



Global Workspace Theory: A Prominent Scientific Approach to the Nature of Consciousness

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Global work space, modularity, hard problem, multiple draft model

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ABSTRACT *The objective of this paper is to present one prominent scientific approach to consciousness by Bernard J. Baars- the Global workspace Theory (GWT). Global Workspace Theory holds the view that the brain has a fleeting integrative capacity that enables access between functions that are otherwise separate. Consciousness is the primary agent of such a global access function in humans and other mammals. GW holds the view that the role of consciousness is to facilitate information exchange among multiple specialized unconscious processes in the brain. Consciousness is a state of global activation in a "workspace". Somewhat similar idea has been introduced by Jerry Fodor. Fodor has placed greatest emphasis on information encapsulation. But there are some criticisms too. GWT does not answer the hard problem of consciousness. And Dennett doubts whether GWT is a "Cartesian Theatre". However, Baar's account of global workspace is a promising scientific approach in explaining consciousness.*

The problem of consciousness is not just one problem. Rather it is an ambiguous term referring to many different Phenomena. These problems can be divided under two headings *hard* and *easy* problems. The easy problems are those that can be explained in terms of computational and neural mechanisms. On the other hand, the hard problem is the problem of experience. When we think, when we perceive, in addition to the information processing there is also a subjective aspect. This subjective aspect is experience.

Many thinkers have developed scientific approach to resolve the problem of consciousness. The objective of this paper is to present one prominent scientific approach to consciousness by Bernard J. Baars- the Global workspace Theory (GWT).

Global workspace Theory

Baars has developed a brain mechanism much like the global workspace architecture. The architecture is relational in the sense that it continuously mediates the interaction of input with memory. Human brain is massively parallel, many things are happening at the same time and most of them are unconscious. The brain shows a distributed style of functioning in which the detailed work is done by millions of specialized neuronal grouping without instruction from some command centre. Each cell is specialized for a specific function according to its DNA, its development history and chemical infection from other tissues. We can create memories of the stream of experience merely by paying attention to something Human being are always paying attention to things that autobiographical memory must be very large we also have a vast unconscious domain and we gain access to it using consciousness.

The very limited stream of consciousness gives us access to billion of neurons in the brain and body, to the mental lexicon and large source of autobiographical memories, Consciousness may be considered as the gateway to the brain's unconscious sources of knowledge and control. Consciousness seems to be the publicity organ of the brain. It is a mean for accessing, disseminating and exchanging information, and for increasing global coordination and control.

The following six points are general claims made by GWT regarding brain capacities enabled by conscious events.

1. Conscious perception enables access to widespread

brain sources; unconscious sensory processing is much more limited.

2. Consciousness perception, inner speech and visual Imagery enable working memory functions including executive control.
3. Conscious events enable many kinds of learning episodic and explicit learning but also implicit and skill learning.
4. Conscious perceptual feedback enables voluntary control over motor functions, and perhaps over any neuronal population and even single neurons.
5. Consciousness contents can evoke selective attention and be reciprocally evoked by it.
6. Consciousness enables access to self executive interpreters, located in frontal and parietal cortex.

Global Workspace Theory (GWT) holds the view that the brain has a fleeting integrative capacity that enables access between functions that are otherwise separate. In massively parallel system, coordination and control may take place by way of such a central information exchange to distribute information to the system as a whole. Consciousness is the primary agent of such a global access function in humans and other mammals. Several Scientists and Philosophers agree that consciousness enables widespread access.

GWT argues that conscious cognition involves numerous brain networks that cooperate and compete in solving problems. It is the gateway to the brain, enabling control even of single neuron and whole neuronal populations. None of these functions become directly conscious, but conscious feedback seems required to recruit local control by neuronal assemblies. Some features of this emerging framework are:

1. Consciousness is an architectural aspect of the organization of the brain. It has global influence and effects. Only the global the workspace is conscious at any given moment; contextual elements backstage are unconscious, as are the specialized systems of the brain that can receive information from the biggest spot in the darkened theater.
2. A number of brain mechanisms could serve such functions.
3. Conscious experience involves the ceaseless interaction of input with memory
4. Cortical foci of activity appear to provide the contents of consciousness. Taylor suggests that the crucial aspect for the emergence of consciousness form non-conscious neural activity is the creation of relatively long lasting

bubbles of activity in the cortex by local recurrence. It has been proposed that such activity singles out those cortical regions which have highest coding in cortex. This model gives a neural underpinning to the 'global workspace' idea. Thus the detailed coding of the content of consciousness would thereby appear to be critical.

