
Fast, Cheap, & Out of Control: A Review

Varela, Thompson and Rosch (1991) have noted a striking tension between experience and science. On the one hand, our everyday experience provides a compelling and anchoring sense of self-consciousness. On the other hand, cognitive science assumes a fundamental self-fragmentation, because much of thought is putatively mediated by mechanisms that are modular, independent, and completely incapable of becoming part of conscious experience. "Thus cognitivism challenges our conviction that consciousness and the mind either amount to the same thing or [that] there is an essential or necessary connection between them" (p. 49).

This same tension is explored, and exploited to tremendous artistic merit, in Errol Morris' 1997 documentary *Fast, Cheap, & Out of Control*. The subject matter of the film is intentionally fragmentary. Morris explores the stories of four completely unrelated individuals: topiary gardener George Mendonça, lion tamer Dave Hoover, naked mole-rat specialist Ray Mendez, and behavior-based roboticist Rodney Brooks.

The disconnection between the documentary's four stars is heightened by its visual style, which is a collage of images in different resolutions and film formats (color and black & white, 35mm and 16mm, Super 8 and video), interspersed with clips from Saturday serials, old home movies, and cartoons. Morris has said "here we have the ultimate 'low concept' movie, a movie that would utterly resist the possibility of a one-line summary...It defeats that sort of thing by its very nature (four seemingly unrelated stories) and because the themes in the movie are complex and elusive."

Still, Morris depends upon his viewers searching for coherence in order for the film to deliver its substantial emotional effect. We are much like lion tamer Hoover, who assumes that his animals are plotters and schemers. He survives each performance via a 3-second "read" of each animal's intentions as they enter the circus pen, and manipulates their train of thought to disrupt what he believes is their primary intention,

"to eat the man in the white pants". For him, lion taming boils down to animal psychology, not to mention a healthy application of Dennett's (1987) intentional stance. Morris wants his viewers to adopt a similar stance when watching this film, and encourages them by providing a unifying musical score, as well as a thin narrative thread in which his protagonists begin with boyhood dreams, describe their work, and then comment on its future.

Roboticist Brooks' view of intelligence stands in stark contrast to Hoover's, and completely endorses the fragmentation of mind that so concerns Varela et al (1991). Brooks builds machines that exhibit life-like behaviors, but does so by eschewing internal representations and central control. His robot-insects walk in virtue of loosely coupled interactions between independent motor components. "To an observer, it appears as though the robot has intentions and it has goals and it is following people and chasing prey...but it is just the interactions of lots and lots of simpler processes."

How is it that a collection of simple processes are capable of tricking the observer in this way? The answer is that Brooks depends upon the environment, and a robot's ability to sense (situation) and change (embodiment) its world. Interactions between robot processes and environmental factors produce control from which coherent robot actions emerge. Brooks notes that "I don't believe that it is possible to have a disembodied intelligence without a physical connection to reality. Everything you think, every thing in our thought processes, is built around being in touch with reality."

For Brooks, robot behavior can only be considered in the mutual context of agent and environment. The appropriate fragmentary processes will produce some desirable, global, emergent behavior, but only when these processes are organized under appropriate environmental control. Brooks observes "the walking isn't programmed in. Instead it is all these feedback loops, and when you put them together, it walks. A well-respected

professor from Germany said 'But how do you tell it what to do?', and my only answer was that I don't tell the robot what to do; I switch it on and it does what is in its nature." Of course, what is in the robot's nature is also dictated by the environment in which it is situated. "Sometimes I feel a little like Yoda. That's to say sort of feel the force. Don't try and control the robot, but feel how the world is going to control the robot."

The insect-like society exhibited by naked mole-rats was thought to be impossible to find in mammals. Mendez enthuses that "to me, it's like a mammal that breaks all the rules". However, he is convinced that naked mole-rat society is also largely a product of evolving in a particular environment. Constant warm temperatures have resulted in the animal losing both its fur and its ability to shiver. Predatory pressures have resulted in behaviors that put the health and safety of the colony (and the queen) above that of individual colony members.

Importantly, the fluid interaction between agent and environment that Brooks exploits is also evident in the day-to-day behaviors exhibited by the naked mole-rats. Mendez tells how the assumptions that he made about a naked mole-rat enclosure that he was designing were constantly being revised by the unpredicted behaviors of the colony. In the end, Mendez could create an enclosure that would determine the location of various colony activities within it. However, this knowledge was the result of striking interdependencies between the mole-rats and their environment.

One of the main questions raised in *Fast, Cheap, & Out of Control* is whether the fragmentary nature of Brooks' robots, or of the components of a naked mole-rat society, is also true of humans. As Brooks walks into a party hosted by his graduate students he ponders "maybe that's all there is. Maybe a lot of what humans are doing can be explained this way. When I think about it I can almost see myself as being made up of thousands and thousands of little agents doing stuff almost independently."

Morris edits both the sound and the images of his film to continually raise such

questions in his audience as well. Narrative accounts of the fragmentary nature of robots and of naked-mole rats are constantly heard over footage of crowds attending a circus. Morris intentionally interlinks the images of one of his stars with the voice of another in a challenge to the viewer to make deeper inquiries about the nature of human existence. As we see humans and animals performing odd behaviors (when in the appropriate circus environment), we have the sense that Morris is defying us to prove that our strong sense of self is not an illusion that hides the environmental control of many simple, unconscious, sub-processes.

Topiary gardener Mendonça provides a perspective that might serve as the middle ground for resolving the tension between science and experience which is of concern to Varela et al. (1991). Clearly the animals that Mendonça shapes are largely his own design. But how the design develops is also dictated by the nature of the plants that he clips. "Like the bear for instance. I just selected a plant that had branches approximately where I wanted them, and then you begin to cut away everything else, and keep them cut. The head is most always the easiest part to do, because all these things want to do is grow straight up. Then of course the arms, you have to tie them down to make them stay down."

In addition to the internal nature of the plant, Mendonça's creations must also take into account the external environment: the sun, the rain, and the storms. "You are fighting the elements to try to get them to grow the way you want them to grow, to get them to do what you want them to do. It is a constant battle, all the time." The final product, then, is a shape that emerges from competing and cooperative forces from the world, from the plant, and from the garden shears. How do you build a topiary giraffe? Mendonça provides a simple recipe: "It's just cut and wait, cut and wait."

Morris' message in *Fast, Cheap, & Out of Control* is that human intelligence and self-consciousness might similarly emerge as a unifying whole created from conflicting internal and external fragmentary forces. The trick to understanding though might be to consider how such forces might interact.