There are commonalities in the cognitive architecture of all animals on Earth.

Cognitive architecture is defined as the structure and operation of the mind and brain that ultimately produces intelligent behavior (“Cognitive Architecture”). This essay will adopt this definition of cognitive architecture and define intelligent behavior as a knowledge-based reaction to some external stimuli. Before arguing for the existence of common cognitive architecture in all animals, the scope of animals discussed in the essay will exclude animal groups without a brain, due to the chosen definitions and to avoid overcomplicating the essay by adding another debatable question like: “are brains necessary for cognitive architecture?” The commonalities in the cognitive architecture of animals on Earth will be argued through providing examples of common cognitive processes such as 1)sensory data translation and 2) adaptability and flexibility in forming behavior.

First, the initial stages of processing information in all animals require translating sensory data into mentally operable forms (Real, 1991). The ubiquitous nature of sensory data translation in animals can be argued through examining the structures involved in the vision of pigeons, honeybees, and humans; all animals in different animal groups with varying degrees of sophistication. Although pigeons focus more on color than shape as primary cues (Kirsch, et al. 2007), the physical structures and processes involved in translating visual data is remarkably similar between birds and humans (Lamb, 2013). Insects like bees also share similar structures, such as photoreceptors, although with one more type than humans, as part of their sensory data translation (“Bee photoreceptor response model”). These similarities in visual processing structures across multiple animal groups show how sensory data translation is one of the basic and common cognitive architecture.

Second, another commonality additional to translating sensory data is that animals can adapt and flexibly form various behaviors befitting the environment. Examples of this includes the honeybee’s ability to mix-and-match various brain modules to produce adaptive behavior (Menzel, Randolf, & Giurfa, 2001) and how pigeons can mix-and-match primary visual cues from colors to shapes depending on the environment (Kirsch, et al. 2007). These adaptive behaviors of birds and insects can be expanded to include fish (Dill, 1983). The varying animal groups that show this trait illustrates how widespread this process is in the cognitive architecture among animals.

In conclusion, the ubiquitous nature of sensory data translation and flexibility in behavior indicates the commonalities in the cognitive architecture of all animals on earth. The widespread nature of such traits was supported through pointing out examples in various animal subgroups, such as mammals, birds, fishes, and invertebrates.
Bibliography


