

ELEMENTARY SENSATION PRIMACY CREATING A FIRST TO THIRD PERSON GAP OF CONSCIOUSNESS

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ABSTRACT

Global perception, memory imagery and neutral reflection comprise the three main mental functions, and are distinguished by the activity, passivity or neutrality of sense organs. Global perception is composed of elementary sensation and stimulated reminiscence. Elementary sensation is a physical chain of bottom-up information, extending from extra-mental reality to active sense organs and specialized brain regions. Stimulated reminiscence and memory imagery that do not involve sense organ activity represent top-down information from different brain regions. Neutral reflection without sense organs allows abstraction by categorization, structuring and establishment of relations. Elementary sensation with direct physical interactions among the extra-mental environment, sense organs and specific brain regions reflects the present and is thus primary, self-evident, intense, unchangeable and incommunicable. Memory imagery retrieval of anterior perceptions represents the past and is secondary, faint, modifiable and communicable. Neutral reflection enables the abstraction of memory imagery to objective concepts, allowing general consensus. Neurobiological investigations reveal that elementary sensation involving active sense organs activates the same brain regions as memory imagery without sense organ activity does, whereas neutral

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reflection takes place in different prefrontal brain regions. The different brain locations may explain the hard problem and the first-to-third person gap in consciousness. Presence of this gap precludes an identical content of consciousness in two persons, since elementary sensation of the first person cannot be directly transmitted to a third person, given that it has to be recreated with the same environment and the sense organs of that person. Moreover, differences in sense organ constitution or information processing will never allow reconstitution of an identical content of consciousness. In particular, experience gained through the activation of interior sense organs, resulting in pain, for example, cannot be transmitted to third persons. Elementary sensation is the starting point of a continuous process, commencing with bottom-up information transmitted from the sense organ to the two other mental functions, which constitute human knowledge. By initiating the global perception function, elementary sensation acquires epistemic primacy, which induces complex subjective experiences representing the present, thereafter encoded in the memory as fixed episodes of the past that can be retrieved by the function of memory imagery. Finally, the function of neutral reflection objectifies this information by abstraction into concepts. Epistemic primacy of global perception has to be distinguished from ontological primacy of consciousness at the neutral reflection level regarding the non-material existence of experienced consciousness from the material world. However, epistemic primacy remains indecisive with respect to ontological primacy concerning the philosophical theories of materialism, dualism or panpsychism.

Keywords: elementary sensation, global perception, memory imagery, abstract reflection, neurobiological correspondence, hard problem, consciousness primacy, subjective experience, objectification

1. INTRODUCTION

Consciousness leads to the unsolved “hard problem” of determining the origin of conscious experience (Chalmers 1995). On one hand, it is considered as an absolute, for everybody self-evident entity, which “can by no means be reduced to structure,” so that “consciousness is and remains methodologically primary” (Bitbol 2008, p.69). On the other hand, it has to be brought into relation with biophysical matter, since its evolution and functions depend on a healthy brain. Consciousness, as the starting point for the objectification

process, has primacy; therefore, Varela suggested a new stance by “embedding phenomenological reports and objective findings within a unique structure” (Bitbol 2008, p.70).

Chalmers (1995) described two different types of brain-consciousness problems, defining them as soft and hard. The soft problem could be solved more easily and pertains to functions such as discrimination, categorization, information integration, access to one's internal states and distinction between wakefulness and sleep. The hard problem is linked to states of conscious experience dependent on perception through different sensory organs, which lead to qualia in consciousness, such as the experience of redness, hearing the sound of an instrument, or smelling a rose (Jackson 1982). As Levine (1983) explained, there is an explanatory gap between subjective experience and brain functions when elucidated via neurobiological processes. The physicist Zeh (1998) confirmed presence of such a gap, since perceived color is not a property of physical light. Therefore, it remains incomprehensible how and why physical wavelengths induce the subjective experience of the color red.

Consciousness can be explored from an introspective first-person view, as well as from a neurobiological third-person view. Philosophically, Chalmers (1995) discriminated two states of consciousness—a more cognitive state with general awareness corresponding to the soft problems and a phenomenal state represented by the experience of perception, defined as the hard problem.

In this article, existence of a special type of “elementary sensation” is proposed, which induces the same properties as the subjective experience of phenomenological consciousness does (Jansen 2014). Elementary sensation corresponds to the interaction of the physical environment with the corresponding sense organs, whereby the neurological signal is transmitted to specialized brain regions, resulting in a sensation that appears to be primary, intense, unchangeable and incommunicable. Conversely, memory imagery derived from elementary sensation is secondary, faint, modifiable, and communicable. Neutral reflection allows objectification to concepts and structural relations. Since elementary sensation is incommunicable to third persons, it creates a first-to-third person gap in consciousness. For each mental function, the different phenomenological qualia correlate with a different location of the brain regions involved in the process. Thus, the phenomenal gap between global perception and memory imagery on the one side and neutral reflection on the other might explain the hard problem by different interconnections of the corresponding brain regions.

