# Human nature and the origins of language

Noam Chomsky ranks among the leading intellectual figures of modern times and has changed the way we think about what it means to be human, revolutionising linguistics and establishing it as a modern science. He agreed to discuss just some of his ideas with *Radical Anthropology*.

**Radical Anthropology:** It's unusual on the left to work explicitly, as you do, with a concept of genetically determined human nature. Many suspect the idea must set limits on our ability to change the world and also change ourselves in the process. So, let's start by asking, what exactly do you mean by 'human nature'?

**Noam Chomsky:** It is considered unusual, but I think that is a mistake. Peter Kropotkin was surely on the left. He was one of the founders of what is now called 'sociobiology' or 'evolutionary psychology' with his book *Mutual Aid*, arguing that human nature had evolved in ways conducive to the communitarian anarchism that he espoused. Marx's early manuscripts, with their roots in the Enlightenment and Romanticism, derived fundamental concepts such as alienation from a conception of human nature – what we would call genetically determined. In fact, anyone who merits attention and who promotes any cause at all is doing so on the basis of a belief that it is somehow good for humans, because of their inherent nature.

To object that the facts about human nature set limits on our ability to change the world and ourselves makes about as much sense as the lament that our lack of wings sets limits on our ability to 'fly' as far as eagles under our own power. There is nothing more mysterious about the concept human nature than about the concept bee or chicken nature, at least for those who regard humans as creatures in the biological world. Like other organisms, humans have a certain genetic endowment (apparently varying little in the species, not a surprise considering its recent separation from other hominids). That determines what we call their nature.

**RA:** We agree! We would also insist on the importance of anthropology, in order to be sure that the concept of 'human nature' we're working with captures the diversity of human experience. Your work on linguistics, on the other hand, deliberately set out in isolation from anthropology and the social sciences. Why? Do you still consider that separation necessary?

**Chomsky:** The idea of a 'separation' is an interesting myth. It might be worth investigating its origins. The facts are quite the opposite. Some of the earliest work in our programme at the Massachusetts Institute of Technology (MIT), back to the 1950s, was on native American languages (Hidatsa, Mohawk, Menomini). Later, with Ken Hale's appointment 40 years ago, the department became one of the world centres of research in Australian and native American languages, soon after others, worldwide. That engaged faculty and students in issues of land rights, endangered languages and cultures, cultural wealth, educational and cultural programmes in indigenous communities (run mainly by MIT graduates brought here from indigenous communities), the spectacular revival of Wampanoag as a spoken language after 100 years (mainly the work of Hale and Jesse Little Doe), stimulating cultural revival as well, and much else. And of course all of this interacting closely with theoretical work, contributing to it and drawing from it. Where is the separation?

**RA:** But you have always insisted, haven't you, on the difference between natural and social science? Is linguistics a social or natural science? Or has the progress of linguistics as a science blurred any meaningful boundary between the two?

**Chomsky:** I have never suggested any principled difference between the natural and social sciences. There are, of course, differences between physics and sociology. Physics deals with systems that are simple enough so that it is possible, sometimes, to achieve deep results, though leaving many puzzles; I just happened to read an article posted on physicsworld.com on the basic unsolved problems about formation of snow crystals. It's roughly the case that if systems become too complex to study in sufficient depth, physics hands them over to chemistry, then to biology, then experimental psychology, and finally on to history. Roughly. These are tendencies, and they tend to distinguish roughly between hard and soft sciences.

**RA:** OK, let's consider your contribution to the science of linguistics. First it might be worth reminding our non-specialist readers where it all began. Your work on language started with a critique of the then-prevailing view that children had to learn their natal language. You insisted instead that it was an innate part of our brain. In other words, humans no more have to learn language than we have to teach our stomachs how to digest. How did you come to this conclusion? And how can we know whether it's true?

