Episodic Memory, Cognitive Dissonance, and the MBI Bubble

Egan (2007) has recently carried out a series of experiments which could be taken to suggest that humans and monkeys have similar cognitive dissonance responses. i.e. children and monkeys apparently tend to change current preferences to fit past decisions. In Egan's experiments, for example, the subjects had first assessed two possibilities as of equal value, and then had to make a decision based on the idea that they were not. Then they derogated unchosen alternatives. This seems to lead to the idea that the core mechanism of cognitive dissonance is simple as very young children and monkeys do it.

Enthusiasts of the principle of cognitive dissonance (Stafford, 2007) often assume complex mechanisms. But we do not have any decent evidence that the change in attitudes or 'dissonance' comes from an uncomfortable mental state or that it arises from a contradiction between beliefs and actions.

Indeed, it would seem that not only do you need to have abstract beliefs about the world and yourself, you need to have some mechanism which detects when these beliefs are in contradiction with each other or with your actions, and which can (unconsciously) adjust selective beliefs to reduce this contradiction. Secondly, all this sophisticated mental machinery is postulated to exist from changes in behaviour, but it is never directly measured.

But for young children and monkeys, that all seems rather complicated. Surely a much simpler process of choice is somewhat like the idea of the mind operating like a basic computer in naive cases. A decision between A vs B is not just "choosing A" but is also "not choosing B".Then, when the choice becomes B vs C, even a naive mind is more likely to choose C because it is simply re-applying the previous decision of "not choosing B", rather than performing some complicated re-evaluation of its previously held attitudes a-la cognitive dissonance theory. These choices include some statistical white noise, so ultimate results for a choice about C are going to reflect that, of course.

Children and monkeys both grow and evolve, and one way this might happen is that the increasing complexity of neural pathways during this process could add perceived elements to the mind which might be construed by it as chagrin or whatever appropriate feeling is relevant. This too, may be relevant in some ways to discriminatory process but from the work of Egan does not seem necessarily to be at the core of the adult, sophisticated discriminatory process. The advantage of the latter is that it might lead to better and more sophisticated decisions for reasons such as personal or species survival.

Interpretation is not neutral, but represents a statement to the world as to the stance it implies. For example, chagrin at a perceived wrong first opinion (which in the simple example above would be a preliminary perceived idea that A was substantially the same as B), may alter to puzzlement if the same situation arises again and again - say in respect of some D,E and F. An example is in Eisenstein (2007) where a lecturer plausibly debunks a largish group of students about their several views as expressed in individual essays. Eventually they begin to protest at his alleged scepticism. This probably at least illustrates the high level of sophistication they have reached, and on the face of it suggests that more and better window dressing is needed for any theory of mind than we get directly from cognitive dissonance.

This really seems to amount to a similar level of discrimination to that of the recognition of sarcasm. Now we have some neurological evidence as to how such levels of discrimination operate. Shamay-Tsoory (2007) found that people with prefrontal damage had trouble recognising sarcasm, but people with damage in posterior brain areas were unaffected. People with damage in the right hemisphere and the prefrontal lobe (most profoundly evident in those with right ventromedial lesions) also had problems understanding the emotional cues involved in processing sarcasm, such as tone of voice, which correlated with their ability to understand sarcasm.

It was construed that the brain’s language areas interpret the literal meaning of a statement, the right hemisphere and frontal lobes process the emotional context, while the prefrontal cortex integrates the two. The total sample size was 25. This suggested to the experimenters that the right frontal lobe mediates understanding of sarcasm by integrating affective processing with perspective taking.

Now consider episodic memory. Recent work (Rosenbaum, Tulving, 2007) seems to show that theory of mind (ToM) can operate independently of episodic memory. ToM is doubtful in autistic behaviour (Baron-Cohen, 1985) and some doubt it even for non-mammals (Ramsay, 2007). Rosenbaum also says that ability to detect sarcasm , deception, and similar attributes, are not removed by such memory loss. Further, total loss of personal memory made no difference in subjects tested. Indeed Rosenbaum goes so far as to say: "We found that if you're trying to put yourself mentally in someone else's shoes, you don't need to put yourself in your own shoes first."

On that basis, which comes from practical experiments actually carried out with only some fairly basic and probably defensible propositions, we do not need of necessity a very complex ToM to cover a great deal of human behaviour. Even episodic memory of episodes relevant to cognitive dissonance, can perhaps be left out of a preliminary model which deals with cognitive dissonance !

We can even work out which parts of the brain may be relevant to such a proceeding. For episodic memory the relevant regions may be regions within the medial temporal lobe (MTL), such as the perirhinal cortex, parahippocampal cortex and entorhinal cortex (Moscovitch et al. 2006).

Now the above results on cognitive dissonance and episodic memory seem to indicate that we can set up a pretty good Stella or Madonna model for human behaviour without taking account, at least in a preliminary (highly foundational) way, of a complex ToM (Ramsay, 2007).

So a relatively simple basic mathematical model for a "bubble" in the MBI ('Many Bubble Interpretation') discussed earlier, can be constructed. Each bubble will be much the same, in principle, as given in the mathematical Madonna descriptions given in earlier blog entries herein. And in the simpler cases there need not exist episodic memories to retain many of the apparenly intrinsic features of human thought. We can even, in terms of level of simulation simplification, try to emulate Winfree (e.g. in Izhikevich, 2007).

Now there is no need to deal at this juncture with the problems posed by Honderich (1984) or by, for example Trevena (2002) and others, to the work of Libet (2003) and its defence by Haggard (2005), Klein (2007) and others. Libet's results, or others, will just be part of the Madonna formalism within the bubble, which can be "pseudo A series" in its formulation, I think.

Further experimental work will follow.

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