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The Novelty of Chomsky's Theories

By Joseph Agassi,

Tel-Aviv University and York University, Toronto

Summary and conclusions

As a new field, cognitivism began with the total rejection of the old, traditional views of language acquisition and of learning — individual and collective alike. Chomsky was one of the pioneers in this respect, yet he clouds issues by excessive claims for his originality and by not allowing the beginner in the art of the acquisition of language the use of learning by making hypotheses and testing them, though he acknowledges that researchers, himself included, do use this method.

The most important novelty of Chomsky's work is his idealization of the field by postulating the existence of the ideal speaker-hearer and his suggestion that the hidden structure of sentences is revealed by studying together all sentences that are logically equivalent to each other. This is progress, but his tests of equivalence are insufficient, as they all are within classical logic. This limitation rests on the greatest shortcoming of Chomsky's view, his idea that every sentence has one subject or subject-part, contrary to the claim of Frege and Russell that assertions involving relations (with two-place predicates) are structurally different from those involving properties (with one-place predicates). (See the Appendix below.)

Background Items to Ignore

The field to which the present study is devoted is cognitive science or cognitive research, or cognitive psychology — cognitivism for short. It is a new discipline, but

as a field of activity it is at least as old as psychology. Modern psychology began by following the precepts of the traditional British empiricists, who found it advisable to procure empirical information about the process of acquisition of knowledge, so as to boost their theory that the process of acquisition of knowledge is empirical. Yet their theory of learning, by having as input evidence of the senses and theories as output — as well as by their theory of learning as constant conjunction (associationism) — make the modern computer an ideal learning machine. And so the program of Artificial Intelligence (AI) evolved, traditional or connectionist, also known at times as computationism, the program of creating machines that can acquire language as well as new scientific knowledge. This program has blocked the way of the progress of cognitive research. This needs stressing. Cognitivism impinges on different disciplines, including, of course, the philosophy of science and linguistics, as the acquisition of language and of science belong there. But the relations between cognitive science and artificial intelligence differ from its relation with other fields, such as linguistics and the philosophy of science: cognitivism shares both concern and theories with other disciplines, but it competes with artificial intelligence on basics or the rules of research. The rise of cognitivism as a discipline is rooted in a rejection of traditional British empiricism. The antecedents of cognitivism in psychology are the two schools initiated by Oswald Külpe, the Würzburg and the Gestalt schools, as well as Jean Piaget and his associates. In the philosophy of science it is the Würzburgian Karl Popper whose lifework is the critique of traditional British empiricism and its modern offshoots — conventionalism and inductivism (or inductive logic so-called). In linguistics no one has done more in this direction than Noam Chomsky, who criticized inductivism, associationism, and the

view that computers of the kind already available, though more powerful, can acquire a language.

I find it hard to write on Chomsky, since I have very mixed feelings about his output. I find his sales techniques unattractive and distracting, and I appreciate his contributions after I manage to overlook his oft exaggerated claims for them. In addition, I should say at once, my appreciation of his idea does not bespeak agreement: to identify assent with approval is narcissist, and, conversely, to identify dissent with disapproval is defensive. So let me say a few words on his sales techniques that I wish to ignore and proceed to his contributions.

Almost all studies on linguistics face a great initial difficulty that prevents any criticism of them serving any useful purpose; and overcoming it requires a radical reconsideration. It is this. The field is vast, and its students who follow the methodological prescriptions of traditional British empiricism — inductivism — can hardly avoid getting lost in details. They hope that salvation will come from the increase, not the reduction, of the number of data to examine before fruitful examination can begin; moreover, they rightly see nothing short of prejudice in all and any attempt to manage by the initial concentration on any part of the field. The tenacity of these researchers deserves great admiration, but it blocks the ability to theorize in an orderly, critical manner. Those inductivists who do arrive at a theory simply do not follow their own prescriptions, and so their works tend to be methodologically murky. In some researches this does not matter overmuch; in contemporary linguistics it does, no less than in cognitivism, if not more.

Arch anti-inductivist Sir Karl Popper says that the choice of an approach to problems does not matter at all, that anyone who ventures any hypothesis on any question, provided it is at all open to critical examination, will do well to suggest

conjectures and attempt to criticize them, and let the chips fall where they may. This attitude is not specific to Popper, of course: it is traditional enough to have a traditional name: It is called "hypothetico-deductivism". I do not know if Popper is right, and I have ventured to criticize him. Here my point is that the debates between linguists cannot even begin without settling the methodological debate, and then inductivism is simply out of the debate. Here, as an exception, let me endorse Chomsky's critique of inductivism, especially of its classical, associationist variant, as imposing non-theorizing, as at best permitting mere taxonomy, mere classification.

