Consciousness an Afterthought: The Sixth Sense

Keith Elkin

Consciousness is an advanced information channel, a sixth sense.

Consciousness is defined as "state of being aware"; Consciousness "feels" the senses and "hears" the "just-so-story" both are experienced as a sequential stream.

The function of consciousness is to provide a unique information channel to other brain systems. Consciousness is not the seat of the Self or Free Will.

Will (free or not), Access-consciousness, the "just-so-story" teller, and the Self, are not part of consciousness. The general tools of the brain, memory, synchronization, and hunger are distributed and not part of consciousness. The Self, Will, introspection, attention, and reportability can be studied in their own right. This is in contrast to the things we are not aware of, how we: remember, calculate, compose or any of the things that actually act in the act.

> *The unique human convenience of conscious thoughts that preview our actions gives us the privilege of feeling we willfully cause what we do. In fact, however, unconscious and inscrutable mechanisms create both conscious thought about action and the action, and also produce the sense of will we experience by perceiving the thought as cause of the action.*
> *(Wegner 2002, p. 98)*

In the literature there are many references to some combination of structure, connectivity and function.

I have adopted simple metaphors in an effort to promote a bottom up perspective. This perspective builds on two terms colonies and flocks from the studies of insects, birds and their interactions. In addition to the homunculus the perspective of a rational adult biases the analysis of consciousness toward an engineering, control, designed and top down perspective.

"Designed" is philosophical and physically in contrast and opposed to "evolved".

One of the issues with designed system be it Artificial Intelligence or the Global Work space are that they are designed and engineered system. They follow an engineering paradigm and can't mirror an evolutionary paradigm.

An evolutionary paradigm is characterized by:

- No central or coordinated planning
- No pre designed transitions
- Problem solving is done by satisfaction (it works)
- The mind is the product of the evolutionary paradigm.

Any system that must develop from the bottom up must be based on bottom up principles. One could see the evolution of organisms as the evolution of top-down satisfaction from a bottom up system.

Will

Will is ubiquitous and present in some form at every level of organization from the cell to the person. The origins of Will are in the development of homeostasis and the implicit or explicit goal. Will is the origin of intentions.

The term "willusionists" also is focused on the question of Free-will. The discussion of Will does not change by its placement in the subconscious.

Satisfaction

The common denominator guiding the mosaic development of the mind is that the resulting brain modules must be satisfying. The development of brain colonies (modules) must have a satisfactory effect on the action. The obvious candidates are actions that lead to survival, but more central to the issue of consciousness, the development of colonies must support the infrastructure for further refinement of action.

The development of a nervous system was instrumental in creating a mechanism which satisfied the demands of complexity.

Satisfaction is the sole criteria of judgment of any brain activity and its development. If the visual system develops to read braille or the visual system can be recruited to read sign language this is a result of the stimulus and resulting activity satisfying the task. The origins of this final arbitrator "satisfaction" or "good enough" is simply in the demand for action in a timely manner. There is no room for indecision. This is not a question of rational thought, or optimization, but one of necessity.

> *Thus the only functional arbitrator in a changing environment is satisfaction. This is not a question of rational thought, or optimization, only one of necessity.*

The measure of success or more rightly its very existence is solely dependent on satisfaction. The proverbial "executive" is distributed and only needs to satisfy, similar to the running of a colony of termites.

> *Satisfaction is the metric of Will; Will is the driving force behind all action and this in itself is sufficient cause.*

Just-so-story

Consciousness is the experience of a "just-so-story.

Human rationality can be described as the generation of "just-so-stories".

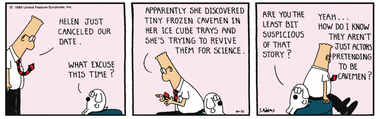
> *These stories can be actual stories illustrated, verbalized or written down, but also the inner stories that enter our awareness.*

In all case the only measure of the value of a story is satisfaction.

To use a modern phrase, the brain evolved as the inter-net-of-things. The subconsciously produced presentations are used by brain systems in a manner similar to any sensory input. So the "just-so-story" is not a simulation or model, but a re-created imagined reality. The advantage of the story-line is to give a communication channel between otherwise non-linked brain systems and to help correlate across a longer time period and sensory modalities.

The mind accepts discontinuities in the context of satisfying "just-so-story".

