

Has Chomsky been blown out of the water?

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The word on the street is that the linguistics of Noam Chomsky has been discredited. An article in *Scientific American*,¹ a popular book by Tom Wolfe,² and a flurry of other magazine articles and web postings are telling us Chomsky is passé.

What exactly was discredited? Mainly item 2 in the following outline. Chomsky's specialty is syntax, sentence structure in human language. He has given the world three main things:

1. Mechanisms to describe sentence structure precisely
 - a. Tree structure
 - b. Transformations to turn one tree structure into another
2. Claims about universal grammar
 - a. The basic principles of grammar are the same in all languages
 - b. Children learning a particular language only learn vocabulary and "parameters"
 - c. This is how they are able to learn to talk quickly from incomplete evidence
3. A unique brand of left-wing politics
 - a. Not connected with linguistics
 - b. Ignored by most linguists

Politics and personal loyalty

Let's deal with items 1 and 3 first. About Chomsky's left-wing politics I have little to say. Like most linguists, I haven't paid much attention to it. (I don't hear good things about it from political scientists.) Chomsky says his politics is not connected with his linguistics, and I believe him.

¹ Paul Ibbotson and Michael Tomasello, "Evidence Rebuts Chomsky's Theory of Language Learning," *Scientific American*, published online September 6, 2016, at <http://www.scientificamerican.com/article/evidence-rebuts-chomsky-s-theory-of-language-learning/>.

² *The Kingdom of Speech*, Little, Brown & Co., 2016.

And that raises a bigger point. What does it mean to be “Chomskyan”? This is science, not a personality cult or cultural fad. The popular press has somehow gotten the idea that all linguists are required or pressured to “follow Chomsky.” I have never felt any pressure to agree with Chomsky. In fact, he has been attracting serious dissent from his closest colleagues for his entire career. Every serious researcher has proposals for major changes to the theory.

What is pervasive is the expectation that other linguists will investigate questions that Chomsky raised, whether to prove him right, prove him wrong, or follow the evidence in some other direction entirely. That’s how science is done. This expectation is warranted because Chomsky has raised undeniably important questions.

Transformational grammar

Chomsky’s first major contribution to linguistics was item 1 in the outline, mechanisms to describe syntax precisely. Before he came on the scene, linguists widely accepted the behaviorist dictum that science can only refer to observed behavior. Some took this so far as to forbid that the study of meaning (which is only observable within the mind), which greatly impeded the study of sentence structure. Chomsky argued cogently that abstract models are as appropriate in linguistics as in physics. He allowed syntactic theory to be abstract enough to do its job.

Besides the tree structures that are now familiar, Chomsky introduced transformations, which are rules that turn one tree structure into another. At first these were used to turn one kind of sentence into another, such as declaratives into questions. They made the grammar more concise; after you accounted for one kind of sentence, the transformation gave you another kind of sentence with no extra work.

Very soon, transformations took on a different function, to build observed sentences from more abstract structures that are not observed. This made it possible to simplify the grammar and make it more general.

Transformations are not operations performed by the brain. Chomsky does not claim that the human mind constructs a sentence by building the “deep” (untransformed) structure and then performing the transformations. No; transformations are just statements of structural regularities. If they were actual mental operations, that would imply that we speak by deciding to utter a sentence, and then deducing how to pronounce it and what it means!

Simply by describing syntax precisely, linguists were led to important discoveries. An example is the Ross Constraints, a set of rules of English grammar discovered by J. R. Ross in 1967, and never previously noted in grammar books, even though they are strict and prominent. Here is an example of a Ross constraint:

You saw a duck with a goose.

What did you see a duck with?

You saw a duck and a goose.

What did you see a duck and? (Ungrammatical.)

The fourth sentence is ungrammatical because nouns joined by *and* cannot be questioned – Ross’s Coordinate Structure Constraint.