2. THE MAIN MENTAL FUNCTIONS

Mental activity allows the acquisition of human knowledge on extra-mental reality by a continuous process following three main mental functions, commencing with (I) **global perception** proceeding to (II) **memory imagery** and culminating in (III) **neutral reflection**. The function of global perception can be further subdivided into **elementary sensation** (Jansen 2014) and **stimulated reminiscence** that complements it (Figure 1). Elementary sensation is physical bottom-up information transfer from the sense organs to the brain. It is characterized by a chain of uninterrupted physical interactions, such as photons reflected from outside objects entering the eye and depolarizing nerve cells in the retina. The neural activation is further transmitted through the nerve system to brain regions in the occipital cortex, specialized in optical signal processing.

The mental representation of extra-mental reality in the brain needs both bottom-up elementary sensation and simultaneously top-down stimulated reminiscence, which complements it by retrieving encoded information from the memory containing episodic memory of the past. Recognizing a friend requires bottom-up elementary sensation evoked by photons reflected from a distant body, but also top-down information from the memory imagery of the past, characterizing the body perceived both as a person and as a friend. Together, elementary sensation and stimulated reminiscence form the function of **global perception**, induced by sense organ activity.

In contrast, if the eyes are closed, the chain of physical interactions between the outside and the brain is interrupted; yet, the extra-mental object can still be mentally represented, albeit via top-down information retrieved from the episodic memory only. In neuroscience, memory imagery corresponds to mental imagery and pertains to already fixed episodes of the past encoded in the memory. They no longer require sense organ activity representing the present.

Global perception through sense organs allows a mental representation of the extra-mental reality, enabling evaluation of the proximal or distant environment of the body. A distant stimulus can be represented by photons (transmitted via electromagnetic waves) or sounds (mechanical waves), which enter their corresponding reception organ and are transmitted to the brain. In a similar vein, internal perception organs depend on an uninterrupted chain of physical interactions from their specific environment to the brain. Elementary sensations are necessarily conscious for the representation of extra-mental

reality and depend on physiological brain functions, which are rapidly lost after brain injury, such as insufficient blood oxygenation.

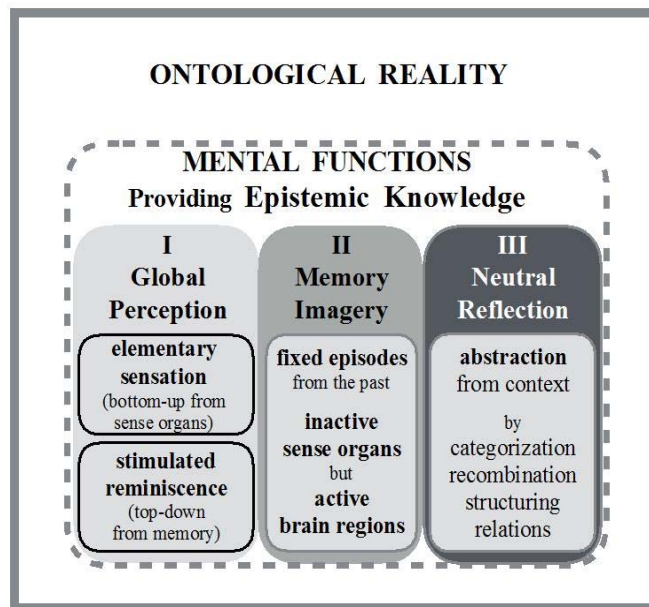


Figure 1. Mental Functions Providing Epistemic Knowledge.

Note: There are three main mental functions: global perception, memory imagery and neutral reflection. Only global perception is divided into two subunits elementary sensation and stimulated reminiscence which are complementary for the constitution of global perception.

3. MENTAL FUNCTION I: GLOBAL PERCEPTION

Global perception combines elementary sensation attained through bottom-up information captured by all sense organs, and stimulated reminiscence as top-down information from already encoded information in the memory, which represents all prior experiences. Both sub-functions are intimately linked and form global perception with no apparent distinction. However, after closing the eyes or ears, the prior perception can still be imagined, demonstrating a clear distinction between elementary sensation

involving active sense organs and memory imagery devoid of sense organ activity. In global perception, elementary sensation retrieves only directly linked episodes from the memory, whereas memory imagery can retrieve all encoded prior episodes. The main distinction among the three mental functions depends on sense organs, which are active for elementary sensation and thereby for global perception, passive for memory imagery, and absent in neutral reflection (Figure 1).

3.1. Sense Organs

Sense organ activity allows mental representation of extra-mental reality through perception in humans as well as animals. However, sense organs should be considered from a much broader perspective, according to Bayne (2011). The author posited that they should not be limited to the classical five senses recognized by Aristotle (350 BC) comprising sight, hearing, smell, taste and touch. Sense organs have the task of orienting living beings in their environment and helping them avoid threats to their survival. Sense organs are situated at different sites in the body and could be classified according to three vital functions for survival. Externally oriented sense organs can alert to the presence of distant dangers, whereas superficial sensory organs warn of dangers in direct contact with the body, and internal sense organs can signal disturbances in organ functions within the body.