It is quite easy for a person to hold uninvestigated and conflicting thoughts as long as consciousness is satisfied. Cognitive dissonance addresses many of the issues. However satisfaction is the reward with the lack of dissonance.



This is not a feedback loop in the simple sense, but a feedback loop of a rarified and extremely intensely processed, correlated and organized remembering. This allows the brains different functional entities to process the information a second time and through different pathways which are not fully present under pre-consciousness evolution.

Colonies

Colonies are groups of neurons that perform learned skills.

The major difference between the brain and the development of other organ systems is the abundance of malleable neurons. It is this abundance of neurons that is the tabula of the proverbial tabula rasa.

In developmental biology you have a scale between mosaic development and regulative development, on this scale the brain is on the mosaic end.

I use the term colony from the study of insects to describe a congealed set of neurons. A colony of neurons roughly corresponds to the known functional areas for example Brodmann, Broca or Wernick's area.

I emphasize the bottom up nature of the mind, by asking "who in the colony knows how to build the colony"? The answer is of course no collection of neurons, thus emphasizing the dynamic and inter-communicative nature of neural activity as a collection of neurons each seen as an agent.

The idea that an area of the brain is colonized during development may provide a vocabulary and new perspective.

The recruitment process is subconscious and solely dependent on the existing pathway and that the resulting activity satisfies the agenda.

The proverbial homunculus is replaced by colonies and flocks of neurons that have resulted in satisfying the immediate and long term needs.

The sequential specialization or anatomical implementation (soft-wired to hard-wired) is dependent on satisfying the demands of the situation during a colonies' developmental or learning period. The dedicated areas of the brain are colonies of specialization that have satisfied the necessity for action.

> *A colony is an organizational structure with local skills, processing its inputs and providing a suggestion. A particular set of neurons (flock or colony) is recruited because it has been successful in performing a particular process.*

For example the development of the skill of facial recognition is synonymous with the colonization of fusiform face area (FFA) of the brain.

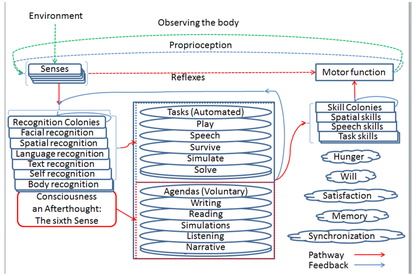
Related skills become colonized and dependent on other simultaneously developed pathways. It is this interlocking and colonization that establishes the subconscious nature and ridged nature of these skills.

This hegemony of pathways and existing colonies is a major constraint on the access and recruitment of facilities or skills.

During each wave of colonization increasingly sophisticated skills (skill that is dependent on another skills), are developed. In the brain the "organs" are colonies of skills.

The colonies of recognition develop from recognition of the internal and external environment to recognizing more complex phenomena such as, language, facial, spatial, the Self, text, and the body as well as abstract events such as cause and effect.

The Self and Consciousness are colonies of recognition, both a kind sixth sense, which is aware of a multitude of other highly developed colonies of recognition. This classification can be dissected by asking "am I aware or conscious of performing facial recognition, can I in any way take control of it" The same goes for language, after I have mastered a language, can I unlearn it and hear the original sounds?



While Will and Hunger are fundamental, with the necessity of influencing the environment and thus the establishment of communication, the recognition colonies take on a crucial role. The set of neurons in a colony is permanent, they are recruited and the membership does not change.

> *During infancy, as the senses are developing the propagation of signals leads to somewhere. It is this somewhere that is colonized to interpret these signals. This is not genetically hardwired; the colonization is wired by activity.*

Flock

Flock is a short version of "Spatiotemporal pattern of neural activity", the term flock was chosen to emphasize the fluid nature and a changing membership. A modern concept could be Crowdsourcing.

Flock describes a function of the mind that is unified in action but changing in location through the addition of new members or the loss of previous members. A flock is very dynamic but internally organized and constructed by performing together as in a musical ensemble.

The creation of a flock is an emergent phenomenon, a flock is structure building; it is the creation of an active neuronal network. The structure of a flock forms a kind of dynamic memory, a structure of associations. The location of the learned may represent the transition from a flock to a colony.