**Chomsky:** I cannot respond to the questions, because I do not understand them. Plainly, children learn their language. I don't speak Swahili. And it cannot be that my language is 'an innate property of our brain.' Otherwise I would have been genetically programmed to speak (some variety of) English. However, some innate capacity – some part of the human genetic endowment – enters into language acquisition. That much is uncontroversial among those who believe that humans are part of the natural world. If it were not true, it

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would be a miracle that my granddaughter reflexively identified some elements of the blooming buzzing confusion as language-related and went on to acquire capacities of the kind that you and I are now exercising, while her pet kitten (chimp, songbird, bee…), presented with exactly the same data, could not take the first step, let alone the later ones. And correspondingly she could not acquire their capacities. There is also a question about whether my granddaughter's achievement falls under the technical concepts of learning developed in one or another branch of psychology, or whether they are more properly subsumed under general theories of growth and development. About these matters there are real questions and legitimate controversy: What is the nature of the genetic endowment? How does acquisition proceed? Etc. Scientists do routinely ask similar questions about the visual system, system of motor organisation, and others – including, in fact, the digestive system.

**RA:** Point taken! But aren't what you term 'external' languages such as Swahili of secondary interest from a scientific point of view, since language as you define it is basically for internal cognition, not social communication? It's surely central to your position that you don't need Swahili or any other external language just to think logically and clearly? A second point is that most of us take for granted that innate human capacities such as vision or digestion evolved gradually, through what Darwin termed 'descent with modification'. Your argument that language emerged in an ancestral individual in an instant – before any external language could have existed – suggests that we are talking about an entirely different kind of thing?

**Chomsky:** I would not say that Swahili is an 'E(xternal) language'. I don't even understand what that means. In fact, I know of no characterisation of E-language. I introduced the term, but didn't define it, except as a cover term for any conception of language other than I-language. Without an explanation of what you mean by Swahili (apparently, something other than the similar I-languages of individual speakers), I can't answer the question whether it is of secondary or primary (or no) interest. I do not agree that I-language is "basically for internal cognition, not social communication." It is surely used for both, and it's not "for" anything, any more than hands are "for" typing on the computer, as I'm now doing.

It's a mistake to suppose that capacities must evolve gradually. There are many known examples of sharp changes – slight genetic modification that yields substantial phenotypic effects, and much else. By coincidence, I was just looking at an article in *Science* on the 'Avalon explosion', which appears to be one of many examples of an explosion of forms without gradual selection. But it really doesn't matter in the present context. The human digestive and visual systems did clearly evolve over a very long period. Language as far as we know did not. Anatomically modern humans are found up to 200,000 years ago; behaviourally modern humans appear very recently in evolutionary time, as far as evidence now exists, perhaps within a window of 50-100,000 years ago, a flick of an eye in evolutionary time. That's why palaeoanthropologist Ian Tattersall regards human intelligence generally as an "emergent quality", not "a product of Nature's patient and gradual engineering over the eons."

I did not say that language as a completed system emerged in an individual in an instant. But I cannot think of a coherent alternative to the idea that mutations take place in individuals, not communities, so that whatever rewiring of the brain yielded the apparently unique properties of language, specifically recursive generation of hierarchically structured expressions, would therefore have taken place in an individual, and only later been used among individuals who had inherited this capacity.

RA: Sure, evolution proceeds through the selection of chance mutations that arise in individuals. But is there nothing we can say about the terms of selection? Nothing about why a chance mutation for language might have increased in frequency in the population? Fingers surely evolved for something, after all – even if not for typing e-mails! To be sure we've understood you here: you say that communication is a possible function of language but that it's just one among many possible functions, hence of no special relevance either to the nature of language or its origins?

**Chomsky:** At the Alice V. and David H. Morris Symposium on the Evolution of Language held at Stony Brook University in October 2005 (and elsewhere), I quoted evolutionary biologists Salvador Luria and Francois Jacob, both Nobel Laureates, as expressing the view that communicative needs would not have provided "any great selective pressure to produce a system such as language," with its crucial relation to "development of abstract or productive thinking"; "the role of language as a communication system between individuals would have come about only secondarily… The quality of language that makes it unique does not seem to be so much its role in communicating directives for action" or other common features of animal communication, but rather "its role in symbolizing, in evoking cognitive images," in "molding" our notion of reality and yielding our capacity for thought and planning, through its property of allowing infinite combinations of symbols" and therefore "mental creation of possible worlds."