External perception necessitates highly specialized external sense organs, such as eyes, ears and nose, providing with vision, auditory and olfactory senses, respectively. Perception at the surface of the body is effected by receptors in the skin for contact, pressure, vibration, thermoception as well as for gustatory sensation in the mucosa membranes of the oral cavity. Internal perception within the body and its organs is supervised by sense organs for alerting of abnormal functions of the inner organs. Specialized receptors are localized in many organs, such as for pulmonary stretch regulating breathing, gastrointestinal tract functions, bladder fullness, and others. As long as inner organs function normally, the sense organ perception remains unconscious, but becomes conscious for intense organ functions, such as forced respiration, violent heartbeats or abundant transpiration or for organ dysfunctions. Any disturbance of sense organs is indicated by nociception, a feeling of pain; thus, external organs like eyes can be blinded, surface organs can be burned and inner organs disturbed (e.g., by bad digestion). Un-localizable permanently active internal sense organs indicate general feelings, such as tonic

associated with muscular tension or weakness related to reduced muscular tension. The concert of all activated sense organs for internal and external perception might constitute an important part of conscious awareness.

Activity of sense organs is variable. Some sense organs can be voluntarily inactivated, whereas others remain continuously active (Table 1). Closing the eyes, closing the ears with fingers or holding the nose closed can temporarily deactivate outside sense organs. However, disturbed surface senses of the skin cannot be discarded from awareness, such as the feeling of pressure, heat or other superficial injuries. A permanent activity of these surface organs is necessary for indicating life-threatening dangers, whereby they could be regarded as security guards, warning of risks for essential survival functions of the body. Under normal functions, their activity remains unconscious and becomes perceptible only when organ functions are disturbed, whereby pain is experienced. Internal sense organs cannot be deactivated either; while some indicate organ functions, others pertain to general feelings, such as tonicity or weakness, as well as illness or wellbeing of the body.

Awareness can involve multiple sense organs simultaneously, but can also become extremely restricted to only one sense, such as breathing, as is the case during incomplete anesthesia. For example, while muscle relaxants are necessary to diminish muscular tension during abdominal surgery, they can also inhibit breathing. When injected too early before profound state of anesthesia is reached, the respiratory inhibition can become conscious again and is felt as an extreme urge to breathe, without any other sense organ perception. With increasing anesthesia, the isolated awareness of one isolated disturbed sense organ disappears again

Table 1. Voluntary and Involuntary Interruption of Sense Organ Activities

	External sense organs	Superficial sense organs	Internal sense organs	Conscious awareness
Voluntary interruption	+	-	-	-
Spontaneous disappearance	+	+	+	-

Note: Depending on the kind of sense organ (external, superficial or internal), it can be voluntarily interrupted or has to wait for the spontaneous disappearance of the stimulating agent. Only consciousness cannot disappear unless profound sleep is reached.

3.2. Elementary Sensation

All senses, such as vision, hearing, tasting, and others, lead to global perception involving sense organ activity, including elementary sensation and stimulated reminiscence. Elementary sensation is limited to the interaction of sense organs with their respective environments by an uninterrupted chain of physical processes. In normal life, elementary sensation and stimulated reminiscence are indistinguishable from each other, making a pure elementary sensation, such as seeing redness or just hearing a sound, more difficult to encounter. In general, elementary bottom-up sensation is associated with stimulated top-down reminiscence. Therefore, elementary sensation is a theoretical concept, defined as pure bottom-up perception devoid of any top-down perception associated with prior episodes, concepts or emotions, which easily come to mind when perceiving an object. Thermoception is a more appropriate indicator of elementary sensation. The pure form of elementary sensation is thus an exception, only rarely found in normal adults. For instance, it can arise when they encounter completely new situations, but is more prevalent in young children, as they have not yet acquired sufficient prior experiences to draw upon.

Elementary sensation has five characteristic properties (Table 2). For example, when taking a bath, as a precaution, one might feel the water temperature with the hand first. If there is an immediate *intense* pain induced by overly hot water, the hand is instantaneously retracted from the bath. The intense feeling of heat corresponds to the direct physical contact of the thermoception receptors in the skin with overly hot water. The intensity of the heat feeling remains *unchangeable* during the entire period the hand remains in contact with the water. However, the intense pain induces the reflex of a rapid withdrawal of the hand. Elementary sensation during environmental contact of all sense organs, such as seeing blinding light, hearing disturbing sounds or feeling burning pain, can only be passively endured without any possibility to diminish its intensity, unless by escaping the unfavorable environment. Elementary sensation is limited to the direct contact of sense organs with the environment, such as thermoception receptors with scalding hot water. Without the direct physical contact, its intensity becomes *irreproducible* from the memory by voluntary actions. For the same reason, it remains *incommunicable* to third persons, until they undergo the same direct environmental contact with their own sense organs, in order to attain the same elementary sensation. Thus, elementary sensation is a true mental

representation of the ongoing extra-mental reality, since it only *reflects the present*.

The fact that elementary sensation is unchangeable could have a biological meaning. If it were modifiable, consciousness could overlook the importance of a dangerous situation. Consequently, a voluntary diminution of sense organ sensitivity could delay response to dangerous situations, whereas intense pain will instigate immediate escape from a threatening situation. In this respect, intense, unchangeable elementary sensation represents the environment in the present and increases likelihood of survival, acting in the role of a security guard.

Table 2. Properties of Elementary Sensation and Memory Imagery

	ELEMENTARY SENSATION	MEMORY IMAGERY
	unbroken physical chain	broken physical chain
1.	intense	faint
2.	unchangeable	changeable
3.	irreproducible	reproducible
4.	incommunicable	communicable
5.	reflecting the present	reflecting the past
	UNIQUENESS	REPRODUCTION

Note: Elementary sensation and memory imagery have opposite properties. Stimulated reminiscence, a subunit of global perception, corresponds to memory imagery, but represents only that part of memory imagery, which is linked to elementary sensations in the past and is directly stimulated by it.