Avoiding terminology such as "scanning", "searching" or "monitoring" as these require a homunculus, I use agenda and satisfaction. The brain is not a von Neumann computer but a connectome of colonies. The development of common bottom up oriented terminology is needed for the cognitive sciences in addition to those drawn from neurology and information sciences. An agenda refers to the process of searching rather than to having a defined goal; it is built on satisfying an act as opposed to meeting a goal.

An agenda describes the task of a flock. An agenda would correspond to a focused activity of the brain. Tennis playing, juggling, solving differential equations, listening to music are examples of agendas implemented in flocks.

The experienced passage of time is actually a measure of how many brain resources are engaged. When time passes quickly there are many resources engaged.

Parallel to Serial Converter

Consciousness is the pathway that provides a method for the brain to take its existing impressions both visual and auditory and re-create a time line of experiences and conversations that are then re-presented to the rest of the brain through the existing internal sensory channels.

> *Evolution has found many solutions to the factoring and coordination of parallel and serial tasks. The vast majority of the processes is subconscious and has a high degree of well integrated serial and parallel processing.*

There are constraints on both serializable and none serializable processes. There are limits on parallel processing when the imposition of serial constraints becomes dominant. Looking at Gustafson's law and Amdahl's law can give a background for the limits. The question of how often parallel tasks need to be synchronized is of paramount importance. The speech for example is inherently serial; however the content requires the assembly of many components in a very short time. In order to achieve this mind uses many parallel processes which then must be assembled and serialized.

The process of serialization is synchronous with the concept of time. Consciousness is intimately involved with our episodic memory and the concept of history and events.

> *Consciousness is a parallel to serial converter. All the parallel processing of the sensory and other colonies are present in the consciousness as a serial stream, with interrupts!*

If you try to become conscious of an unconscious task, the task slows down and becomes less coordinated. This can be because of some interference due to the synchronization required during serialization.

While some see the limits in short-term memory and attention as the basis of a serial single thread consciousness, the real issue is inherent in the task space. The conversion of any parallel process to a serial process is dependent on there being only one sink (observer).

Consciousness can be aware of conflicting tasks and can show a clear inability to sustain a choice.

Some of the subconscious tasks also show an inability to make decisions; the most obvious case is in the Necker cube.

The newborn knows nothing; everything is unclassified and even marginally differentiated. Awareness comes in degrees and develops with the ability to recognize. At each stage of this development a baby also loses something. As the sounds and sights become "something" they also lose their naive experience. These primal experiences are irreversibly replaced by comprehension, by classification and recognition.

Consciousness does not require any ability to describe or even know what the things it is experiencing are. Before you learn a new language you are conscious of the sounds and as you learned a new language the sound turned into words. Consciousness changes as undifferentiated experiences become organized.

Everything newborn learns is like learning a new language, a newborn is learning both recognition and meaning. The process of development in a baby is a process of loss and discovery. Learning is unconscious, "do as I say not as I do". Consciousness may provide only the time line necessary for attention, repetition and effort. Skills are learned unconsciously; as we learn something we lose details, learning changes access.

We learn a great deal by just being there, most of which we are not aware, for example learning a language, which is totally unconscious for years. The eureka experience of using a new word may be its first entry into the consciousness.

As I learned Swedish the sounds of Swedish receded and the meaning of the words replaced the sound. The hearing a sound and producing the sound are intimately linked.

- "…acquiring perceptual skills of segmentation, highlighting, differentiation, and unitization."
- "If perceptual learning is crucially perceptual, it is also crucially learning. Consistent with the ripples of downstream influence that early perceptual changes exert…"
- "…the newly forged expert sees a new world.", "see change'' in perception."
- "…the presence of neuroanatomically compact regions with distinct functional specializations does not sanction the inference that these regions were innately wired to perform those functions."
- "acquired constraints" Isabel Gauthier

It is well known that presenting ones thoughts in writing, storytelling or just talking to one's self can lead to a new perspective and sometimes a leap in understanding. The re-interpretation can happen through several channels.

This recursive re-use of information and a re-processing through the sensory channels provides an opportunity to re-live the original data. Likewise inner narrative by language construction and then disassembled provides a new pathway that the brain would otherwise lack.

> *The transmission of ideas out of the body through the motor areas and then back again through the senses provides a channel that is absent in the brain itself, consciousness provides a similar shortcut*

How the mind actually solves a task is not reflected in how we imagine it to be solved. A good example is the difference between imagined mental rotation and an actual rotation of an object. What is commonly thought of as mental rotation is the result of several different strategies and skills.