There is good reason to believe that they are right, in part for reasons I mentioned in the passage to which you are referring. If the rewiring of the brain that yielded recursive generation of hierarchically structured expressions took place in an individual, not a group (and there seems to be no coherent alternative), then interaction must have been a later phenomenon. Language would have evolved first as an internal object, a kind of "language of thought" (LOT), with externalisation (hence communication) an ancillary process. I can't review here the strong and growing evidence to support this conclusion, but I have elsewhere. There are ample reasons why having a LOT would confer selectional advantage: the person so endowed could plan, interpret, reflect, etc., in ways denied to others. If that advantage is partially transmitted to descendants, at some later stage there would be opportunity for communication, and motivation to develop a means of externalising the internal LOT – a process that might

not involve evolution at all; perhaps it was a matter of problem solving using available cognitive mechanisms. This is, of course, speculation, like all talk about the evolution of language. But it is the minimal assumption, and I think enters in some way into all such speculations, even if tacitly. The conclusion, quite plausible I think, is that while language can surely be used for communication (as can much else), communication probably has no special role in its design or evolution.

As for organs, traits, etc., being "for" something, the notion may be a useful shorthand, but shouldn't be taken too seriously, if only because of the ubiquitous phenomenon of exaptation. Suppose that insect wings developed primarily as thermoregulators and then were used for skimming and finally flying, evolving along the way. What would they be "for"? Or what is the skeleton "for"? For keeping one upright, protecting organs, storing calcium, making blood cells…? A property of an organism enters into its life (and survival) in many different ways, some more salient than others. But there is no simple notion of its being "for" some function.

**RA:** At the conference you mention, you also talked about 'the great leap forward' – the 'human revolution', as many have called it. It's fair to say, we think, that most Darwinian theorists would regard the social dimensions of this major transition as having played a decisive role. We are thinking, for example, of the late John Maynard Smith, who linked the emergence of language with the earliest social contracts – an idea harking back to Rousseau. How does your origins scenario fit with approaches of this social and political kind? Darwinians don't take cooperation for granted. Can you say anything about the socio-political conditions which might have driven our ancestors to start talking and listening to one another?

**Chomsky:** I should make it clear that the term 'great leap forward,' referring to the burst of creative activity, sudden in evolutionary time, was not mine. It's Jared Diamond's. It's commonly assumed that the emergence of language was a key element of the great leap. We of course know very little about the sociopolitical conditions that existed at the time, but there's no scenario I can think of that suggests how a sudden change in these conditions could have led to the emergence of language. The only plausible assumption I have ever heard, and I suspect the only one that would be taken seriously by evolutionary biologists, is that some rewiring of the brain, perhaps the result of some slight modification in the functioning of regulatory circuits, provided the basis for this new capacity.

The simplest assumption – which appears to be implicit in all of the more complex ones that have been proposed – is that the rewriting yielded 'Merge', the simplest recursive function, which instantaneously made available an infinite array of structured expressions generated from whatever conceptual 'atoms' are available. That yields, in effect, an internal I-language, a 'language of thought,' providing obvious advantages to the person so endowed. If the mutation is partially transmitted to offspring, they too would have the advantage. And over time it might have come to dominate a small breeding group. At that stage there becomes a motivation to externalise the I-language, that is, to map the internal objects generated to the sensori-motor system, yielding what we think of as language – the external expressions we are exchanging now, for example. That mapping is quite non-trivial, and the problem of how to construct it can be solved in many different ways. It is in these ancillary processes that languages differ widely, and in which the mass of complexity of language resides. It's not at all clear that this is, technically, a step in the evolution of language. It might have been just a matter of problem-solving, using existing cognitive capacities.

