PSY-PHY

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By the same author

LIFEBALL

MINDWORLDS

G.O.D. IS GREAT

PHILOSOPHER

CORAL

BRITIZEN JON

ALBION

PSY-PHY

A BRIEF INTRODUCTION
TO ULTIMATE REALITY

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PSY-PHY

SCHILLER'S HAIKU

This great realm of souls:
its chalice foams and bubbles
to infinity.

INTRODUCTION

The human mind as each of us knows it is still in many ways a mystery to science. We have a lot of work to do before we can claim to have cracked it.

My aim in this book is to explore this challenge and suggest a framework we can use to reach a deeper understanding of the mind in terms that make sense to scientists. I see the work as a contribution to psychophysics – my term of art for the future field at the interface of psychology and physics.

Physics is the fundamental science of nature. Psychology is not yet a science in the same sense. It resembles biology before the theory of evolution gave biologists a unifying framework. Neuroscientists are nibbling away at psychology, but they still don't have a convincing theory of mind. Something is wrong, but no one seems to know what.

My diagnosis of the problem is that the framing logic for the challenge needs recasting. We need to recognize the role of becoming, or of evolution in the widest sense, to the task of building the models that do the heavy lifting in science. The idea that we're faced with a conceptually static reality, along with a geometric time dimension that exists outside of us, is wrong. It's been shown to be wrong by quantum physicists. When we respond with an open mind to this fact, the project of developing a conceptual basis for psychology can be made to look much less daunting.

But the task is still a tricky one. We need to dip into some deep and difficult logic and mathematics, and we can't avoid some alarming paradoxes that can make the whole enterprise

look doomed. The journey takes us over rocky ground and seems to wander all over the landscape of our best theories about our place in nature. Happily, years of grappling with all this stuff has taught me to find ways of smoothing over the bumps and bridging the nasty patches, so the gloss presented here goes easy on its readers.

THE ELEVATOR PITCH

Given the new view of logic and math, plus the new view of quantum physics and the gusher of new facts from the neuro-sciences, my new perspective on psychology isn't weird at all. The weirdness was already absorbed in the givens. But it is a radically different perspective from the conventional view that faced the pioneers of psychology a hundred or more years ago. It will take some getting used to.

In short, we use a logic of becoming to distinguish the big self from the little self. If the ego is the big self in being, the little self is projected into existence as a puppet avatar in a virtual reality, or a mindworld. As conscious beings, we live in a mindworld movie. Each brief self is timestamped as it goes from being to existence, and our lived reality is a strange loop that turns and grows in time.

When it's cut this short, the new view doesn't make much sense. Any pitch short enough to deliver in an elevator ride is likely to be just as unintelligible. But if we make it a tad longer (imagine a fast talker in a slow elevator in a tall skyscraper), it might make more sense. Here goes.

When we let logic unfold into mathematical set theory, we find that a dynamic view of truth in a formalized theory of becoming looks rather interesting. When we then apply this logic to review time in physics, we find that it takes on a new

character that's attractive from a psychological point of view. When we then see how the dynamic view of time unfolds in quantum theory, we find we have a promising new way to get a grip on the notorious paradoxes that make quantum physics seem impossible to understand.

This three-step development is all by way of introduction to the deeper view that follows – though it takes us halfway through the story to get that far. The science of mind we aim to glimpse is based on lots of experimental work in biology and on recent neuroscientific studies of mammalian brains, so we need to review all that next, as well as the wider debates that frame any such work. Then, in an easy application of the key results so far, the new view pops out with startling speed and clarity as a physical insight that pans out to a universal perspective of breathtaking scope.

A deep breath later, the consolidation of that outcome in logic and philosophy is reassuringly smooth. If we see reality as a movement from being to existence, we can assign mental and mathematical ideas generally to a virtual realm of being and reserve existence for the more defined and limited realm of things in spacetime. Then we can distinguish the ego in being from its avatar in existence and depict the temporal flow from ego to avatar as the frame-by-frame realization of a mindworld movie. After all that, we can regard our social life as a multiuser online game. That's the story.