The spatial processing afforded through the senses provides a unique perspective. The visional system provides skills that are not available to the control conscious or otherwise.

Consciousness Explained; Daniel Dennett; 1991;p 289

The rotated object.

The striking difference between the conscious images and experiencing can point out the vastly superior aspects of the immediate sensory experience.

The brain is not only the electrical activity but a living cognitive process where the substrate is biological where neurotransmitters and neuropeptides play a major roll. Neurotransmitters and neuropeptides might be an additional complication to artificial neural network and those dreaming of an upload of the mind.

…continuously and unconsciously learns to re-describe its own activity itself based on constant interaction with itself…. Cleeremans

This does not necessarily imply a causal relationship between the conscious sensations and the production of words. I know what I think only when I see what I write (p. 31). Pockett, 2004

Rather than classifying acts as automatic or intentional, it could be useful to classify them as to how their resources are recruited. Reflexes are very stable in their recruitment, automatic less so but their recruitment is fast and less flexible, intentional actions must be subdivided possibly by the size or diversity of the recruited colonies. Playing tennis or juggling may recruit an enormous portion of the minds resources, but have very little intentionality in any particular action.

Consciousness

Awareness requires recognition. Consciousness together with the Self is similar to the output of some of the most refined and processed sensory colonies, facial recognition and language recognition for example. Self is the recognition of one's own body image and the inner activity in its most general sense.

Consciousness is the recognition of one's own inner narrative. This inner narrative begins before language and is part of the development of syntax and semantic colonies in their primal form.

You are conscious of language and not the sounds that are not "heard". In a similar manner what we are conscious of is almost entirely determined by unconscious mechanisms of attention. A clear example is the "invisible gorilla" illusion. Once the task agenda is implemented, consciousness is dependent and subject to subconscious mechanisms that severely limit our awareness.

Consciousness does not provide experience of the raw primal sensory data, with few if any exceptions consciousness is only aware of rarefied and processed information.

For example consciousness is subject to all the illusions of the sensory apparatus like the Necker cube or Thatcher Illusion. Another clear example is that when we learn our native language, we are not aware of the primal sounds of the language but only are conscious of the meaning.

Thinking or hearing an inner voice is not doing.

Does your inner voice have a dialect or accent? It is not clear if the origins and the shared resources of inner speech are the source of its influence or if conscious awareness is needed. Ben Alderson-Day

Consciousness is like the dream, consciousness can make us experience our environment and our own thoughts, but it can't really directly make us do anything.

…. there is not yet any evidence that speaks to the causal role of consciousness for the functions that I shall address. (Hommel, 2013)

The pre-consciousness communication between brain systems evolved and is limited by the earlier pathways; these pathways did not provide the possibility of a historical correlation or integration with a high level pattern of cause and effect at a significantly abstract but focused level. Consciousness provides this pathway, allowing perception of previously unperceived cause and effect.

I do not want to imply that consciousness is dependent verbal language abilities, consciousness has syntactic and semantic elements, but these are pre-linguistic multi-modal elements and closer aligned with cinematic language.

> *The proposal is that the mind is influenced of consciousness only as an information channel or sixth sense. The "results" of consciousness is then processed in a similar manner to the other senses.*

The function of consciousness is the feedback of a serial timeline in the form of a "just-so-story" which the brain can experience.

> *Consciousness is the feedback of a serial timeline*

The purpose or function of consciousness if I may use that term, is the channel for presenting a story-line combining our internal and external experiences. The rest of the brain can then experience this story-line using the loosely coupled per-consciousness brain systems technology.

Central to understanding Consciousness is to understand the "story-teller" and the central aspects of "feeling" thought.

The mind is a massive activity of parallel simultaneous activity; however consciousness is a sequential experience. This in itself puts limits on what capabilities consciousness.

We are conscious of the "just-so-story" in a language and a context, both of which are produced by unconscious processes.

Consciousness is not without indirect effects, we routinely report what our inner voice says. Following along the line of Gilberto Gomes (Gomes) that verbal thoughts, are reportable at some level. Consciousness is the feedback loop to my own mind, and telling another person about it is another feedback path. Thus consciousness indirectly influences both my own behavior and others.