The secondary step of externalisation evidently took place under existing sociopolitical conditions, and probably profoundly changed them. Beyond that, evidence is thin. I do not see how notions of social contract might play more than a superficial role. Scientists generally, not just evolutionary biologists, don't take much for granted. But there isn't much doubt that like other animal societies, those of *Homo sapiens* involved plenty of cooperation, which might have been considerably enhanced, one would suppose, by the emergence of the remarkable instrument of language.

**RA:** Would you agree that science involves restricting our speculative hypotheses to those that can be tested against empirical data? We are not clear in what sense the speculation you have just offered us is testable. Presumably we should expect to find recursion playing a central role in every known language – not just in the language of thought but in language as actually spoken. It seems that this isn't the case. Some linguists have claimed that the language of the Piraha, for example, almost entirely lacks recursion and for that reason presents a challenge to your theory. Does it?

**Chomsky:** Don't quite understand the first question. Which speculation do you have in mind?

As for the Piraha, there's a common confusion between recursion and embedding. Everett claimed that Piraha lacks embedding. Others challenge that claim (since his examples of Piraha language appear to me to have examples of relative clauses embedded in phrases, I don't know what Everett means by embedding). But I haven't seen any claim that Piraha lacks recursion, that is, that there are a finite number of sentences or sentence frames. If that's so, it would mean that the speakers of this language aren't making use of a capacity that they surely have, a normal situation; plenty of people throughout history would drown if they fall into water. Nothing much follows except for a question as to why they haven't made use of these capacities (a question independent of Everett's assumptions about the culture). No one seriously doubts that if Piraha children are brought up in Boston they'll be speaking Boston English, that is, that the capacities are present, unlike other animals, as far as is known. There's no challenge to the theory – not mine, but everyone's – that the human language faculty provides the means for generation of an infinite array of structured expressions.

**RA:** We had in mind your whole speculative origins scenario. How does it stand up to what we know about primate politics and cognition? The hypothesised behavioural ecology of our hominin ancestors? The laws of

evolution of animal signals? Does it say anything testable in the light of findings from these arguably relevant fields, or in the light of archaeological data? And so on…

**Chomsky:** You'll have to explain to me what you mean by my 'speculative origins scenario'. In particular, can you identify what I've written about this that is even controversial enough to require empirical test? Or is it not perfectly consistent with what is known about our ancestors? Or, for that matter, what is not accepted, tacitly, by everyone who has had a word to say on this topic?

**RA:** It is a refreshingly bold "just-so" story for the evolutionary emergence of language. It's certainly parsimonious and has a kind of logic on its side, but how could we discriminate between your story and any other? Modern Darwinism provides us with ways to turn a just-so story into a testable proposition – by modelling the costs and benefits of proposed adaptive behaviours, for example. To count as scientific, a hypothesis surely has to be testable. Can you specify just one or two experimental results or archaeological finds or anything else that might in principle pose a problem for your hypothesis of instantaneous language evolution?

**Chomsky:** I'm afraid I am still puzzled. The question I raised remains unanswered, and as long as this is so, I do not really understand what you are asking. If it is true that what I have suggested is not even controversial enough to require empirical test, is perfectly consistent with what is known about our ancestors, and is accepted, tacitly, by everyone who has a word to say on this topic, then I do not see how the question you are posing arises. So I cannot proceed until you indicate to me in what respects that judgment is incorrect.

I have not suggested that the emergence of language is instantaneous. Rather, that the rewiring of the brain enabling an infinite array of structured expressions was in effect instantaneous. I have never heard of an alternative to this suggestion. That leaves plenty of questions, among them, the question to what extent the internal computational system that arises is a "perfect solution" to conditions imposed by the CI (conceptual-intentional) interface (hence in effect also instantaneous), and the question how the internal syntax-semantics is externalised, a later process virtually by definition, and one that might not even involve evolution in the sense of genomic change.