GRAPPLING WITH PARADOX

It took me decades to think through the core idea, then years to sort out the rest. To find ways to bridge the yawning gaps in my early drafts of a narrative, I took some difficult detours through philosophy, logic, and mathematics.

My academic home port for embarking on the voyage was Oxford. The scientific need to work out a deeper theory of mind dawned on me in 1970 as an undergraduate reading physics who was struggling to get his head around the deeper issues stirred up by relativity and quantum theory. Then, at sea as a postgrad researcher, I navigated into philosophy, logic, scientific method, mathematical logic, foundations of math, and the philosophy of language.

A breakthrough of sorts animated me over the summer of 1974 in Berlin. I drafted a book in 1975 to sketch out my idea, which I took from handwritten notes to a bound typescript, but it didn't make much sense. There was obviously still a mountain of work ahead of me.

The problem was paradox. Classical logic, the logic we use to build computers and the internet, is intolerant of anything that even flirts with paradox and contradiction. Everything must remain rigorously consistent. This is clearly a virtue for any practical endeavor, and no sane scientists would wish to disavow a commitment to consistency. But it makes building deep theoretical foundations quite tricky.

The strategy I chose in Berlin was to stare down the contradictions that emerged in ambitious applications of logic. This would be like the two superpowers coldly staring down their political differences over the Berlin Wall. The paradoxes were deep and wide, but they weren't overwhelming.

Back in Oxford, I continued my studies, then worked in London until 1987, when I moved to Germany. There I did editorial deskwork on academic studies in math, physics, and computer science for a decade.

In the early years of the new millennium, still in Germany and working in software development, I took part in a series of conferences on the latest developments in neuroscience.

Early inklings of a new science of mind were appearing on the strength of an impressive flood of new experimental work. Theoretical physics was also looking better. Relativistic and quantum physics had become the firm basis for all the sciences and inspired new models for cosmology and particle physics. The pieces were in place to get the job done.

THIS BOOK

The time was ripe to publish or perish. I published my best essays from the previous decade in my 2009 book *Mindworlds*, retired from software development, wrote a few more books, and returned to England in 2013. A few further distractions later, I can now offer this book to the world.

The great challenge for a project like this is to identify the intended audience and then to pitch the exposition at a level that supports and respects that audience. Even expert readers deserve explanations and references that suffice to locate and define the key ideas and innovations within a familiar frame. Readers who are new to the issues raised here are especially entitled to a full and fair presentation of what for experts may seem like elementary points that surround the main novelties. The challenge is to balance the wants and needs of all such readers without being boring.

In the end, I chose to compose a light and fairly readable main text followed by relatively technical notes and references at the end for scholars. This approach has sound precedents among expositions of novel ideas in science, especially ones that seem too unconventional or controversial to be squeezed into the straitjackets of peer-reviewed journals or specialist academic monographs. I want to reach a wider audience, and this seems the best way to do so.

The book has six fact-laden chapters. A bold teacher could recycle the material as a resource for a one-semester course aimed at STEM students who want to think outside the box. But my ambition is for the book to attract readers from many different backgrounds. If it failed to excite readers outside the academic community, I'd conclude that my efforts to make it readable, lively, and provocative had been wasted.

To whet the appetite of people who like to read the menu before consuming what may be junk in books like this, here's a quick overview of the six chapters.

The first chapter, *Being*, reviews the relevant history behind the search for a scientific theory of mind and introduces the tools of formal logic and set theory we need to overcome the obstacles facing that science.

The second chapter, *Time*, applies the new view of logic to the classical conception of time, as worked out by physicists and mathematicians, and explains in more detail how time works in a theory of mind.

The third chapter, *States*, introduces quantum theory, with the aim of showing how the new logic of time enables us to avoid the air of paradox surrounding it, and hints at how the quantum ideas can help us in a theory of mind.

