Stephen Pinker and Communication with Extraterrestrials

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In his 1994 book, *The Language Instinct*, Stephen Pinker defends a theory of language based on ideas first proposed by Noam Chomsky. Pinker draws upon work in cognitive science to support and extend Chomsky's ideas. In opposition to what he calls the "standard social science model," Pinker challenges the claims of Quine, Sagan and others that language can determine the ways we see the world. Pinker rejects the claims that other creatures might share some of our capacity for language, and he denies that linguistic categories are cultural constructs.

"Language," he tells us, "is not a cultural artifact that we learn the way we learn to tell time or how the federal government works." According to Pinker, "some cognitive scientists have described language as a psychological faculty, a mental organ, a neural system, and a computational module." But Pinker prefers the "admittedly quaint term 'instinct.' Language," he says, "is no more a cultural invention than is upright posture." (p. 18)

To link Pinker's work to extraterrestrial communication may seem whimsical. Pinker is, after all, almost entirely concerned with the this-worldly task of persuading us of the fruitfulness of a revolutionary new way of looking at language. Because the scope of his enterprise is so great, however, it is handy to have some fixed point of reference. Asking whether Pinker's theory of language would in principle allow communication with extraterrestials is simply a more-or-less neutral way of seeing what Pinker is up to. This move is not entirely arbitrary since Pinker himself raises the issue in *How the Mind Works*. (1997)

In order to define our starting point as concretely as possible, consider one of the earliest practical efforts at extraterrestrial communication: the plaque that NASA attached to the Pioneer spacecraft launched in 1972. On the plaque were a line drawing of the spacecraft and of male and female humans together with diagrams of the solar system and a hydrogen atom. Advocatesof the plaque adopted what might be called a positivistic attitude. They assumed that the laws of physics are uniform throughout the universe, that the science of any civilization capable of acquiring the Pioneer spacecraft would be logically equivalent to our own, that the diagrams and symbols would be recognized as such, and that their meaning could be recovered from the plaque itself. (Sagan 1977, 235; 1980, 296)

Critics of the plaque argued that all representations are culturally determined. Descriptions of "reality" always involve presuppositions which

themselves cannot be expressed in the language. How people perceive the world depends on the symbol systems they are using. "Reading an image, like the reception of any other message, is dependent on prior knowledge of the possibilities; we can only recognize what we know." (Gombrich 1971,82-96) Communication among people using different symbol systems is difficult or impossible because there is no way to represent, and hence to translate, the conditions which are presupposed by the existence of the symbol system.

Where does Pinker's view of language fit in comparison to these accounts? Would his description of language favor the pro-plaque or anti-plaque positions? At first glance the answer seems obvious. Pinker would be on the side of the pro-plaque people because he strenuously rejects the view that thinking is governed by language. He identifies the claim that it does with what he calls the "'Standard Social Science Model,' according to which the human psyche is molded by the surrounding culture." (1994,23) He has no patience with the "Sapir-Whorf hypothesis of linguistic determinism, stating that people's thoughts are determined by the categories made available by their language, and its weaker version, linguistic relativity, stating that differences among languages cause differences in the thoughts of their speakers.... The idea that thought is the same thing as language is an example of what can be called a conventional absurdity: a statement that goes against all common sense...." (1994, 57) This he tells is "wrong, all wrong."

Clearly, Pinker is opposed to the people who say that the plaque won't work because the conventions that govern language vary with the culture. But does his rejection put him on the side of the positivists? Not really, or at least not all at once. The reasons for Pinker's rejection of linguistic determinism are quite different than those of the positivistically inclined NASA scientists.

Pinker finds the basis for his rejection in "two sets of tools [that] now make it easier to think clearly about the whole problem [of the relation between thought and language]. One is a body of experimental studies that break the word barrier and assess many kinds of nonverbal thought. The other is a theory of how thinking might work that formulates the questions in a satisfying precise way." (1994,67)

It is certainly no surprise that Pinker cites "experimental studies" as the basis for the claim that there is non-verbal thought. He is after all an experimental psychologist. But does this commit him to something like the positivism views of the plaque designers?

What experiment shows us, according to Pinker, is not just that non-verbal thinking occurs, but that thought itself is independent of language.

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> People do not think in English or Chinese or Apache; they think in a language of thought. This language of thought probably looks a bit like all these languages; presumably it has symbols for concepts, and arrangements of symbols that correspond to who did what to whom.... But compared to any given language, mentalese must be richer in some ways and simpler in others.... There must be extra paraphernalia that differentiate logically distinct kinds of concepts...and that link different symbols that refer to the same thing.... On the other hand, mentalese must be simpler than spoken languages; conversation-specific words... are absent, and information about pronouncing words, or even ordering them, is unnecessary. (1994,81-2)

According to Pinker, "mentalese" exists prior to any natural language. It is the necessary condition for the existence of natural languages. It determines the form of natural languages, and is itself dependent on the evolutionary structure of the brain.