**RA:** Let's try to summarise your argument so the point we're driving at can be made clearer. Although language in a broad sense relies on various evolved structures and mechanisms, and although language can be used for communication, the crucial step that gave our species the language faculty was a chance rewiring of the brain. This genetic event instantly gave rise to a computational mechanism for recursion – something unique to humans, and perhaps originally nothing to do with language. Perhaps it evolved as an adaptation for, say, navigation, this mechanism subsequently being exapted for language. In your 2002 *Science* article co-authored with Marc Hauser and Tecumseh Fitch, you describe all this as a "tentative, testable hypothesis in need of further empirical investigation". Our previous questions were merely inviting you to clarify for our readers what some of these tests might look like. What kind of experimental or observational results might pose a problem for the theory?

We're taken aback by your claim that every serious scholar agrees with you on these points. Our own impression is that virtually every scholar vehemently disagrees! Ray Jackendoff and Steven Pinker come to mind. We are not interested, for the moment, in whether the truth lies more with you or more with Pinker and Jackendoff. If we are to have a Darwinian account of the emergence of language, we surely need to ask what might have been the selection pressures that gave rise to it in humans but in no other animal? Pinker argues that the explanation is social cooperation, explaining this in turn by invoking kin selection and reciprocal altruism. But these are widely applicable Darwinian principles, by no means restricted to *Homo sapiens*. So why didn't apes evolve language? Or something a bit like language? Were our hominin ancestors particularly co-operative? Which ones and when? Is there any archaeological evidence, for example, that our ancestors of four or five millions of years ago were getting especially co-operative? What socio-ecological factors might have driven this? And so on. This has turned into a longer than usual question, but the reason we're interested in these kinds of issues – and why we're interested in the fact that you seem to ignore or downplay them – is that they have obvious political dimensions. What ecological and social conditions, for example, are conducive to communistic co-operation? Or is everything we need to know to be found in the computational mechanisms of individual human brains?

**Chomsky:** You say you're "taken aback by your claim that every serious scholar agrees with you on these points," namely the points I've actually made. As far as I am aware, that is true. Pinker and Jackendoff, for example, tacitly presuppose these points. Of course they disagree with views that they've attributed to me. But that was not my question: to repeat, what is controversial in what I've actually said and written?

There's no "hypothesis" in the paper I co-authored with Hauser and Fitch about recursion in language being an exaptation from deeper capacities, maybe used in navigation. Rather, that's proposed as a possibility that could be explored, and tested. It's easy to see how it could be explored: e.g., by studying these processes in different systems and looking for commonalities, differences, appearance at various times of evolution, the usual approaches of the comparative method; obviously premature in this case, because not enough is known. There are plenty of hypotheses discussed, and there are masses of empirical evidence testing them, but they are about the nature of the system that evolved – obviously a prerequisite to study of its evolution.

So I'm back to where I was. Unless you can identify some thesis that is controversial, and that isn't accepted, at least tacitly, in all speculations about language evolution that can be taken seriously, I can't respond to the queries.

**RA:** OK, we take your point, but we're trying to get you to talk about some interesting issues in evolutionary

science. The popular science writer Marek Kohn describes well what I mean in his chapter on trust in his book *As We Know It*. Kohn quotes anthropologist Chris Knight as saying that "Darwinian theory shows that cheating is likely to result in higher fitness than co-operating – and the greater the rewards of co-operation, the greater the unearned benefits to the freeloader. Any theory of how language, symbolism or culture originated has to show how a system based on cooperative agreement could have developed without being destabilised at any stage by the pursuit of individual interests." What do you think of this?

**Chomsky:** I don't see the force of the claim. For one thing, evolutionary theory has nothing to say, in general, as to whether cheating is more advantageous than cooperating. There are many circumstances in which the contrary would be true, and empirical evidence, though it exists, has little bearing on real situations. For another, there's no need (or way) to establish what Knight demands. One might just as well argue that language differentiation results from pursuit of group interests, like other kinds of cultural variety. And individual interests are beside the point. Furthermore all such matters (even mapping of I-language to the sensorimotor system) may have nothing to do with evolution in the biological sense.