3.3. Stimulated Reminiscence

Global perception requires—in addition to the sense organ-dependent elementary sensation—complementary information from past experiences, which is necessary for the identification of the perceived extra-mental objects. Elementary sensation as a bottom-up stimulus induces the reminiscence of

directly linked past experiences by retrieval of top-down information encoded in the episodic memory. Stimulated reminiscence presents past experiences directly linked to the elementary sensation, such as the identification of the perceived object by its name and special properties, as well as the associated feelings, like gladness or anger. Together, elementary sensation and its stimulated reminiscence form the function of global perception in the present. Stimulated reminiscence is only a selected part of the total memory imagery, retrieved by the specialized stimulus of elementary sensation (Table 2).

4. MENTAL FUNCTION II: MEMORY IMAGERY

While sense organs are deactivated during memory imagery, they are represented by their corresponding brain regions. Thereby, memory imagery without the involvement of active sense organs acquires five unique properties, distinguishing it from elementary sensation, which allow markedly different properties. First, in contrast to the intensity of elementary sensation, memory imagery remains *faint*, such as when the perception of the contact of the hand with the overly hot water is retrieved a day later (Table 2). Second, although elementary sensation is unchangeable by voluntary actions, memory imagery has become *changeable*, since it can be forgotten or recalled in consciousness again. Third, epistemic memory is based on encoded information and becomes *reproducible* by retrieval from the episodic memory. Fourth, it becomes *communicable* by signs or language to a third person, who can thus retrieve similar episodic events from his/her memory. Fifth, since memory imagery without the involvement of sense organ activity was fixed during encoding, it *reflects the past*, which may be different from the evolving actual present. In contrast to elementary sensation, which is unique, memory imagery is a reproduction of the past, albeit with greater liberties than those afforded by the strong dependence of elementary sensation on sense organs for the representation of extra-mental reality in the present.

All global perceptions are automatically encoded in the unconscious memory, from which they can be retrieved. The fact that memory imagery is changeable presents an enormous advantage, since it can now be modified by neutral reflection for categorization, recombination, comparison and the establishment of relations. With the raw material of memory imagery, neutral reflection can invent a new, objective world based on physical, biological and psychological structures. Thus, if the subjective memory imagery of pain induced after placing one's hand in overly hot water is compared to a

thermometer in the bath, the correlation of subjective feeling to objective measure would allow avoiding another bath in scalding hot water in the future.

Global perception via sense organs represents the present of extra-mental reality and memory imagery its past. Due to their contrasting properties, these functions can be considered independent but complementary entities.

5. MENTAL FUNCTION III: ABSTRACT REFLECTION

Memory imagery representing a fixed past allows, with neutral reflection, decomposition of events into their constitutive elements by abstraction. This facilitates further analysis of the past, as well as recombination of different elements for predicting the future. Reflection is considered neutral, since it is generally no longer associated with emotions, whereby an individual attempts to achieve dispassionate reasoning through abstractions and recombination of memory imagery. Global perception and memory imagery are considered subjective experiences, representing high complexity of personal experiences. Neutral reflection continues the knowledge acquisition process and decomposes memory imagery into more abstract elements. This allows consensus to be reached with third persons more easily, whereby the information is considered objective. This seems to be concordant with some interpretations in philosophy. For example, as noted by Bitbol (2008), “scientific knowledge shows us that objective domains of knowledge are elaborated in two steps, with conscious experience as an implicit departure point” (pp.54-55).

Abstraction by neutral reflection is represented by **categorization**, which eliminates individual properties for only considering general properties of a group. **Relations** of different groups to each other could show common **structures** and reveal causal interactions between structural elements. **Recombination** of adequate structural elements might then allow the constitution of new causal structures, which could represent a potential future behavior of nature or the invention of a not yet realized behavior in nature.

Neutral reflection allows extrapolation into the past and the future of general concepts extracted from global perception. Whereas elementary sensation is limited to the present and memory imagery to the past of a person, neutral reflection can extrapolate general concepts into the past far beyond a person’s birth, by going back to the father, grandfather, or even Homo Sapiens living about 100,000 years ago. In such cases, the self-evidence of elementary sensation is lacking and is replaced by logical evidence. For certain relations

and events, general consensus can be obtained, whereas those that occurred in distant past that is typically undocumented remain potentiality. Extrapolation into the future follows similar rules. Progress and outcomes of regular events that take place in the present or have occurred in the recent past can be extrapolated into the future with relative confidence. Conversely, those based on irregular behavior in the present and past can only be extrapolated using probability or potentiality, thus indicating their likelihood of continuing into the future. In other words, the certainty of conviction decreases from self-evidence for elementary sensation in the present to logic evidence for memory imagery, and finally to probabilities for neutral reflection concerning the distant past and future. Nevertheless, even probabilities could be useful in attempting to elucidate the constitution of the Universe.

6. CONCORDANCE WITH NEUROSCIENCE

Elementary sensation and memory imagery seem to utilize highly similar brain circuits. Neurobiological information obtained via fMRI (functional magnetic resonance imaging) proved that mental imagery of a movement requires very similar brain circuits as the execution of the movement itself. Roth et al. (1996) found that brain regions activated by the contraction of muscles during a particular movement are also activated when the movement is only imagined. Thereby, it can be posited that the mental simulation of movements involves the primary cortex in a similar way as the execution of the imagined movement. This important finding was confirmed by Jeannerod (1997), Nyberg et al. (2006), and Olsson et al. (2008), among others.