The fourth chapter, *Life*, starts with a review of how life on Earth has grown in modern scientific terms and continues by describing the brain and the tools we use to explore it.

The fifth chapter, *Minds*, outlines a new way to understand how the brain supports the mind and proposes a hypothesis, rooted in modern logic and physics, to explain the temporal nature of conscious experience.

The sixth chapter, *Worlds*, introduces worlds of consciousness as mindworlds and then presents and explains nine laws of psychophysics to summarize the book's key message.

Between the fascinating details (some of them arcane), the main argument should be easy to follow. Though my own story is irrelevant to the case made here, I've included a few minor biographical comments where the extra facts seemed helpful. To make for easy reading, I've suppressed footnote markers in the main text. The notes and references are for specialists, and most readers will have no problem ignoring them. I've also suppressed URL and doi data in the references – motivated readers can use the cited text to locate resources online with an intelligent search app.

This is not a scientific monograph in the traditional sense. But it is intended to introduce a perspective that makes a real contribution to serious science. As I said, I've made an effort to keep the journey interesting for readers who not only share my ambition to reach the destination but also want to enjoy the ride.

England, 2025

KANT'S HAIKU

Thoughts without content
are empty, and sense inputs
without concepts blind.

BEING

Once upon a time, Germany was a land of thinkers and poets. The kingdom of Prussia and the patchwork of statelets left over from the Holy Roman Empire fostered gifted musicians, brilliant mathematicians, talented scientists, and the greatest harvest of philosophers since ancient Greece.

Foremost among the philosophers was Immanuel Kant, a scholar versed in physics and math who first suggested that galaxies were "island universes" and who made a monumental contribution to the theory of mind. His great insight was to grasp that we never experience the world directly but always through what he called the "lenses" of categories within the "æsthetic" of space and time. We have no immediate view of the real world and see only the phenomenal world through these lenses. Kant's historic contribution was to argue that any rational being, anywhere in the universe, is constrained to apprehend reality through a set of categories.

Pre-eminent among the philosophers who followed Kant was Georg W.F. Hegel, who conceived an amazing synthesis of that theory of mind with a dialectical history of everything that put its stamp on Western philosophy for the next hundred years. Hegel sought to outdo Kant by dismissing the idea of a real world beyond the categories. He found ways to fit every aspect of human life into a dialectical framework that exposed it to rational reconstruction within a nexus of logical relationships. In doing so, he revealed the limits of his own logic. His early disciples included Karl Marx, whose revolutionary ideas transformed politics in the twentieth century.

The philosopher whose career heralded the eclipse of the German love of genius in the apocalyptic demise of the Third Reich was Martin Heidegger. His main achievement was to resurrect the ancient Greek concept of being in a way that invited a new approach to building a theory of mind. The French existentialist movement in philosophy and psychology arose from Heidegger's ideas.

The horrors of the Third Reich put an end to Germany's golden age. Philosophy in the traditional German manner lost its brio, and physics took over as the fundamental discipline for advancing our basic knowledge about reality. In the early twentieth century, physicists developed a new understanding of space and time and discovered a new world of ideas in quantum mechanics to replace the classical understanding of the physical world that had persisted in its deepest essentials for two thousand years. Thinkers who pursued the decay of Hegelianism into Marxism offered only stale dogma. In the new world, atomic bombs made physicists more important.

Today, with computers, artificial intelligence, and robot lab technology, the industrialization of science has grown from physics and chemistry to include biology and medical science, where its impact has been transformational. Science has gone global. Its next frontier challenge is psychology.

MIND THE GAP

My main purpose in this book is to trace out the implications of a radical perspective in logic for the project of building a scientific theory of mind. This lets us formulate the central paradox regarding the relation between mind and matter in a way that makes scientific sense. By exploring the interface between the embryonic science of psychology and the mature

science of physics, as well as the firehose of facts emerging from work in the neurosciences, we can lay the foundations for a viable science of psychophysics.

