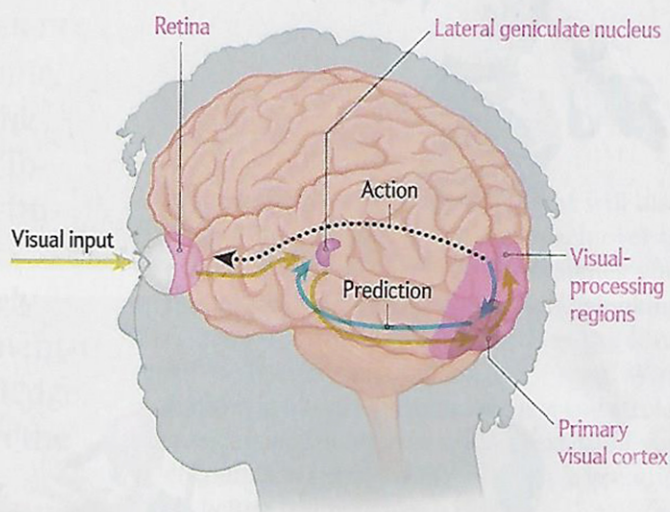


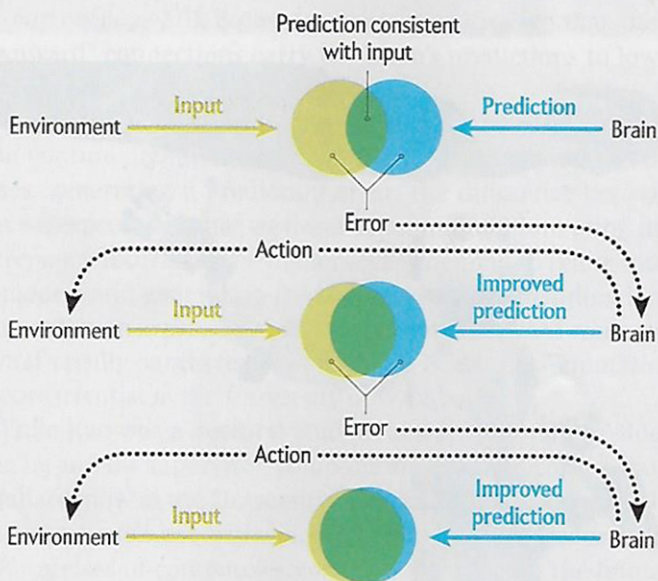
Predictive Brain

Our minds are prediction machines, using prior experience and knowledge to make sense of the deluge of information coming from our surroundings. Many neuroscientists and psychologists believe that nearly everything we do—perception, action and learning—relies on making and updating expectations.



Visual Processing

The brain's anatomy supports the idea of predictive processing. The visual cortex, for example, receives inputs from the eye, but connections also run in the other direction. Neuroscientists believe that these “downward” connections, from higher levels of the brain to the lower (such as the primary visual cortex and the lateral geniculate nucleus), carry predictions. These meet with the sensory input to generate a prediction error: the difference between what you expect and what you see. A signal coding this discrepancy returns to the higher levels of the brain. Other downward signals send commands to move the eye muscles, adjusting what we see.



Cascade of Predictions

When the brain generates a prediction error, it uses this information to update its expectations and select actions that will help resolve the discrepancy between beliefs and reality. For example, if an individual cannot determine what an object is simply by looking at it, the brain might send a command to pick up the item and examine it to gather more information.