If this is the case, what can be said about the Pioneer plaque as an artifact that is supposed to have the same meaning for creatures with an entirely different evolutionary background as it does for us?

Pinker addresses the issue glancingly in *How the Mind Works*. (1997) In a chapter headed "Revenge of the Nerds," he mentions NASA's second effort at communication with other beings, the Voyager recording "Sounds of Earth." He dismisses it as a "fine idea, if only because of the questions it raised." (150) He moves on to a brief discussion of the search for extraterrestrial intelligence (SETI) and the Drake equation. That equation involves seven variables beginning with the estimated number of stars in the galaxy and including a estimate of the proportion of life-bearing planets on which intelligence emerges. The equation was first proposed by Frank Drake at a conference in 1961 as a back-of-the-envelope way of estimating the probability of other intelligent life in the universe.

Because the 1961 conference members guessed that all planets on which life developed would eventually produce intelligence, Pinker sees the SETI project as perpetuating a grave misinterpretation of Darwinian evolution, namely that of understanding evolution in teleological terms. There is no more reason for supposing that creatures from other worlds would evolve intelligence, he tells us, than for supposing that they would evolve elephant-like trunks. Although he views SETI as based on a mistake, he denies that he is arguing against it. (154-55)

Pinker thus leaves us with the remote possibility of intelligences other than our own, but still with the question of whether his account of language would allow in principle for communication with them.

On this planet Pinker finds that language is a uniquely human characteristic. While other animals may communicate, they lack the anatomical and neurological capacity for language. (1994, 334) Trying to teach chimps or other animals to use language is futile. Only humans among some fifty million species have followed the evolutionary path to intelligence (1997, 197). The brain and body structures necessary for language are not found in any other terrestrial species. He speculates that four elements which may have contributed to the development of human history might have to include a nocturnal intelligence: vision, group living, hands, and hunting.

> A planet with life may not be enough of a launching pad. Its history might have to include a nocturnal predator (to get stereo vision), with descendants that switched to a diurnal lifestyle (for color) in which they depended on fruit and were vulnerable to predators (for group living), which then changed their means of locomotion to swinging beneath branches (for hands and for precursors to upright posture), before a climate shift sent them into grasslands (for upright posture and hunting). What is the probability that a given planet, even a planet with life, has such a history? (1997, 197-8)

Because both intelligence and language are the results of a long series of chance events, as Pinker insists, are we justified in concluding that if roughly similar sequences were to occur in another planetary environment, again roughly similar to our own, the result would be a kind of intelligence or a kind of language sufficiently similar to ours so that we could recognize them as language or as intelligence, but still not be able to comprehend the differences? In other words, would the circumstances that linguistic relativists (e.g., Gombrich and Whorf) observe at the level of this-worldly natural languages necessarily recur at the level of interplanetary communication, assuming that any communication were as possible? ("If a lion could speak, we could not understand him.")

It is not clear how Pinker would answer this question. His criticism of the Whorf-Sapir hypothesis is that Whorf's data was inadequate. (1994, 55-67) If "linguistic determinism" fails, if thought is not determined by natural languages, then the way is open for an account that finds fundamental similarities among all natural (human) languages, a "Universal Grammar." The best explanation for such a grammar is physiological, an "instinct" developed by natural selection. Granted that there is a Universal Grammar, then thinking has its own language, "mentalese". If mentalese is the result of evolution, then it is highly probable that it is unique. If it is unique, then communication with extraterrestials is impossible, and the Pioneer plaque is a futile gesture. If there is some overlap between mentalese and the language of extraterrestials, then "linguistic relativism" will

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recur at that level.

According to Pinker, the existence of a Universal Grammar is a contingent upon human evolutionary development. Since that development is not likely to recur on another planet, neither is a symbol system that could translate ours. In *The Language Instinct* Pinker dismisses the likelihood that there is any instance of homologous development of language in apes, so we suppose that convergence would be even less likely on a foreign world.

Pinker's sharp division between language competence and intelligence creates a difficulty. If the two really are independent of each other, as Pinker claims, (1994, 45-54) then their evolutionary histories would be distinct. You might suppose that this difficulty could be avoided if intelligence were a necessary, but not a sufficient condition, for language. But "language," he tells us, "is a specific instinct, not just the clever solution to a problem thought up by a generally brainy species." (1994, 45)

The evolutionary development of language is essential to Pinker's claim that there is a language instinct. Essential to the evolutionary account is the existence of something organic that can evolve. There is overwhelming evidence that the brain is the seat of linguistic competence. What remains to be explained is the mechanism that would justify the claim that the capacity is innate, rather than acquired. If the language instinct is independent of intelligence, then the mechanisms that explain them should be independent too. But Pinker does not make it clear that this is the case.

