



Psychological Reality: Why We See the World the Way We Do

Video Transcript

Blueprints of the mind

So far in this course, we've explored the philosophical foundations of human reality. We've seen how evolution shaped perception and decision-making. And we've traced the major milestones of cognitive evolution. But one question remains. How does the brain – this complex biological system – make sense of the world at all?

As David Marr and others have emphasized, the key challenge for any living organism is to extract useful information about the world from sensory inputs. And that is a central concern of this chapter. To this end, we will dive into cognitive science: the interdisciplinary, scientific study of the mind and its processes.

In cognitive science, we want to understand how the mind works. We describe behavior. Try to predict it. And, ultimately, we want to explain it in formal principles – in the same way a physicist might explain a falling apple by referring to gravity.

In science, we rely on models. Models are simplified representations of often complex systems. And they help us understand how those systems work.

Take planetary motion. Raw recordings of that data reveal very little. But with a model like the solar system, the pattern becomes clear. We can see exactly how planets orbit the sun.

As physicist Richard Feynman once put it: "What I cannot create, I do not understand." So, to understand the mind, we must try to build it – at least in simplified forms.

By building computational models of perception, learning, or decision-making, scientists can test their theories directly. If a model successfully predicts behavior or neural activity, we have reason to believe that we've identified some of the underlying principles.

Let's take perception as an example to see how ideas in cognitive science have evolved.

Descartes' early model of perception shows how light strikes the eyes, setting off signals that travel through hollow nerve tubes – deep into the brain. Eventually, those signals reach the pineal gland – the supposed seat of the soul, where all the magic happens.



Today, we know that this isn't exactly what's going on – but the core idea matters. In this view, the world comes in from outside. And with each step inward, the brain builds a richer and richer picture. In classical models of vision, information flow is in one direction. From the sensory periphery, deeper and deeper into the brain.

This is called a feedforward architecture. Visual processing moves step by step – from lower to higher levels of processing where it's integrated into a more and more complex understanding.

More contemporary models turn this picture upside down. Today, much of cognitive science sees the brain not as a passive receiver, but as an active prediction machine, in which most of the work is done from the inside out. One framework we'll explore in this chapter is called predictive processing. Perception under this framework is viewed as an inferential process, sort of the brain's "best guess" of what is out there in the world.

What makes frameworks like predictive processing particularly valuable for science is that they can be formalized mathematically. They require researchers to state exactly what the brain is supposed to compute, under which assumptions, and by which mechanisms. Once formalized, a model generates quantitative predictions – about behavior, neural activity, or both. And that's what turns a verbal idea into a testable theory.

This brings us to the *Computational Theories of the Mind* – the broader framework we'll explore in this chapter. The core idea: cognitive processes are computations. They take an input, apply a set of operations, and produce an output, systematic and rule-based.

But if we want to understand the mind by building it, we need to ask: what exactly are we trying to build? What problem is the brain actually solving? And how do we even begin to answer this?

In the next step, we'll look at a foundational framework for studying the mind.