

Chapter 2

Understanding How the Mind Works: The Neuroscience of Perception, Behavior, and Creativity

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ABSTRACT

The understanding of the inner workings of the mind are relevant to enhance curriculum achievements, therefore optimizing the professional practice in general and of the arts and design in particular. The recent birth of neuroscience as a transdisciplinary field poses a challenge to the curriculum and is yet to be included as an integral part of its core. The lessons taught by #TheDress viral Internet phenomenon are here discussed with the intention of enlightening the urgency of a popularization of neuroscience knowledge, from daily life to the professional practice, as a tool to explain how context and experience influence our perception. Along the same lines, the section “The Roots of Human Behavior” addresses the fundamental concept of human behavior and how our emotions were built by our genes, helping us understand basic and complex human choices. Finally, the section “The Neuroscience of Creativity” discusses the neural basis of creativity and its relation to intelligence by dissecting what neuroscience already knows about the development of creativity and how the work environment could foster creativity. The discussion of these topics in this chapter aims to enlighten readers of the importance of neuroscience knowledge in the curriculum and how the arts and design practices can benefit society to become more tolerant.

INTRODUCTION

Although many leading concepts in modern neuroscience can be traced back to the speculation of ancient Greek philosophers (Crivellato & Ribatti, 2007), the neuroscience was not established as a unified discipline until 1971, date of the first meeting of the Society for Neuroscience. Neuroscience as a

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discipline is considered the rebirth of the mind study and one of the first truly transdisciplinary fields, giving researchers a large conceptual umbrella under which they could posit hypotheses about the neural basis of thinking at all levels (Tokuhamma-Espinosa, 2010).

The first section of this chapter presents an event that catapulted neuroscience to stardom as a pop phenomenon, when on the 26th of February 2015 the photo known as #TheDress became a viral Internet Meme with over 10 million people from around the world astonishingly arguing over the dichotomy in color perception caused by its ambiguity: #whiteandgold or #blueandblack. This image taught the general public that color perception can be as relative as human perception in general. The brain is equipped with a mechanism called perceptual constancy, responsible for bringing some stability to our already troubled lives. In the specific case of color, this mechanism is constantly compensating for changes in lighting in order to aid the color appearance of objects to remain stable. Without the color constancy, we would perceive objects changing color constantly because the light emitted by them actually changes according to the change in lighting. The full understanding of the reasons behind people perceiving #TheDress as either white-and-gold or blue-and-black and what they have in common is still a scientific mystery to be solved, but the most important lesson from this viral phenomenon is that neuroscience principles can be easily grasped by the general public and that color perception can be as subjective as a political opinion or a purchase decision.

The second section presents humans as a congeries of genes. These genes are responsible for humans greatly appreciating their own well being, and greatly dealing with their own pain. They are also responsible for mutual assistance among relatives. The closer the relationship the more likely they are to help a family member: a mother is always willing to sacrifice more for her son than her nephew, and the nephew more than the son of a neighbor, and so on. What lies behind all of this is the selfish gene. Humans don't think and act on their own need to increase their chances of being replicated. The selfish gene is a replicator and an almost immortal replicator lasting millions of years. The mortal lasting only a few years is the human. The selfish gene is responsible for humans fighting so much and almost never helping a stranger. But the selfish gene doesn't control everything and humans might be the only animals on the planet who are aware of being the result of selfish genes as well as having the capacity to transcend the selfishness of this very gene. Only humans can change the rules of the game so that they can become real humans.

The third section discusses the neuroscience of creativity and the ability of thinking outside the box, that is; thinking differently from the norm. Creativity is a combination of genetics and environment. However, neuroscience studies still cannot explain how exactly these two factors are combined in order to enhance the development of creativity. The increase in size of the human brain happened during two different periods of our evolution and may have generated a sophistication in human memory that provided humans with a better mental understanding of the environment and with greater creativity on how to socially behave. This section also discusses the neural basis of creativity and its relation to intelligence and also tackles the importance of enhancing the working environment in order to foster creativity.

CONTEXT IS EVERYTHING: LESSONS FROM #THEDRESS

Color vision scientists around the world went to sleep just to wake up on Friday the 27th of February, 2015 with several emails and messages questioning them about the color of #TheDress. At first glance, most scientists concluded that they were all seeing the same picture on different screens and that dif-

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