The mechanism that Pinker introduces in *The Language Instinct* is the ideal digital computer, a Turing machine. But he introduces it to explain how thinking (intelligence?) may occur in the absence of natural language. Having described several examples of behavior that indicate thinking in monkeys, infant and adult humans, Pinker asks, "What sense, then, can we make of the suggestion that images, numbers, kinship relations, or logic can be represented in the brain without being couched in words?" (1994, 73) He answers his own question by saying that, "Turing described a hypothetical machine that could be said to engage in reasoning.... By looking at how a Turing machine works, we can get a grasp of what it would mean for a human mind to think in mentalese as opposed to English." (1994, 73) Here the line between language and thought is certainly not very clear.

Looking at Pinker's later accounts does not help much. In *Words and Rules* (1999) he moves from a digital to a qualified connectionist model. "No one doubts that language is computed by networks of neurons in the brain," according to Pinker.

> Rules—even the pristine, logic-like rules of Chomsky and Halle—are intendedas high-level descriptions of processes or structures that are implemented in some ways in neural circuitry. (1999, 104) Regular inflection... is computed by a mental operation that does not need access to the contents of memory, namely, a symbol-processing operation or rule, which applies to any instance of the symbol 'verb.' (1999, 119)

A purely connectionist account would replace rules with regular association, and open the way for the claim that language is acquired rather than innate. Pinker concedes that irregular inflections are based on association, but a major part of language still depends on hardwiring that justifies the claim that there is a "instinct" underlying Universal Grammar.

To the extent that a connectionist network responds to regularities in its input by regularities in its output, it could learn in any environment. Differences in the number and arrangement of connections would lead to differences in output even though the input was the same. This model would support the linguistic relativism that Pinker rejects.

Pinker maintains that at least some of the regularities must be caused by already existing connections determined genetically. The pre-existing connections would instantiate a rule that could then be said to evolve as the neurons do. This is a compromise with relativism, as Pinker acknowledges. "If the modified words-and-rules theory is correct, it would have a pleasing implication for the centuries-old debate between associationism and rationalism: Both theories are right, but they are right about different parts of the mind." (1999, 119)

So far we have seen that the claim that human language is instinctual leads to the conclusion that linguistic determinism rejected at the level of this planet would recur if there is life elsewhere, so the NASA plaque is futile. We have seen also that separating language from intelligence leads to difficulties, and that Pinker in his more recent work allows some role to culture.

One last point may be made more briefly. Pinker's commitment to evolution also commits him to something like NASA's positivistic view of science and so further diminishes the explanatory power of the instinct hypothesis.

Pinker takes for granted the semantic connection of word to object. His explanation of the logic of thought begins with the claim that "The first key idea is a *representation* (emphasis in original): a physical object whose parts and arrangement correspond piece for piece to some set of ideas or facts." (1994, 74-75) How does something completely arbitrary come to "represent" something entirely different? (This problem is central to the question of the plaque. Why should our arbitrary signs represent anything to beings who did not memorize

the connection between sign and object, or who do not use our Universal Grammar?)

Pinker does give the problem some attention, but mostly to dismiss it. He pokes fun at Quine's famous "gavagai" example that was intended to explain the difficulties of ostensive definition. Pinker tell us that,

> It is an example of a more general problem that Quine calls "the scandal of induction," which applies to scientists and children alike: how can they be so successful at observing a finite set of events and making some correct generalization about all future events of that sort, rejecting an infinite number of false generalizations that are also consistent with the original observations.
>
> We all get away with induction because we are not open-minded logicians but happily blinkered humans, innately constrained to make only certain kinds of guesses—the probably correct kinds—about how the world and its occupants work....
>
> In an important sense, there really are things and kinds of things and actions out there in the world, and our mind is designed to find them and label them with words. The important sense is Darwin's. (1994, 153-4)

Scientists and children make inductions that are ultimately guaranteed by natural selection. In *How the Mind Works*, Pinker says flat out that there are independently existing natural classes that justify our use of general terms. "The world is sculpted and sorted by laws that science and mathematics aim to discover." (1997, 308) This is scientific realism strong enough to please any NASA representative. If the mentalese is an evolutionary development— the successful response to an environment that is governed by the same laws that operate everywhere, then Universal Grammar will have its analogue at some level in any symbol system successfully (truly?) representing it. The Pioneer plaque is, therefore, a perfectly reasonable first effort at communication with extraterrestrial, if they exist.

What suffers is the explanatory power of the language instinct. The existence of a Universal Grammar no more makes it possible to deduce an actual natural language than does the existence of symbolic logic. Given the empirical data, including the natural language, we may reason to the best explanation. Among the possible explanations is a language instinct, but if we assume the validity of science, as we must if we are to employ evolutionary theory, the existence of a language instinct is of only local interest. It may account for our use of language, but it clearly does not account for the possibility of language. Unless, of course, the anti-plaque people are correct. Then it's up for grabs.

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