GW holds the view that the role of consciousness is to facilitate information exchange among multiple specialized unconscious processes in the brain. Consciousness is a state of global activation in a "workspace" in which information in consciousness is broadcast back to the rest of the system. At any given time there are multiple parallel process going on in the brain which receive the "broadcast". Access to the global workspace is granted by an attentional mechanism; the material in the workspace is then under the spotlight of attention and is processed in a serial manner.

Modularity View of Mind

Somewhat similar idea has been introduced by Jerry Fodor in his 'Modularity of Mind'. His notion is that mind is modular in nature. He explains mind as made up of modules and non-modular central system. Both of these are characterized by the district role marked for each one of them. While modules as input systems perform the task of transforming the information to which they are privy into a format comprehensible for undertaking large scale searches. Some distinguishing features of modular are: (1) They are domain specific (2) They operate mandatorily, (3) they permit only limited access to computed representation, (4) They are fast (5) They are informationally encapsulated, (6) They have shallow outputs, (7) they are neurologically hardwired in the sense that they have characteristically fixed neural architecture, (8) They exhibit characteristic and specific breakdown patterns, and (9) They are innately specified.

Of these, Fodor has placed greatest emphasis on information encapsulation, which is the claim that processing with in modules only has access to the limited information represented within the module, not to information stored elsewhere in the system. For Fodor it is the fact that modules rely only on encapsulated information that allows them to be extremely fast in their processing, but limits them to specific domains of information, reduces their flexibility and results in their out puts being shallow.

As opposed to modules, the most salient feature of the central system is their "cognitive penetrability". The central system is also functionally distinct from modules there are no content - specific central process for which correspondingly specific neural structures have be identified. Also they do not communicate with the world directly. They can have access to the sensory input solely via the output of modules. Fodor has nowhere argued that mind is entirely modular in nature. He suggests that for the time being, it is a wise research strategy to concentrate on the modular aspects alone. He believes that minds are modular in many respects, but some of the most important and interesting aspects of it are non-modular characteristics and Baar's account of global workspace is in some sense similar. According to GWT consciousness is a highly distributed activity in the cortex so there is no spatio-temporal location in the brain where communication comes together.

Criticisms

Even though GWT is a promising scientific theory of the information processing involved in consciousness, it does not answer the hard problem of consciousness. According to Chalmers, the really hard problem of consciousness is the problem of experience. When we think and perceive there is a whirl of information processing, but there is also a subjective aspect. This subjective aspect is experience. When we see, we experience visual sensations: the felt quality of redness, the experience of dark and light, the quality of depth in a visual field. There are body sensations, from pains to orgasms; mental images, the felt quality of emotions and the experience of a stream of conscious thought, what unites all of these states is that there is something it is like to be in them. All of them are states of experience. Sometimes, the terms such as 'phenomenal consciousness' and 'qualia' are also used to indicate subjective aspect of consciousness. Chalmers argues that all the theories presented till today are about the other aspects of consciousness. None of them can explain the experience that is the hard problem of consciousness. He also claims that theory of consciousness should take experience as fundamental.

Some critics, like Dennett, have wondered whether GWT is a "Cartesian Theatre". Dennett expressed sympathy with global workspace theory of consciousness and has recently re-emphasized his alliance with this problem. He holds that consciousness of a more basic form may not require a sophisticated artificial substrate. Also says that any conscious machine will probably have to develop this capacity through an extended learning process, just a human beings do. According to Dennett's multiple drafts model of consciousness, mental activity occurs in parallel. Rather than projecting to single location for processing in unison, different ongoing streams of information are processed at different times. Each of these streams can correspond to different sensory inputs or thoughts. Processing or editing of the stream can occur, which may change their content. Editing can consist of subtractions, additions and changes to the information. Awareness of a stream's content can happen before or after editing takes place. Dennett's theory is more logically coherent and captures some of the empirical evidence on conscious experience. It suggests that there is no central place where consciousness happens, but that multiple mental events occur in parallel. We may or may not be aware of these events. There are two further problems, one concerning with that the contents of consciousness is and the second is the role of central system.

Conclusion

However, Baar's account of global workspace is a promising scientific approach in explaining consciousness. Even though it leaves some aspects of consciousness untouched, is remained as prominent in the realm of consciousness studies. The contemporary developments in cognitive neuroscience suggests some empirical evidence toward the understanding of global workspace theory . Brain researchers show some evidence for global distribution of conscious contents. GWT predicted the widely distributed nature of brain on the basis of some Psychological evidence. Today this case is supported by a sizable body of brain evidence. Recent findings support the claim that consciousness stimuli mobilize large areas of cortex , presumably to distribute information about the stimuli.

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