The same principle was demonstrated for visual perception by Kosslyn et al. (2001) and Ganis et al. (2004). Empirical evidence confirmed that direct perception activates almost the same brain regions in a bottom-up process as mental imagery in a top-down process for the same vision (Ganis and Schendan 2008, Schendan and Ganis 2012). This is well illustrated by examining a spectacular case in which a painter suffered complete loss of color vision due to brain damage. This individual became color blind after a car accident. He could no longer see colors and was even with his eyes closed, unable to imagine colors, thus he could only visualize shades of grey (Sacks and Wassermann 1987). This phenomenon confirmed that the same brain circuits were required for both direct perception and mental imagery of color.

In agreement with the findings on vision, it was experimentally confirmed that direct audio perception and memory audio perception also require the

same brain circuits. Both perceiving and imagining songs is associated with bilateral neuronal activity in the secondary auditory cortices, as explored with fMRI and cerebral blood flow (CBF) (Zatorre et al. 1996, Halpern et al. 2004). The practice of mental imagining was shown to even improve performance, although not to the same level as real practice (Zatorre and Halpern 2005).

Jeannerod (2001) demonstrated using fMRI of the motor cortex during mental imagery that, the activation of the brain circuit activation is reduced to about 30%, indicating (Jeannerod 2001) a significant difference between imagery and execution of motor actions. A similar reduction of brain circuit activity may be expected for visual and audio perception; however, no pertinent data has been reported in the literature. Nonetheless, neurobiological findings may suggest that, during elementary sensation, the sense organs and their corresponding brain regions are fully active and that memory imagery in the absence of sense organ activity requires use of almost the same brain regions.

The different brain location of mental imagery in sense organ associated brain regions and abstract reflection in prefrontal regions might allow explaining the hard problem of consciousness by the inhibition of sense organ linked brain regions for conscious experience, when prefrontal regions are stimulated for reflection.

7. FIRST-TO-THIRD PERSON GAP FOR CONSCIOUSNESS

Elementary sensation always requires activity of sense organs. Therefore, it cannot be reproduced in a first person from memory imagery without sense organ activity, since the continuous physical chain of elementary sensation is interrupted. Consequently, there are no means of communicating it from a first to a third person by signs or language. In order to acquire the same experience of elementary sensation in a third person, it has to be recreated in that person by establishing the same sense organ circuit with the same environment, but now with the proper sense organs of the third person. For example, the experience of tasting a particular wine can be approximately described with words, which is inadequate for inducing an identical wine experience in a third person, if he/she had never tasted this wine before. Thus, elementary sensation is incommunicable to a third person by words or gestures.

Conversely, stimulated reminiscences can be retrieved from the episodic memory of a third person through language or special signs, if it was already encoded in his/her memory. If the third person already tasted the same wine,

he/she can retrieve the experience from his/her memory imagery, which would nonetheless be subjective. On the other hand, if he/she never tasted any wine in his/her life, which could be the case for a child, it would be impossible to imagine the taste of a wine. Hence, experience can only be retrieved from memory imagery of a third person, if he/she already had the same experience before.

A first person might expect that his/her elementary sensation, when recreated under the same conditions in a third person, should be identical. However, no elementary sensation can directly connect the consciousness of a first and a third person by physical interactions; therefore, the identity of experience can neither be perceived nor proven. Nevertheless, it is easily projected from a first person on a third person by imagining that he/she might have identical experience. Although this might perhaps be possible in identical twins, the mentioned reasons suggest a profound first-to-third person gap.

7.1. Sense Organ and Behavioral Differences

Differences can be caused by the biological constitution of the sense organs or by the treatment of the perceived signal in the third person's consciousness. A color-blind person will never have the same visual perception of a colored object as a normal person does. Human sense organs in different persons are rarely identical. For example, vision varies for its degree of acuity due to myopia or cataract, audition diminishes with increasing age due to decreased sensitivity to certain wave frequencies, and sensitivity to cold temperature increases with age. Therefore, even recreation of elementary sensation via the sense organs of a third person does not warrant identity between a first and third person. At most, a certain degree of approximation can be attained, which confirms the existence of first-to-third person gap.

Elementary sensation is entirely dependent on its corresponding sense organ, whereby other perception organs are of no help. In a blind man other senses, such as audition, can become more pronounced than in normal persons and be helpful, by allowing the blind individual to rely on sounds when interpreting the external stimuli. Nonetheless, the contribution by other sense organs is only indirect.

Even memory imagery of a first person cannot be expected in the third person, when he/she does not possess the same sense organ as well as engagement in the same prior activity. For example, a man is unable to attain memory imagery of the pain a woman experiences during childbirth, since he

is lacking the same organ and can therefore never go through that process. Therefore, he can only recall pain he previously experienced in other organs to approximate the pain felt during childbirth. Similarly, a woman that has never given birth would not be able to experience the associated pain until she lives through that process. Therefore, even memory imagery needs the presence and full activity of the corresponding sense organs in order to be similar in a third person (Figure 2).

