Podcast Interview: Steven Pinker

PNAS: I’m your host Prashant Nair and welcome again to Science Sessions. Evolutionary biologists have long puzzled over how humans evolved intelligence, which allowed them to develop the arts and sciences, even though the environment in which our ancestors evolved was one largely fit for a foraging lifestyle. That question was first raised by the renowned co-discoverer of natural selection, Alfred Russell Wallace, and has since preoccupied many biologists. Among them is Harvard University psychologist Steven Pinker. Pinker previously described in PNAS intriguing hypotheses about the origin of our intellectual faculties. At the American Association for the Advancement of Science annual meeting in Boston this year, Pinker expanded on his ideas about the cognitive niche – a means of human survival based on reasoning and social cooperation. I asked Pinker how the cognitive niche may have set the stage for the evolution of human intelligence.

Pinker: The cognitive niche was introduced by the anthropologists John Tooby and Irv DeVore, and it refers to a way of surviving in an ecosystem by developing cognitive models of the causal structure of the environment and using it to exploit plants and animals by manipulating the environment in anticipation of how those laws will work.

PNAS: Another hypothesis to explain the origin of human intelligence, says Pinker, is that the cognitive niche was conducive to the development of psychological faculties that led to abilities like language. And it is the cognitive niche, he says, that likely explains the origin of language, in contrast with an array of proposed theories.

Pinker: The common sense view of why we have language is that it helps us to communicate, and I think that’s largely right. There’s been a misguided intuition that language is more powerful than it needs to be to enhance survival and reproduction; that language is somehow profligate or luxurious because it’s got so much complexity, and that has led to a number of exotic hypotheses, such as language is a courtship display (we just use it to show off how good our genes are), that it’s a substitute for grooming among primates, that it’s the result of one big lucky macromutation, it’s a consequence of some complex law of physics that we don’t understand on what happens when you pack a hundred billion neurons into a skull. I think the original intuition that language evolved for communication is right. And, using Tooby and DeVore’s theory of the cognitive niche, I try to provide a more sophisticated, modern, biological explanation of how language fits in with the other aspects of the human phenotype.

PNAS: Language, Pinker says, likely gave humans an edge in the arms race between prey and predator that played out in our evolutionary past, allowing our ancestors to adroitly manipulate the environment to their advantage.
**Pinker:** We not only developed these ways of manipulating the environment to our advantage, by trial-and-error or strokes of genius, but by pooling the results of trial-and-error and lucky accidents and strokes of genius of other people. We pool our information; we perfect our tools and our hunting strategies and our gathering strategies; and that’s where language comes in. Language multiplies the benefit of any discovery you make about how to manipulate the environment because it’s useful not just to you, but to your kids, and your spouse, and your kin. It’s also a excellent trade good, and so by just expending a few minutes of talking, you can, as the saying goes, teach a man to fish and feed him for a lifetime, and I think that is not unrelated to the fact that humans are also the champion cooperators in the animal kingdom. One of the reasons humans cooperate so much is that a lot of good can come out of cooperation, namely the acquisition of know-how facilitated by language.

**PNAS:** Like language, technological know-how, such as tool-making ability, and social cooperation, Pinker says, also evolved in the human lineage because these traits likely enhanced one another, allowing our ancestors to better exploit the cognitive niche. Yet another factor that might help explain the successful evolution of our species, he says, is our relatively long childhood, compared with other animals.

**Pinker:** We spend much more of our lives being children than you’d predict for a primate of our lifespan. Presumably, that’s an apprenticeship before you go out into the world and set up your own household or village; you acquire an awful lot of skills for your culture. We’ve got dads, who, at least occasionally, care for their kids, feed them, protect them (unusual among mammals, especially among great apes) presumably because our children, who are vulnerable for much longer, depend upon learning to survive that it shifts the trade-off that males in any species face between investing in their own offspring and siring as many offspring as possible.

**PNAS:** So, how might the cognitive niche have led to the development of science?

**Pinker:** All humans have a kind of folk science. All human groups have names for the local flora and fauna which often map pretty well onto the Linnaean categories of species or genus. Humans have folk theories of essences and ingredients, probably a necessity to come up with the idea of extracting say a poison or a medicine from a plant or an animal. We have an intuitive physics that governs trajectories, and an intuitive materials science, often elaborated in quite fanciful ways by modern scientific standards. But people everywhere try to make sense of their environment, which includes reasoning from fragmentary evidence to hidden forces and laws. The tracker Louis Liebenberg has speculated that the art and science of tracking may have been one of the pre-conditions for science. When you track, you’re testing hypotheses about what kind of animal left those marks, and what condition the animal was in, and which way it was going, even if the animal itself is totally out of sight. That might be one of many
ways in which the cognitive niche involved a kind of proto-science of inferring invisible forces and events from fragments of visible evidence.

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