Review of
Scientific American Mind May/June 2014
Article "*Consciousness Redux: Keep it in Mind*"
By Christof Koch

article at : http://www.scientificamerican.com/article/consciousness-might-emerge-from-a-data-broadcast/

April 22 2014

This article supports the proposal that the "Global Workspace Model" (GWM) of the brain explains what "consciousness" is and how the brain produces it.

As the author notes, the notion of a GWM derives from the early days of artificial intelligence, where specialized programs accessed a shared repository of information, the "blackboard". According to this theory, it is the act of broadcasting data from this "blackboard" throughout a computational system, whether cybernetic or biological, that makes it conscious. Consciousness, in this view, is just brain wide sharing of information that is in the memory buffer of the blackboard.

The article is filled with computer terminology like "buffer", "module", "bandwidth", "overwrite", etc. The Global Workspace Model looks a lot like superimposing our conception of how a computer works on the brain and calling it a theory of consciousness.

What is meant by consciousness is not clearly defined, and throughout the article, different nuances of consciousness are used interchangeably.

The author states for example:
" [The GWM]… starting point is behavioral experiments that manipulate conscious experience of people in a very controlled setting. It then seeks to identify the areas of the brain that underlie these experiences. "

"The data can be sent off to a particular brain area that processes language-a language module-where this knowledge can be readied for sharing with other people by formulating a spoken explanation: 'Guess who I just saw over there.' "

"Whenever a stimulus is consciously perceived, its neuronal footprint…shows up in many parts of the cerebral cortex."

Isn't it possible however, that "Consciousness" is not just an "on" or "off" affair, but rather more like a spectrum? At the lowest levels consciousness is merely the ability to detect a change; at higher levels, conscious perception is possible; and at still higher levels, conscious experience, including self awareness, awareness of other conscious entities, (I am having this experience and I can tell you about it) and the awareness of beauty is possible. The article conflates these differing levels.

The article addresses the issue of the unconscious. The author notes:

"The vast subliminal onslaught of data thereby turns sounds into meaningful words, and photons into objects and identifiable people. These processes evaluate and weigh evidence, pass judgment, and synchronize movements… They are sophisticated and act quickly but do not share information …nor do they transfer it to the common workspace."

That is to say, these processes, arguably the most important, as they facilitate varying levels of consciousness, are invisible to the GWM.

The author notes that a technique called masking is used to reveal information about unconscious processes. A picture or word is briefly flashed to a subject, preceded and followed by random lines or x's. In this case the subject is not consciously aware of the picture or word, but may be subliminally aware: electrical activity may still register in the cortex.

For example, a picture or word made fully visible to the subject will show multiple areas of electrical excitation, including the fusiform gyrus*. A masked picture or word will result in electrical excitation almost exclusively to the fusiform gyrus.

Electrodes show that the "unconscious", in this case apparently the fusiform gyrus, is able to process different word combinations differently.

The results of the fusiform gyrus masking study are interesting, but it is far from clear that masking can reveal anything about the sophisticated ongoing unconscious processes responsible for turning sounds into meaningful words, and photons into objects and identifiable people.

Is a more accurate interpretation of the GWM experimental situation merely that a visual stimulus presented to a subject will result in a mapable pattern of electrical activity within that subject's cortex?

At the end of the article the author writes:
"Proposing that what we consciously experience can be defined as the brain's ability to distribute information from the global workspace to the rest of the brain brings up several questions: Why and how… does broadcasting information from the global network give rise to consciousness? What message is being broadcast?"

If the GWM does not bring clarity to these questions, it is merely an unsupported hypothesis.

Indeed the patterns of electrical activity going on in the brain as a result of presentation of a stimulus, either visible or masked, cannot per se tell us anything about the nature of this activity. They may as well represent global or local stimulus detection. Why equate them with conscious perception, let alone conscious experience?

The fact that the processes most crucial to consciousness experience are, as described in this article, unconscious, and therefore unknown, together with the author's own list of unanswered questions all but knocks the legs out from under the GWM as a theory that really explains consciousness.

Given that human biological tissue has semiconductor properties, and generates phonons as well as photonic crystals (which control photons the way semiconductors control electrons), one might wonder why the author summarily relegates quantum processes in the possible generation of consciousness to the "flapdoodle" category.

*According to Wikipedia, the fusiform gyrus is accepted by most researchers as being associated with processing of color information, face and body recognition, word recognition, and within-category identification.