The behavior of a first person after elementary sensation can also be very different from the one of a third person. When a first and a third person have to provide a solution to a common problem, they often arrive at different judgments, suggesting a different content of their respective consciousness. A person extremely fearful of spiders will, when seeing a spider, exhibit much more exaggerated reaction compared to that of others.

As differences in the content of experience certainly exist, only some general structures of experience might be considered identical in first and third persons, such as awareness contrasting with deep sleep, responsiveness to verbal or other stimuli and context-induced behavior, such as empathy. However, this view of third person consciousness is extremely limited, as it is reduced to general concepts, which no longer include the full extent of the first-person consciousness, only its main structures.

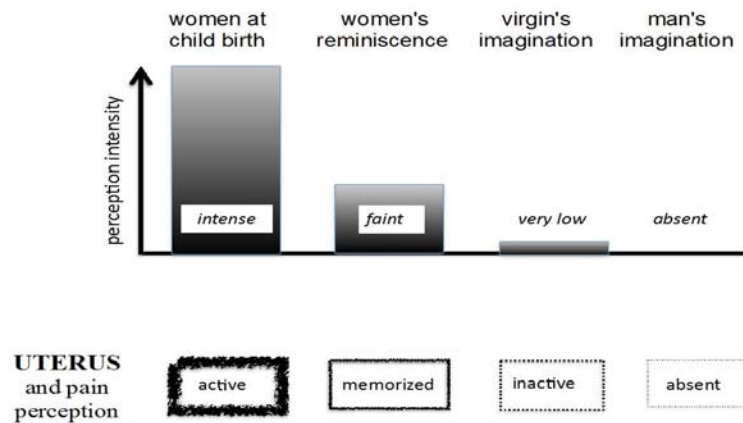


Figure 2. Pain Perception at Childbirth Compared to Imagined Pain by Others.

Note: Direct perception of pain in a first person can only be imagined by a third person, if that person has undergone that experience in the past.

7.2. First-Person Consciousness

Elementary sensation in the first person is limited to a certain range of distances, which changes with the perception organ type. Externally oriented sense organs, like eyes, but also superficial sense organs, like thermoception, can perceive over long distances, such as the sunshine. However, internal oriented sense organs, such as those that induce feeling of pain or illness, are limited to the inside of the body.

A medical doctor knows pain feelings from his/her own elementary sensation; yet, when confronted with a patient reporting pain, the doctor has no sense organ for perceiving either the special character or the intensity of the patient's pain. Thus, he/she can only imagine his/her own pain experiences and project a vague concept of potential pain on the patient, in the sense that the patient should have something similar to his/her own pain experiences. This is an objectification of pain in general, which is devoid of the precise subjective pain experience based on elementary sensation at the first-person level and is replaced by a vague thought concept derived from multiple kinds of pain feelings. The objectification process reduces the unique, self-evident primary perception to a group of potential pain feelings already present in memory imagery from prior elementary sensations. Thus, any projected pain experience on third persons remains doubtful and uncertain with respect to its special properties and its intensity.

Interruption of sense organ activity and thereby of elementary sensation can have two causes. External sense organs that allow us to receive distant input, such as eyes and ears, can be voluntarily closed and the input they receive interrupted. Alternatively, extra-mental objects interfering with sense organs can spontaneously disappear from vision or audition. Proximate external organs, such as skin, and internal sense organs provoking pain feelings, cannot be voluntarily interrupted; only their cause can disappear, like an illness causing pain. Nevertheless, proximate and internal senses leave memory imagery, with the exception concerning consciousness itself. The elementary internal perception of consciousness remains permanently present until it is interrupted by deep sleep. Even memory imagery of consciousness, as it was in the past, is impossible. Thus, consciousness evoked by language in a third person can only induce his/her existing actual conscious experience.

7.3. Third-Person Consciousness

Although first-person experience is considered as complete and self-evident knowledge, a first person can only obtain incomplete knowledge on the third person's consciousness. Thus, a first person is limited to a projection of his/her own content of consciousness on a third person. Since mental projection is no longer an uninterrupted chain of physical interactions between the first and the third person, it is subjected to significant errors, which render the estimation of third-person consciousness uncertain and create the first-to-third person gap (Table 3).

The importance of this gap must be considered for the concept of consciousness by distinguishing two different definitions, one for experienced consciousness at the first-person level and another for projected consciousness at the third-person level. Since neither of these concepts can ever be identical, any confusion would necessarily lead to misunderstandings.

7.4. Uncertainty Concerning Third-Person Consciousness

The content of third person's consciousness can only be estimated with the help of independent outside sense organs, like eyes and ears, if the third person exhibits specific signs on his/her inner feelings by language or gestures, such as by lamentations or showing signs of pain (Table 3). The interpretation of these signs is in general based on correlations made by the first person between his/her own conscious experience and the corresponding context. Although there might be some correlation, there can never be any certainty. Identical factors, such as a syringe sting, produce very different reactions, making the feeling of pain different, even if the context is identical. This is further confirmed by the effectiveness of placebo medication, highlighting the uncertainty of interpretation of signs conveyed by third persons. Thus, high degree of uncertainty is the main characteristic of projected consciousness on third persons.

