

Chapter 3

Inquiries About Cognitive Thinking

ABSTRACT

This chapter of the book is about cognitive processes and the ways they are related to learning and creating. The text discusses how scientific concepts can be translated to the realm of mental imagery and visual thinking and how solutions inspired by nature and science-based issues support developing sensitivity and the use of original ideas in our work. Because cognition and learning may not be limited to humans, the text examines some mental operations in animals. On the other hand, the text discusses how the science- and technology-related producers might enhance their imagination and problem solving with graphical thinking and visual literacy.

INTRODUCTION

Some mental processes we share with animals. Below however, a focus is placed on human cognition, abstract thinking, and processes enhancing our creative actions. Discussion about the ways to communicate is causally related to the notions of the cognitive thinking, cognitive science, and cognitive learning. The same may be said about concepts such as mind, consciousness, or even creative processes, art and the response to art. There is growing knowledge about the visual brain and its plasticity, organization of neurons, and how nervous system represents, processes, and transforms information. Many disciplines study the mind, for example psychology, linguistics, computer

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science, philosophy, anthropology, cognitive neuroscience, and computational models of cognition. Cognitive science is the study of the mind and its processes, so it examines the nature, the tasks, and the functions of cognition.

Cognitive thinking, as the act of knowing, may relate to problem solving, hypothesis testing, and concept acquisition. People use the cognitive thinking to select and analyze information, organize it into memory store, and then retrieve from memory information picked up by the senses. They use it not necessarily consciously, for example for decision-making, in experimental research for gathering data and information, testing hypotheses, interpreting results, and providing scientific evidence for new theories.

The Human Brain Project (<https://www.humanbrainproject.eu/en>) is a multibillion-dollar program involving research on neuroscience, computing, and brain-related medicine conducted by over 750 scientists from more than 20 countries. The Virtual Brain is an open-source modeling platform for researching brain's structure and function. A super-resolution imaging technique developed at Purdue University provides a view of brain molecules with full 3D resolution. It helps to understand how a neuron works, how brain processes information, and allows monitoring age-related mental impairments such as Alzheimer's and Parkinson's diseases. For example, researchers have taken 3D single molecule super-resolution images of amyloid plaques associated with Alzheimer's disease in 30-micron thick sections of the mouse's frontal cortex (Wiles, 2018).

3.1. COGNITION AND LEARNING MAY NOT BE LIMITED TO HUMANS

Questions about animal minds and doubts cast upon whether animals think are fraught with fear that animals are unknowable. This attitude has been changing in the light of current research results made in terms of considering humans as a part of animal world. Also, biology inspired science and technology revealed new information about animal world and lowered the artificial barrier between humans and animals. We are currently learning to look at the animal world and the experience of other animals with a premise that humans are not the measure of all things, and all life is one (Safina, 2015). In this light we can acknowledge that, in the words of Carl Safina (2015), "animals know who they are; they know who their family and friends are. They know their

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