Cephalopod behavioral ecology as a comparative model in understanding visual communication

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Abstract of Dissertation

In the course of evolution, human cultivated the ability to communicate using various methods with respect to the development of sensory organs detecting a certain range of gestural, audio, visual, and tactile information. Over the years, perhaps under a cultural condition necessitating specificity and accuracy of information transmission and exchange, these communication methods have further refined into more complex and mediated languages that contain both connotative and denotative information. Furthermore, in recent years, with rapid progress in computer technology reshaping the relationship to physical and mediated reality, the language is now constructed of multi-layered linguistic matrix paralleling the complexity of nature that is no longer consciously decipherable other than its facade. This indecipherable complexity of language brought increasing necessity to relay again on the more direct relationship with both physical and virtual reality by fully utilizing immediate physiological sensation as a cognitive stimulus that governs ones thought and action. In light of this current condition and transition, this study focuses on cephalopod's behavioral ecology as a comparative model to investigate biological empiricism in a visual language shared between cephalopod and human.

Coleoid cephalopod (octopus, squid, and cuttlefish), has developed their unique languages governed by both environmental and biological factors in its' evolution affecting varieties of gene expressions. They have developed an ability to rapidly change their body pattern for both crypsis to avoid predation and for inter- and intraspecific communication. Cephalopod possesses a large brain relative to its body weight, complex nervous systems, and lens eyes. These physiological attributes allow them to control complex layers of neuro-controlled cells (chromatophores and iridophores) in their skin to change their appearances rapidly. This unique ability of cephalopod to process external input into a visually detectable output allows quantitative analysis of not only between the relationship of input and output and more impotently allows detection of their cognition.

This study is divided into four major parts. 1. History of cephalopod science and art, 2. Comparison and application of cuttlefish body pattern in understanding art and design, 3. Future direction in cephalopod related fields. With these four parts, the study will demonstrate the preliminary analysis of cephalopod body pattern as a comparative model to understand the fundamental principle of visual communication.