Essay III

What is the Binding problem, and why is it important in understanding consciousness? What kinds of solutions have been proposed and how do they inform our understanding of consciousness:

(With respect to the unity of consciousness, *how are the diff features of objects brought together to make a single object, which is referred to as* the binding problem (Blackmore, 2003). In other words, the question is how the different senses are brought together to give rise to a unified experienced world.

How r the diff senses brought together to make a unified experienced world (***multisensory integration***)?

Wat happens wen consciousness is more or less unified than normal (***unusual experiences***)?

According to Blackmore, the binding problem cannot be addressed by imagining that different senses are brought together for display to ab observer inside the brain, especially since there is no observer inside the brain or no display in whole for the observer (2003).

The binding problem can be illustrated using an example of visual binding.

[sidenotes, not part of essay: But the more general ‘binding problem’ applies at many levels of description from neural level to the phenomenological

* & there r other prblms of binding that are not related to consciousness

In cognitive science the problem concerns how conjunctions/co-occurrences of properties r represented (ranging from the binding of shape/color in detecting blue triangles/red squares to the binding of words/phrases to their roles in sentences) sidenote end]

Further, the problem involves the how dynamic binding occurs in real time. Using Blackmore’s example of a flipping coin, the question concerns what keeps together the color/form/movement & other attributes of the coin (2003).

Incidentally, this problem is closely bound up w both memory & attention:

For example, try remembering entering ur front door (lots of features have to be imagined at once, e.g. the color/the key on its ring/etc) 🡪The result is more or less a unified memory of something u do every day (& all that info can be held briefly in working memory)

As well, some ppl argue: the binding problem is the same problm as understanding how attention works

* On this view, as long as u pay attention to the flipping coin, its various attributes are bound together

Wen a person thinks about something else, the diverse attributes fall apart & the coin (such as the memory of door) are no longer experienced as unified wholes

Moreover, there is evidence that attention is required for binding. For example, wen attention is overloaded or diverted, the wrong features can be bound together to product illusory conjunctions (i.e. wen A is running along the street and mistaking seeing a black dog only to realise it was a golden Labrador passing a black bag).

Bilateral damage to Parietal cortex – which affects attention – can cause binding deficits & in visual search tasks *focused attention* is necessary for finding unknown conjunctions

Treisman - who proposes the ‘***feature integration theory***’

For Treisman, binding is central to conscious experience; further, conscious access, with respect to perception, is (always) bound to objects and/or events, not to free floating features of those objects and/or events (Blackmore, 2003).

Other factors suggest that as closely related as binding and attention are, they cannot be the same thing (Blackmore, 2003).

* For example, binding is also involved and required for tasks that are carried out unconsciously (how the person caught the coin)

Another suggestion is that of Crick and Koch’s, which is referred to as Binding by Synchrony (the proposed solution to the binding problem)

In fact, Crick & Koch’s theory proposes a solution to the binding problem; their theory relates binding and consciousness (Blackmore, 2003). For example, the 1980s study of the cat’s visual cortex revealed oscillations (in the range of 35-75 hetz), in which large numbers of neurons all fired in synchrony with one another (Blackmore, 2003). These are referred to as Gamma Oscillations (Blackmore, 2003).

{side note - Gamma oscillations (define): is a pattern of neural oscillation/ rhythmic or repetitive neural activity in the central nervous system. Neural tissue can generate oscillatory activity in many ways, driven either by mechanisms within individual neurons or by interactions between neurons

(Slide) neural oscillations and synchrony in cortical networks –

The timing of rhythmic activity in cortical networks influences communication betwn neuronal populations sidenote end}