Kant made a start. He didn't get far with it, because there was so little scientific work to build on, but he said his start marked a Copernican revolution in how we understand the relation between the mind and the world. Recall that Nicolaus Copernicus was the Renaissance man who replaced classical Ptolemaic cosmology, which put the Earth at the fixed center of the universe, with the heliocentric view that Earth and the other planets orbit the Sun. Kant said we see reality through a veil of phenomena, and the categories we apply to understand phenomena are as subjective as the idea of a fixed Earth. Reality is stranger than we can grasp.

Modern physics presupposes observers. We are observers. Our minds give us a perspective on the reality that surrounds and sustains us. Our subjective minds reflect a spatiotemporal world of physical phenomena. In modern physics, the deeper reality is a labyrinth of mathematical forms.

Yet minds are somehow spatial. Most psychologists take our concepts of space and time as subjective in the Kantian sense, but they also accept – naively, perhaps – that in reality we also have definite locations in space and time.

Here we're faced with some awkward choices. Mathematical objects are separate from each other, yet they lack location in space and time. Perhaps our minds (or souls – the distinction between them is far from clear) are similar. Perhaps mental phenomena generally have a being or existence like that of mathematical objects. Minds are often compared to software running on the brain, and we all agree that software is akin to mathematics – algorithmic programs process information in the same way that arithmetic calculations process numbers.

Numbers or information can claim to be eternal residents in Plato's heaven, whereas grubby calculations on paper or buggy code in a computer register are as subject to change and decay as anything in the physical world.

Space and time are formal concepts we use to order reality and make sense of the sensory flux that pixelates the surfaces of our phenomenal worlds. Without some kind of geometry, we couldn't distinguish physical objects from each other or make sense of their changing. Even today, most physicists say space and time are as real as it gets.

Following the Copernican revolution, physics in our sense began when Galileo Galilei and Isaac Newton proposed laws in mathematical form to account for exact measurements of phenomena. Newton made a point of stipulating that absolute space and time exist in physical reality as the imperturbable foundation of his mechanics and his theory of gravitation. It was only in the twentieth century that we learned to relativize these Newtonian absolutes.

The conventional view in physics is that the observer is a perspectival point located in space and time. When Kant explored how the observer's mind relates to space and time, and then Hegel and Heidegger explored the idea further, they gave us the stub of a line we can continue. We can say the spatiotemporal realm of things exists within a wider realm of being that includes mind and mathematics.

In the philosophy we get from this stub, human beings are people with minds, and minds have being, whereas physical bodies exist. Being is somehow distinct from existence.

Let's push on and see how far this goes. We can say minds have being but not yet existence. We could say minds have moral and metaphysical attributes that go beyond anything we might casually grant to tables and chairs. Maybe we could say

souls have the moral and metaphysical attributes, and minds come along for the ride, but then we'd need to explain souls. Maybe minds are the user interfaces for souls, and self-consciousness extends to minds but not to souls. Or maybe we should forget about souls and stick to minds. Okay, but consciousness is something we can't forget about.

LIVING WITH CONSCIOUSNESS

In recent decades, consciousness has become the main battle-ground for a theory of mind. It's what distinguishes human beings with minds from humanoid zombies or meat machines. On this view, aired by the philosopher David J. Chalmers, to have consciousness is to have an inner life or a subjective experience of the world. Chalmers gained academic fame as the young man who sang "the zombie blues" with rock-star zest to promote his claim that the hard problem in advancing from the neuroscience of cognitive processing in the brain to a scientific theory of mind for psychology is to build a theory of consciousness.

Minds are closely related to consciousness in the sense that they provide personal windows or theaters of consciousness. Explaining consciousness is the key step in explaining minds. Both are big, baggy ideas, perhaps too big for easy scientific assimilation. A scientist can reasonably focus more narrowly on states of mind. We can admit that states of mind exist but insist nonetheless that minds are too nebulous for existence. This may seem inconsequential, like mere wordplay, but we're working toward a powerful mathematical framework here, so let's not abandon our approach until the fuller picture begins to take shape and the motivation for this distinction between being and existence emerges.