Ross constraints were, for many linguists, the first inkling that we still had more to discover about the grammar even of English; we weren’t just using trees and transformations to restate what we already knew. A cascade of discoveries ensued, as well as reorganization of transformational grammar to include constraints on transformations.

Universal grammar

Chomsky’s most famous claim, however, is item 2 in the outline. He proposed that the principles of grammar are the same in all languages; the brain is pre-programmed for universal grammar. To learn a particular language, all you have to learn is the vocabulary and a set of “parameters” that establish how the grammar rules play out in that particular language. That is how children manage to learn to talk so quickly and efficiently, without being taught, from hearing incomplete examples of speech.

Universal grammar is what is being deeply questioned nowadays. The questioning comes from several sources.

The first is greater awareness of the diversity of human languages, and especially the discovery by Daniel Everett of a Brazilian indigenous language, Pirahã, that apparently has no subordinate clauses, and thus lacks Chomsky’s most important sentence-forming mechanism. Much earlier, the extremely variable word order of the Australian aboriginal language Warlpiri gave linguists pause; the usual mechanisms don’t seem to work there. Even if these languages are rare cases, they still are spoken by human beings, and if there is universal grammar, it must apply to them.

The second is advances in cognitive psychology. Back in 1957, there was almost no cognitive psychology. Chomsky was rebelling against Skinnerian behaviorism. Most psychologists at the time advocated an impossibly simple theory of how the mind works. Against that backdrop, he had to postulate inborn universal grammar in order to do everything that simple stimulus-response associations couldn’t do. Nowadays we know that the human mind has complex, powerful, abstract capabilities in many areas, not just language, and new possibilities are opening up for explaining language from general mechanisms of thinking and learning.

The third factor is the increasing use of data-driven methods in computational linguistics, spilling over to the study of language in general. Suppose there are no rules of grammar. Suppose instead that the main thing we learn is vocabulary, along with the ability to

generalize about how words are used. When we hear a sentence, we ask ourselves, “What have I heard that resembles this?” and understand it based on prior examples.

In a data-driven approach, structure arises because sentences obviously consist of parts that can be recognized before recognizing the whole. Categories like “noun” and “verb” arise naturally because we have to lump uncommon words together: “I haven’t heard this word very many times, but it looks like it’s used the same way as this other one...” This predicts that the grammar of uncommon words will be simple and regular, but common words will have more quirks because we have more examples from which to learn them. That is exactly what we observe in language, and it’s a source of great clutter in a grammar constructed on Chomskyan principles. However, data-driven computer programs to analyze language work well.

So what’s left?

It would be premature to conclude that universal grammar has been proven not to exist. It is not even undisputed that Pirahã lacks subordinate clauses. What is certain is that nobody has worked out cognitive explanations for all of syntax, nor captured all of it with a data-driven approach. For example, it is hard to imagine how the Ross constraints would emerge from either general cognition or data aggregation.

But universal grammar has lost some credibility. Suppose the whole notion is eventually abandoned. What will be left?

First, syntax is still real. Sentences still have definite structures – they could hardly have definite meanings without it – and the structures can be intricate. So the study of the mechanisms of syntax is not going away.

Second, psycholinguistics is going to be big business. As theoretical linguistics links up with psychology, there will be plenty of work to do on how the brain processes language. A sore spot with psychologists for a long time has been that transformational grammar is only an account of *what* the brain does, not *how* it does it. Nowadays, many linguists have the same concern.

Third, opportunities to discover more about language are continuing to open out before us. Collection and analysis of data have become easier than ever before. Where fifty years ago, a research paper might just contain one linguist’s observations, nowadays research normally involves computer-aided study of huge sets of examples of language in use. (Want a million examples of how a word is used in English? Google it.) Linguistics is increasingly empirical, and that’s a good thing.

In short, Chomskyanism may be on the wane, but linguistics is not, and the study of syntax is not. There is no reason to expect the hypotheses of the 1960s to endure forever, and change should not surprise us.

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