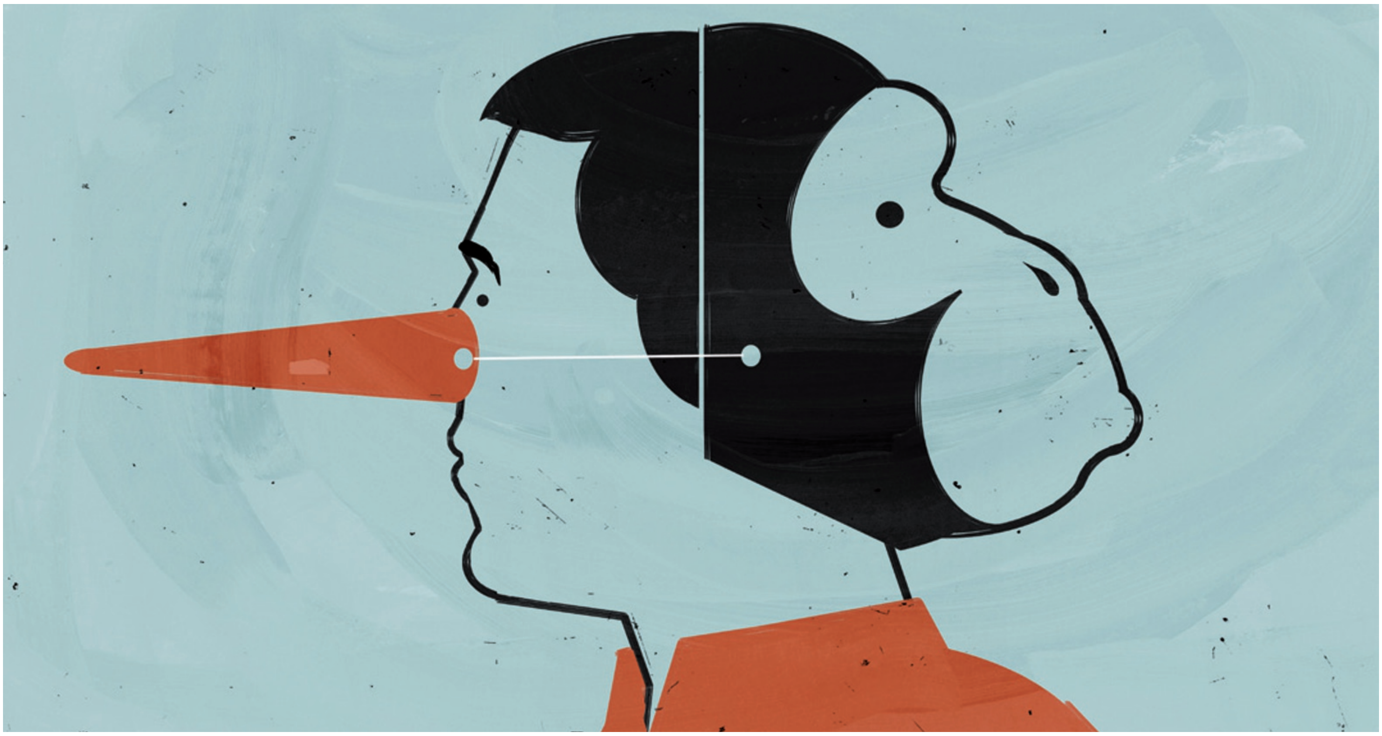
AUTUMN BOOKS



ILLUSTRATIONS BY ALESSANDRO GOTTARDO

EVOLUTION

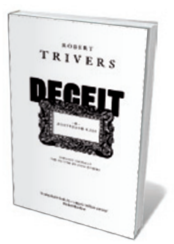
Lies we tell ourselves

Stuart West is inspired by Robert Trivers' evolutionary argument that self-deception is crucial to deceiving others effectively.

Nature is filled with exquisite examples of deception. Fireflies mimic the flashes of others to attract and eat them; birds make fake alarm calls to scare competitors away from their lunch; male fish mimic females so that they can sneak sex while avoiding the wrath of larger males. In *Deceit and Self-Deception* (US title *The Folly of Fools*), Robert Trivers, one of the most influential evolutionary biologists since Charles Darwin, invites us to look closer to home to find a more surprising form of deception — one in which we fool ourselves.

In this provocative and wide-ranging book, Trivers examines the evidence that self-deception occurs, theorizes why it happens and shares the insights that can be gained from looking at human behaviour. In discussing the science of deception, he doesn't shrink from giving his views on areas in which it has implications, such as drug addiction.

Trivers starts by making a clear and powerful case that conflict — common at all levels of interaction, from groups to individuals and genes — favours deception. If an individual can mislead others, they gain an advantage, whether in a competition for mates or in division of labour.



Deceit and Self-Deception: Fooling Yourself the Better to Fool Others
ROBERT TRIVERS
Basic Books/Allen Lane: 2011.
352 pp./320 pp.
$28/£25

A strong theme is that deception drives detection mechanisms, which drive better deception and so on, in a deceitful co-evolutionary dance. So we should not be surprised that humans have evolved sophisticated methods for producing and detecting deception. Trivers argues that deception itself may have been an important evolutionary force in selecting the large brains and intelligence that now allow us to study it.