The uncertainty of projected consciousness becomes much more pronounced when projecting human consciousness on animals. There are certain signs, such as response to reward or punishment, or observation of behavior reminiscent of human behavior, like empathy, which seem to allow the projection of human consciousness on animals. Nevertheless, animal consciousness must be different from its human counterpart, since animals do not possess the same intellectual capacity. The degree of difference in

character and intensity is extremely difficult to evaluate. In higher-order species, like dogs and cats, there could be a general agreement for consciousness, although of a lower level than the experiential human consciousness at the first person level. However, it becomes more doubtful, if such kinds of consciousness could also be projected on lower-order species, like worms or ants, whereas it is difficult to imagine that experienced consciousness could be projected on unicellular amoeba or on plants. Nevertheless, panpsychism extrapolates consciousness to every living organism, even molecules. However, in this case, the definition of consciousness seems to be different and corresponds more to proto-consciousness, i.e., a precursor form of consciousness, which still needs complementation to become experienced first-person consciousness.

Table 3. Differences in Global Perception for a First and Third Person

Global Perception		Outside sense organs	Inside sense organs
experienced by first person	through elementary sensation	primary, self-evident	primary, self-evident
GAP			
third person	projected after re-creation	non-identical	no re-creation possible
	on by language / signs	incomplete	incomplete
	only by context	doubtful	doubtful
	on animals	uncertain	uncertain

Note: The content of consciousness in the first person as the reference is compared to the probable content of consciousness in a third person under different circumstances.

8. PRIMACY OF ELEMENTARY SENSATION

Acquisition of knowledge is a continuous process requiring the three main mental functions of (I) actual global perception, (II) fixed memory imagery, and (III) neutral reflection. Elementary sensation, as the starting element of global perception, introduces a character of uniqueness dependent only on the actual present (Figure 3). It is linked to an uninterrupted chain of physical interactions from the object through sense organs to the brain and undergoes in the present the slightest changes of extra-mental objects and their environment (Jansen 2014). In addition, it is intense, unchangeable, irreproducible and incommunicable, which reinforces the character of uniqueness and requires its primacy.

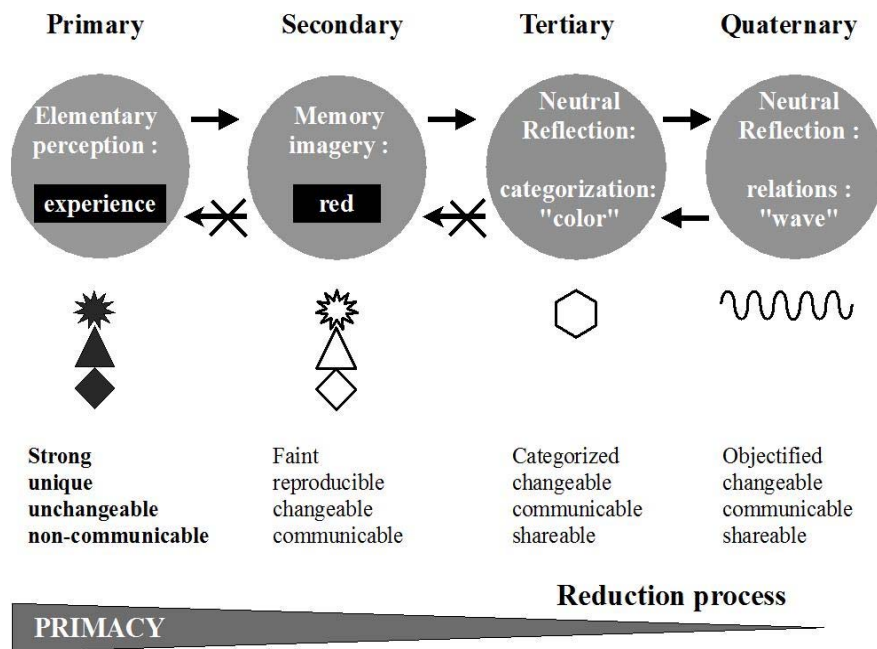


Figure 3. Process of Knowledge Acquisition by Successive Mental Functions.

Note: Elementary sensation is automatically encoded in memory imagery, which allows neutral reflection as a means of categorizing and objectifying the initial complex subjective experience by reduction with increasing abstraction to general concepts.

Since elementary sensation directly depends on sensory organs, it is the only entry path for the connection of extra-mental reality to its mental representation. For this reason, it acquired primacy with respect to the other mental functions, making it the starting point, irreducible to other prior conscious elements. Human knowledge is a further derivative of elementary sensation, since it depends on the information provided by all sense organs.

The other mental functions (denoted as II and III above) further transform the initial subjective information by memory imagery and neutral reflection into more and more abstract concepts. Memory imagination reflects a fixed encoded copy of prior global perception. Thereafter, neutral reflection further reduces memory imagery by abstraction that involves categorization, structuring, recombination and establishment of relations to concepts, which can lead to general consensus (Figure 3).

Primary global perception resembles the primacy some philosophers attributed to the phenomenology of consciousness. For example, Bibol (2008) noted that

“we tend to mean by ‘consciousness’, taken as **immediate experience** rather than self-awareness” (p.53). He further asserted, “It is not something that can be known or described by us in the third person as if we were separated from it; but it is what we dwell in and what we live through in the first person. I would recapitulate this by saying that **consciousness is existentially primary**” (p.54).

