How Emotions Are Made: The Secret Life of the Brain by Lisa Feldman Barrett

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This book is about the “theory of constructed emotion,” which is based in experiments and research.

My goal in reading the book was to explore whether current neuroscience can add any clarity to the *prolepseis,* as there is so little remaining text concerning them. What I found is that it actually is relevant to the entire Canon. Though the subject of the book is emotions, it also covers sensations and feelings as well as what I think we can interpret as *prolepseis*. Note that although the author (LFB) says that construction dates back to ideas relating to Heraclitus’ “no man steps in the same river twice,” Epicurus or Epicurean thought is never mentioned in the book.

The book is very readable, with lots of illuminating examples and explanations. My aim here is to try to simplify (perhaps oversimplify) the information for comparison with the Canon, at least to the best of my ability.

Core ideas of constructed emotion:

1) Variation: an emotion does not have a “fingerprint” or a specific set of neurons.

2) Your particular perceived emotions are not an inevitable consequence of your genes but are built in because of the specific social context in which you grew up: for instance heart rate changes are inevitable but their emotional meaning is not.

3) Emotions are not, in principle, distinct from cognitions and perceptions.

In every instant that we are alive we are exposed to immense amounts of sensory information. If the brain processed all of this as bits of input, it would be so inefficient and metabolically expensive that we wouldn’t survive. Therefore the brain makes **predictions** to attempt to anticipate and explain every fragment of sensation that you will experience by combining pieces of your past and estimating how likely it is that each bit applies in your current situation. This is so fundamental that some scientists consider prediction to be the brain’s primary mode of operation.

Predictions are then tested against small bits of sensory input that are useful in the moment. Prediction errors are used to learn by way of **prediction loops** which occur at all levels from neurons interacting to brain regions and networks interacting. These continual prediction loops then create the experienced sensations that make up your experience and dictate your actions.

Prediction loop: Predict---→ Simulate---→ Compare---→ Resolve errors---→ (and back to Predict)

Simulation is an invisible process in which your past experiences give meaning to your present sensations. Your brain uses your past experiences to construct a hypothesis (simulation) to compare to the flood of input from your senses and to select what is currently relevant. What we experience as our senses are simulations of the world, not reactions to it.

"*The balance between prediction and prediction error determines how much of your experience is rooted in the outside world versus inside your head. In many cases, the outside world is irrelevant to your experience. In as sense, your brain is wired for delusion: through continual prediction, you experience a world of your own creation that is* held in check by the sensory world [my emphasis]*. Once your predictions are correct enough, they not only create your perception and action but also explain the meaning of your sensations. This is your brain's default mode."*

So the Sensations are still true. But in this model, in a given instance, they are basically a reality check on the predictions and simulations.

It is interesting to examine predictions as *prolepseis*, in the language of the Canon. LFB states that predictions and concepts are neurologically the same thing. While "predictions" and "concepts" are her words, to me these ideas read as a modern description and clarification of *prolepseis*.

The brain uses **concepts** to group and separate things and to guess the meaning of sensory inputs, both external and internal. Without these you are experientially blind; with concepts your brain simulates so invisibly and automatically that your senses seem to be reflexes, not constructions.

"*Everything you perceive around you is represented by concepts in your brain." "...concepts aren't fixed definitions in your brain, and they're not prototypes of the most typical or frequent instances." "When your brain needs a concept, it constructs one on the fly, mixing and matching from a population of instances from your past experience, to best fit your goals in a particular situation."* Your brain hones *"the probabilities until it settles on the best-fitting concept that will minimize prediction error."*

The brain begins constructing concepts very early in life, perhaps even in utero. *"The newborn brain has the ability to learn patterns, a process called **statistical learning**. The moment that you burst into this strange new world as a baby, you were bombarded with noisy, ambiguous signals from the world and from your body. This barrage of sensory input was not random: it had some structure. Regularities. Your little brain began computing probabilities of which sights, sounds, smells, touches, tastes, and interoceptive sensations go together and which don't."*

Instances grouped as a concept are not stored as a group in the brain, they are represented in different patterns of neurons on each occasion and are created in the moment.

“The human brain is a cultural artifact. We don’t load culture into a virgin brain like software loading into a computer; rather, culture helps to wire the brain. Brains then become carriers of culture, helping to create and perpetuate it.” “What’s innate is that humans use concepts to build social reality, and social reality, in turn, wires the brain.”

“The concept of “Emotion” itself is an invention of the seventeenth century. Before that, scholars wrote about passions, sentiments, and other concepts that had somewhat different meanings.”