**RA:** The question is under what circumstances is the sharing of valuable information with non-kin using a cheap signalling system like language an evolutionarily stable strategy (ESS)? In all other species, a signal must be costly to be seen by the signal receiver as reliable in situations of conflict. But if you don't accept that language is an adaptation or arose in a Darwinian, biological world, then you need not submit to the constraints posed by selfish-gene theory. Is that why you don't see the force of these arguments?

**Chomsky:** Selfish-gene theory tells us nothing about the value of interacting through language. Human language is nothing like the signalling systems of other animals. Of course language arose in a Darwinian biological world, because that's all there is, but that world relates only superficially to the pop-biology that circulates informally.
**RA:** OK, let's move on. Our activist readership will be interested to know what they can do with your ideas. Frederick Engels once wrote, "The more ruthlessly and disinterestedly science proceeds, the more it finds itself in harmony with the interests of the workers." That's quite an inspiring idea. Revolutionaries need no ideology, he is saying – only science, conducted dispassionately for its own sake. Are we right in saying that you don't encourage socialists or anarchists to view science – or at any rate, your own linguistic science – as having potential in that political sense?

**Chomsky:** I don't encourage socialists or anarchists to accept falsehoods, in particular, to see revolutionary potential where there is none. Anton Pannekoek didn't encourage radical workers and other activists of the anti-Bolshevik left to see revolutionary potential in his work in astronomy, for the simple reason that he was honest, and knew there was none to speak of. The shred of truth that can be extracted from the remark of Engels that you cite (which I don't recognise) is that those who wish to change the world should have the best possible understanding of the world, including what is revealed by the sciences, some of which they might be able to use for their purposes. That's why workers education, including science and mathematics, has commonly been a concern of left intellectuals.

**RA:** But do you think the scientific community should get collectively self-organised and consciously activist? Let's take the example of climate change. Is astronomy entirely unconnected with the task of familiarising ourselves with the big picture here? With the origins of life on earth, with the reasons why we have life on earth in the first place and with comprehending why capitalism might be ultimately inconsistent with Earth's future as a habitable planet? Anton Pannekoek may, rightly or wrongly, not have seen the revolutionary potential of his astronomy, but he certainly linked his scientific outlook with his politics – in political pamphlets on Darwinism and human origins, for example. Might we yet see a pamphlet by Noam Chomsky, linking your scientific and your political thinking for a popular audience?
**Chomsky:** I am reasonably familiar with Pannekoek's writings, and do not recall his drawing conclusions about his political stands from his work on astronomy, nor do I see how one could do so. Nor why it should be a demand – no sane human being devotes 100% of his or her life to political activism.

If scientists and scholars were to become "collectively self-organised and consciously activist" today, they would probably devote themselves to service to state and private power. Those who have different goals should (and do) become organized and activist. All the questions you raise merit inquiry and attention, and if there are lessons to be drawn from the sciences, then that should be the concern of everyone, including scientists to the extent that they can make a contribution. One contribution they can and should make is to be clear and explicit about the limits of scientific understanding, a matter that is particularly important in societies where people are trained to defer to alleged experts. I have written occasionally on links between my scientific work and political thinking, but not much, because the links seem to me abstract and speculative. Others believe the links to be closer, and have written more about them (Carlos Otero, James McGilvray, Neil Smith, and others). If I can be convinced that the links are significant, I'll be happy to write about them.

**RA:** We have mostly talked about the evolution of language, but you are perhaps most famous for your political stand. It is understandable that your political work should attract hostile criticism – material interests are at stake. What can seem more puzzling is why arcane academic debates, more fittingly subject to disinterested inquiry than political polemic, can provoke equally impassioned criticism. Why is this, do you think?

**Chomsky:** It should seem puzzling, to professionals as well. I have seen many illustrations over the years, and they go back quite far in history. Sometimes people are "defending their turf." Sometimes it is personal jealousies. I know of cases that are really depraved. Academics are not necessarily nice people. And one might mention a remark attributed to Henry Kissinger: the reason academic disputes are so vicious is that so little is at stake. ■