

The Choice-making Theory of Consciousness

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Evolutionary theory teaches us that all biological functions have precursor forms that date back to the beginning of life. There is a broad scientific consensus that consciousness is a biological function and the product of evolution. Before we can answer the question, "What is consciousness?" we must be able to answer the question: "What were its precursor forms?" This question can be restated as "What biological function, present throughout evolutionary history, could have become consciousness?" One answer to this question is "choice-making."

We usually think of choice-making as synonymous with decision-making, implying the presence of a deliberative agent. The definition proposed here is much simpler: the selection of one option when two or more are present. This definition permits the perhaps novel idea that there is such a thing as agent-less choice. If you set aside the deity hypothesis, natural selection itself is an example of agent-less choice.

The evolutionary history of choice-making begins with the earliest single cell life forms in the domains of eubacteria, archea and later eukarya. They are still the dominant life forms on earth, and we are their direct descendants.

What does it mean for a single cell organism to make choices? The first function of all life is acquiring nutrients necessary for survival and reproduction. Single cell organisms select nutrients from their environment and these nutrients are "admitted" to the cell's interior by way of protein structures embedded in the cell membrane. These structures allow some chemicals to enter while denying entry to others. This is a good example of automated and distributed choice-making and leads to our next definitions.

We will call the collection of choice-making processes for any given organism its **Choice-making System (CMS)**. We will call the method or methods by which an organism acquires nutrients its **Food Acquisition Strategy**. We will call the cellular floating encounter with nutrients the **Encounter Strategy (EN)**. The Encounter Strategy is alive and well today in floating algae, some zooplankton and in sessile animals like coral.

About a billion years ago animal life and plant life separated from their eukarya single cell ancestor. From here we will follow the evolutionary line of animals, although these principles can be applied to plants as well. What distinguished animals from plants was the ability for self powered movement. In the beginning, this movement was almost certainly as random as floating had been. But powered movement created more contact with nutrients, so the energy tradeoff worked.

At some point around 800 million years ago, animals acquired the ability to direct their movement. As a general rule animals can not move in more than one direction at once. Directed movement required some centralized function that mediated "up vs. down" and "left vs. right." We will call the cells or protein structures that performed this earliest central choice-making function the **Choice-making Core (CMC)**. This was the very beginning of what would eventually become the "self." No other theory has such an elegant explanation of the origin of self.

From this point choices for animals became progressively more complex as animals evolved to fill available food niches. Animal choice-making progressed through two major thresholds in choice-making complexity.

The first threshold was reached when animals began to search for and find food. The **Search and Find (SF)** food acquisition strategy required complex behavioral choices with too many variables for choice sequences to be fully pre-programmed. Search-and-Find strategies superseded earlier EN strategies where food could be obtained without directed movement. There is evidence from an article published in *Cell* magazine (2010) that this occurred in pre-bilateral times at least 600 million years ago.

Following the SF food acquisition threshold, a second and more powerful threshold was reached when the food chain included predatory animals pursuing and capturing prey animals with the capacity to flee. We will call this food acquisition strategy **Pursue and Capture (PC)**. The choice-making demands of pursuit are iterative and interactive and involve even greater complexity than SF strategies. At these two thresholds, low variable automated choice-making would have reached the limits of its adaptive advantage in helping organisms obtain food. Rule-based or open-ended choice-making emerged to meet the demands of these more complex food acquisition strategies.

The last major threshold in the growth of CMS complexity was reached when animals began to cohere in social groups, as early as 150 million years ago. Survival and reproduction began to require the ability to make choices about kinship relationships and social competition for food, status and mating. These demands reached new heights of complexity in the evolutionary line of primate species that emerged approximately 40 million years ago. The human line of descent diverged from our common ancestor with chimpanzees approximately six million years ago. In the subsequent period, the natural selection of more complex choice-making systems is evident in the fossil record of increasing brain sizes of pre-human primates. Sexual selection and selection pressure acting on choices associated with tool use and language were no doubt responsible in part for the final progression to the level of CMS complexity evident in present day humans.

The pathway described above suggests that evolutionary history contains a complete continuum of simple to advanced choice-making systems from the earliest single cell life forms to each modern animal at the end of its evolutionary branch.

All functions of the human mind/brain including the cortex, sensory processing, memory, emotions, speech and logic can be viewed as direct choice-making or choice-making support systems. Choice-making is the evolutionary purpose of the mind/brain. And it is the only functional way to view the mind/brain as a coherent whole. Think of the thousands of choices you make every day, from the ancient choices of how to move and what to eat, to the modern choices of what to say, what to think, what to write, what to believe, how to interact with other people, how to look at and read this word, and much more all blending together in a feeling of continuous engagement with the internal and external worlds.

There is much more to this theory than could be presented here. For more information check out *The Origin of Consciousness: The Natural Selection of Choice-making Systems* (2012) available from Amazon. The book discusses many of the implications of this theory for modern human consciousness including free will (yes) and qualia (useful). And look for the sequel *The Micropsychology of Choice-making: How Fractal Choice-making systems drive what we think feel and do*.

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