The book goes beyond the evolutionary literature by arguing that individuals can be selected to deceive themselves. The idea that we, or any other organism, should deceive itself is arresting. Why should we go to the trouble of having elaborate sensory and neurobiological systems that obtain and process information about the environment, only to throw away or hide that information in exchange for a distorted view?

Trivers' theory is that individuals mislead themselves because it helps them to deceive others more convincingly. Imagine two individuals, human or

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other species, wrangling over a resource such as food, territory or mates. Each displays their quality and assesses the other's. The result is that the one least likely to win backs down. Trivers argues that if one individual thinks that they are bigger and stronger than they are, they will display as such — and in a way that makes them more likely to fool others.

To examine this idea, Trivers brings together neurophysiology, behaviour, immunology and psychology. Behavioural data show that some classes of individual are more likely to misjudge factors such as their own intelligence or sexual orientation. Neurological data suggest that the conscious mind has a positively biased view of self, relative to the subconscious mind. Immunological studies show that deception has costs to immunological function. And psychological studies suggest that biased memory, denial and projection are common.

Trivers relies heavily on data obtained by methodologies from brain scans to immunological assays to plethysmographs that measure organ volume. He aims to stimulate research and debate, raising more questions than he answers. How might we model self-deception from an evolutionary perspective? How do we distinguish the psychology of deception from that of self-deception? Could we test for it in non-humans? What are the competing hypotheses? How do we test the costs and benefits? What are the psychological consequences?

A common theme in his examples is that deception has been selected because of its benefits at the individual level, but that this can lead to disastrous consequences at, say, industrial or national level. Trivers offers much food for thought on these topics, in chapters that are likely to provoke controversy. He suggests that self-deception has a major role in the initiation and justification of wars, the development of false historical narratives and the existence of religion.

Deceit and Self-Deception has broad appeal and a well-structured narrative. Trivers adds numerous anecdotes, such as what to do when being searched by the police (look away), or why you should avoid walking with him near squirrels (in case he makes a sudden lunge, provoking an attack).

Trivers touches on wide-ranging issues: the role of evolutionary biology in the social sciences; the placebo effect; lie detectors; genocide; the scientific method. But he conveys a powerful and focused message: if we can learn to recognize and fight our own self-deception, we can avoid negative consequences at levels from the individual to the national, and live better lives. ■

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PARTICLE PHYSICS

A question of mass

The struggle to find a theory of the weak nuclear force reveals intriguing personalities, finds **Edwin Cartlidge**.

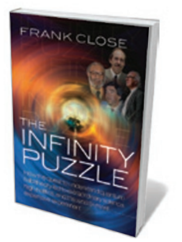
The Higgs boson is an expensive quarry. Finding this as-yet-unseen elementary particle, thought to endow others with mass, is the headline aim of the Large Hadron Collider — a venture costing billions of dollars and involving thousands of scientists at CERN, Europe's high-energy physics lab near Geneva, Switzerland. Just why the Higgs is so significant is laid out in Frank Close's fascinating book *The Infinity Puzzle*, which chronicles the hunt to pin down the fundamental forces of nature, and the human triumphs and failings along the way.

Close, a particle physicist, offers a compelling history and sociology of modern particle theory. We discover the motivations and achievements of a rich cast of brilliant individuals, and get enough of the science to grasp what they were trying to do. Where Close really shines is in exposing the fraught process of recognition in science, focusing on key players such as Pakistani theoretical physicist Abdus Salam and the man after whom the famous boson is named, British physicist Peter Higgs. We get a feel for what has been called "Nobelitis" — the preoccupation with claims to discovery that can afflict pioneers in their fields.

The book's focus is the search, starting in the 1950s, for a theory to describe the weak nuclear force, which is responsible for radioactive decay. The challenge was to devise a theory that was consistent with the strange laws of quantum mechanics, but that did not predict absurd infinities for the values of some particle properties.

> IT IS HARD TO SEE HOW THE HIGGS DISCOVERY ... WILL BE ABLE TO TELL US **WHY WE ARE HERE.**

An analogous problem had arisen when physicists tried to describe electromagnetism using a theory known as quantum electrodynamics (QED). Julian Schwinger and Richard Feynman found a solution to it in the late 1940s; they bypassed the infinities by calculating the electron's properties relative to known values of its charge and mass (a trick known as 'renormalization'). Unfortunately, no such mathematical feat was evident in the more difficult cases of the weak force or the strong nuclear force, which holds protons and neutrons together in atomic nuclei.



The Infinity Puzzle
FRANK CLOSE
Oxford University Press: 2011. 416 pp. £16.99, $28.99

In 1954, Chen-Ning (Frank) Yang and Robert Mills used the mathematics of group theory to put forward a description of the strong force that was analogous to QED. Later, their work would form the basis of successful theories for both the strong and weak forces. But it was dismissed at the time because it predicted that particles transmitting the force have electric charge but no mass — particles that are not found in nature.

The solution to the quandary of these massless particles, it turned out, was 'symmetry breaking'. According to this idea, all particles were equal and massless in the very hot early Universe, and it was only as the Universe expanded and cooled that this symmetry broke down and particles with different masses condensed out. Sheldon Glashow, Steven Weinberg and Salam were awarded the 1979 Nobel Prize in Physics for incorporating symmetry breaking into a description of the weak force, thus creating the 'electroweak' theory that united the weak and the electromagnetic forces. In 1999, Dutch physicists Gerardus 't Hooft and Martinus Veltman won the Nobel for proving that the electroweak theory ▶