CONCLUSION

Consciousness allows knowledge acquisition by a process employing three successive mental functions, starting with elementary sensation (part of subjective global perception), followed by memory imagery and leading to objective neutral reflection. These three functions are distinguishable by the activity, passivity or absence of sense organs. All sense organs of the body, in the broadest sense, are intimately linked to consciousness and simultaneously explore the external environment, the surface and the inside of the body. Nevertheless, under special circumstances, such as anesthesia, they can be extremely limited, whereby only one special sense remains active. External sense organs can be voluntarily turned off, whereas superficial and internal sense organs are permanently active, serving as security guards for the body. Activity or passivity of sense organs distinguishes between two mental

functions: global perception and memory imagery. Global perception is based on the interplay of elementary sensation and stimulated reminiscence of past experiences. Elementary sensation is limited to the period of direct contact between sense organs and their special environment through an uninterrupted chain of physical interactions. When the chain of physical interactions through sense organs is broken, memory imagery can retrieve all global perceptions of the past. In everyday life, elementary sensation and stimulated reminiscence are intimately interlinked; hence, pure elementary sensation is rarely found in adults, yet it is more frequent in young children who lack sufficient prior experience encoded in the memory. Since elementary sensation is the only instant of an uninterrupted chain of physical interactions between extra-mental reality, sense organs and the brain, it reflects the present. Memory imagery is a fixed and faint reminiscence of prior elementary sensation and represents the past. Elementary sensation seems to correspond to the philosophical concept of sensation. This is succinctly explained by Smith (2011), who noted,

“any sense modality... can function either perceptually or non-perceptually. In the latter case, what the sense gives rise to are mere sensations, not perceptions” (loc. 5186).

In neuroscience, global perception and memory imagery are believed to activate similar brain regions (Ganis et al. 2004), whereas neutral reflection is essentially found in different prefrontal brain regions (Kandel et al. 2013). According to Chalmers (1995), comparing global perception and memory imagery to neutral reflection results in a phenomenological gap. According to neuroscience, this gap (the hard problem) might correspond to their localization in different brain regions with probably different interconnections.

Another considerable gap exists with respect to the communication between a first- and a third-person consciousness. Global perception is in general incommunicable by language or behavior from a first person to a third person, such as the taste of a particular wine. The psychoanalyst Lebrun (2008) posited that the symbolism of language represents discontinuity, which does not reflect the continuity of sensitivity in a singular person. For externally-oriented sense organs, the global perception of a first-person experience can only be induced in a third person through recreation with the same outside environment by utilizing the sense organs and brain circuits of that person, which correspond to the first-person experience. Still, recreated elementary sensation in a third person does not warrant an experience identical to that of the first person, since the sense organs or the treatment of

information can be very different in a third person. Thus, an intense global perception can be very different in a first- and third-person consciousness, reflecting a first-to-third person gap.

When external sense organs are involved, an approximate recreation of elementary sensation in a third person can be more appropriate than in the case of internal directed sense organs. Here the first-to-third person gap becomes much more pronounced, since it is not possible to recreate internal events for elementary sensation in the third person, such as inducing pain. The only possibility is for the first person to correlate his/her internal experience to his/her environmental context by imagining that the same context should yield the same elementary sensation in the third person. However, as such correlations are highly uncertain, they preclude any conclusions on an identical content of global perception in a first and third person. Only indirect signs by language or gestures from the third person can be interpreted by the first person and suggest the content of his/her global perception.

Neutral reflection allows a continuous objectification process that ranges from the highly complex subjective global perception and memory imagery to more simplified objective concepts. Thereby subjective experience becomes reduced to invariant structural relations, as described by Bitbol (2008):

“Firstly, one progressively pushes aside any feature of experience on which conscious subjects cannot agree, such as individual tastes, community values, or the emotional tinge ...” and “Secondly, one only retains a sort of structural residue of conscious experience that can be the object of a consensus ... (p.54-55).

Elementary sensation, with its character of uniqueness, is the starting point for all other mental functions, memory imagery and neutral reflection, which continue the treatment of the initial, unique subjective information. Thereby, elementary sensation acquires absolute primacy over the other mental functions. Varela (1998) described global perception as lived experience where one starts from. In agreement with the certain and self-evident character of the first-person experience, Bitbol (2014) claimed its primacy, stating

“There are good reasons to think that pure experience, or elementary consciousness, or phenomenal consciousness, is no secondary feature of an objective item but plainly here, **primary** in the strongest sense of the word” (p.266).

Primacy of elementary sensation is a consequence of its consideration as the entry point for information, allowing the acquisition of knowledge, which corresponds to epistemic primacy. Ontological primacy, in the sense of an independent, non-material consciousness, requires judgment at the neutral reflection level, when comparing the evolution of consciousness in different biological entities. Although a human sperm cell can combine with ova to become a child, and a spore can develop into a plant, only the child acquires consciousness, whereas the plant is generally not considered to possess consciousness. Even if the first-person consciousness is thought to be immaterial, the material difference between a plant spore and a human sperm cell must also have some influence on the emergence of consciousness in the child. At least, it must be responsible for a minimal material disposition, necessary for allowing the expression of immaterial first-person consciousness. Thus, epistemic primacy of elementary sensation alone is not a sufficient argument in favor or against philosophical theories concerning materialism, panpsychism or dualism. In any case, epistemic primacy as the starting point of human knowledge has to be distinguished from ontological primacy purporting the existence of an independent non-material first person consciousness.

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