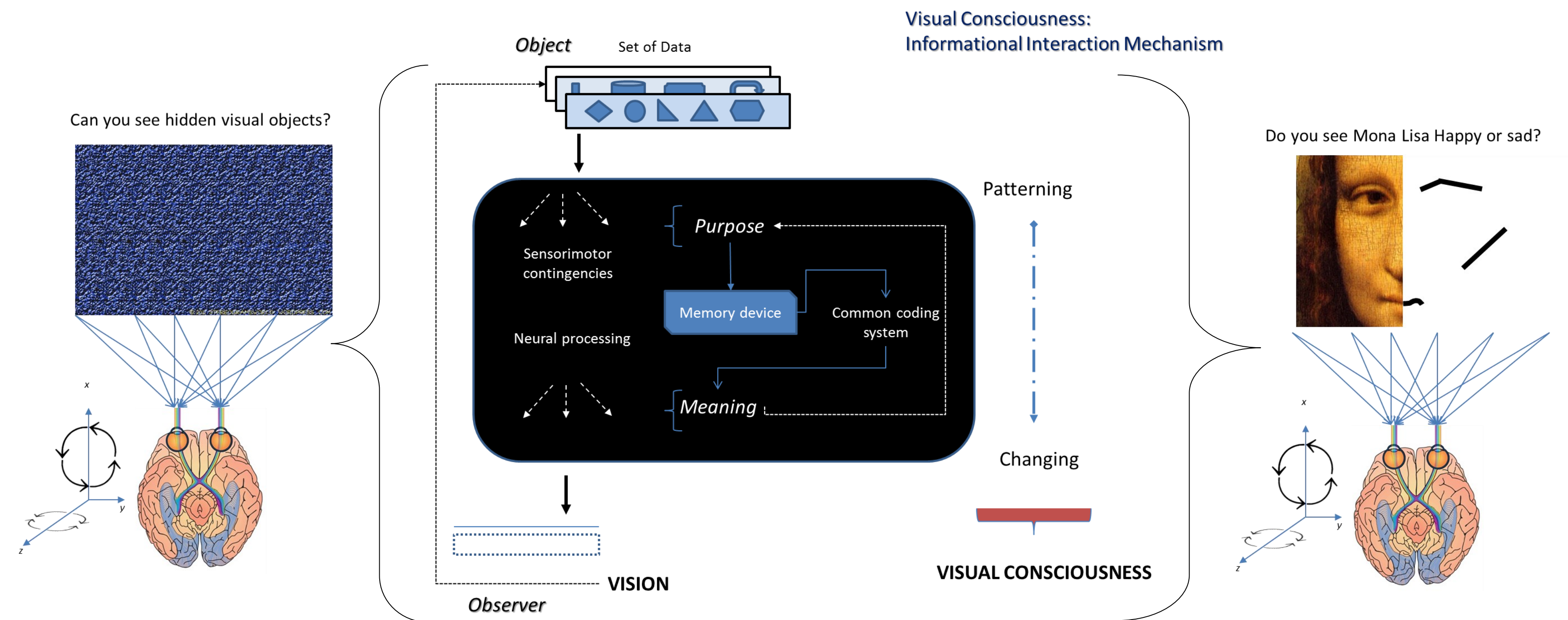
Physical/neural explanations seems inadequate in relation to the feelings attached to observable objects. Neural firing, for instance, will not help define our sense of the blueness of an object hidden in the stereogram, or the happiness expressed by Mona Lisa.

Visual awareness seems to have 3 features associated with “raw” feelings:

1. Ineffability,
2. Structure, and
3. Sensory presence

The feelings one has in relation to observed objects, and the identification of similarities and differences, are qualities of the sensorimotor interactions.

Bodiliness (modifying sensory input through body movements), **insubordinateness** (sensory input originates in the outside world which, to a certain extent, is outside our control), and **grabbiness** (the outside world has the ability to capture our cognitive resources) will conceptualize the sensory presence and ineffability of visual experiences, and the structure of observations.



A stereogram is an optical illusion of stereoscopic depth created from a flat, two-dimensional image or images. Seeing hidden images in the stereograms is achieved if there is a meaningful informational interaction, otherwise understanding will not be achieved.

A face can reveal the emotions of the owner. However, visual perception of emotions needs an informational change in the observers' coding system, otherwise there won't be consciously visual understanding.

Informational Action and Visual Awareness

Response to the explanatory gap:

The organography of the visual apparatus, and the movements of the apparatus of visual sensorimotors are important for visual perception. Here, sensorimotor contingencies depends on action, but “acting” is not solely responsible for visual consciousness, because:

1. Vision is an activity of **testing changes** in an environment. Changes in visually-targeted objects create meaning.
2. Testing the changes is **individualized** by the sensory modalities. Data are switched from raw data into meaningful patterns **with common codes** for a person in a given **context of observation**.
3. Without “observers”, there is **no qualified** seeing. The observation of an object is marked by the qualities of interactions with the world.
4. Visual qualia are **informational illusions of changes**. The qualia of an observed object occurs when information is integrated, missed, or misprocessed; an erroneous transfer of data impacts the sensorimotor and neural system.
5. Visual awareness is a **semantic activity** that results from the **informational driven interaction** of an observer with an object (Roederer, 2005). The conscious quality of the observation is associated with the **quantity and quality of the sensorimotor interactions with the object**. *Visual awareness is realized when a change in an observed object causes an immediate change in the visual system and neural pattern of the perceiver*. Changes in the derived information will be marked when there is ‘informational shock’ and a meaningful change for the observer.

Visual consciousness is not a single entity located somewhere in the brain, but rather a collection of tasks and environment-contingent capabilities. Simply, if an observer has not interacted with an object, there is no a process of change in sensorimotor and neural system.

Conclusion

Visual awareness via **bodiliness** (modifying informational input through movements of the visual apparatus), **insubordinateness** (informational input of objects derives from the outside world and the outside world escapes our control to a certain extent), **incoordinateness** (sensory data separates external information from internal memory), and **grabbiness** (the outside world has the capacity to code our cognitive resources) conceptualize informational presence.

“Feeling” in the realm of visual awareness is not just a product of neural mechanisms associated with information processing, but awareness is achieved when informational-driven interaction changes the neural firing patterns associated with objects or behaviors in internal memory. However, this is not the ultimate explanation.

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