So much for the initial difficulty, which is greater than one may notice on a first impression: whereas the inductivists share the merit of being consistent, some contributors to the field are both inductivists and hypothetico-deductivists. No smaller a figure than Quine has endorsed Popper's hypothetico-deductivism without having withdrawn his famous allegiance to B. F. Skinner, whose operant conditioning theory is a version of inductivism, of course. I do not know how to approach this matter; when possible, I tend to ignore an author's sliding from hypothetico-deductivism to inductivism, but with the writings of such writers on linguistics as Jaakko Hintikka, I do not know how to do it.¹

For my part I do not wish to contradict what Popper said on this score; I think he was in two minds, however, as to the following question, that is central to this discussion, which I will present while borrowing Einstein's terminology and his frankly metaphysical approach: what is a better strategy, to attack problems as the spirit moves one, or to offer some strategy or a program proper? The matter, I suggest, is decided largely, though not completely, by the facts of the matter: diverse hypothetico-deductivists have no clear research programs; yet if they belong to

different schools, they follow different programs. Regrettably, often the different programs are manifest in practice, hardly in different statements.

To give an example, before Chomsky, linguists seldom used inferences to elucidate the structure of a sentence. Chomsky repeatedly claims that the surface structure of a sentence is misleading, that it has a deep structure, and he proves it by showing that in two different senses the sentence is logically equivalent to two different sentences possessing quite different structures. And as logical equivalence of two sentences involves merely inferences with one premise, this is the kind of inference Chomsky regularly employs. At times even expressions are so treated, like the famous "the shooting of the hunter" that may be describe an event in which the hunter is active but also an event in which the same person is passive, and then, I presume, readers can choose any sentence they like for the purpose of the Chomskyan exercise. They can take this phrase as the subject of a sentence and then it cha be in active or in passive mood, and it can be taken as an object, and the verb will help understanding of the phrase. This is a nice example, as it collapses many examples into one — all those which employ the phrase in question. Very seldom does a linguist, especially Chomsky, employ inferences with more than one premise. This is essential for the structure of relational sentences. consider the inference with three sentences: as premises take a , "Tom and Dick are brothers" and b "Dick and Harry are brothers"; as a conclusion take c "Tom and Harry are brothers" This inference can be analyzed either as an inference between categorical sentences, where being a brother is understood in the sense of being monks, where it is valid as it stands, and as an inference between relational sentences, where the inference is allowed in the light of the sentence "a brother's brother is a brother", which holds for the relation of siblinghood but not for all relations, for example, not for the relation

of friendship. Since such inferences are not usually employed in the linguistic literature, I do not know how to handle the situation. In particular, I do not know how Chomsky's theory of the subject part and the predicate part of a sentence applies differently to cases where two subject sentences can be reduced to two one-subject sentences and to cases where this reduction is unavailable. There is, of course, a whole logic of relations and its significance for mathematics was never contested, but I do not know what Chomsky — or others — would say of the matter. Perhaps their strategy is simply to leave relations alone for a while, and this may be wise. But if so, then not saying so out loud is unwise — though it may well be good public relations, I cannot tell.²

An enormous amount of material left unstudied, and this is quite legitimate, but in deference to public relations this is done silently and so uncritically, and this is a pity. For example, we might expect the translation of two equivalent sentences from two languages, each to its deep form, and to show the identity of the deep grammar in both, since Chomsky's chief thesis is that deep grammar is the one and same for all languages. There is no such study, not even one comparing two Indo-European languages, let alone English and Chinese. Chomsky regularly advertises his ideas while glossing over such difficulties. He totally overlooks problematic aspects of the situation instead of noting them and declaring his policy to leave them unattended for a while. This is a perfectly legitimate policy, but it looks less brilliant to those who are not indoctrinated. Thus, he entirely ignores the question, how does a pre-verbal infant select input from the verbal environment, even though he notes, as he should, that according to his general schema, such a selection is essential for language acquisition. He argues also too slickly, overlooking obvious objections to his arguments. Thus, he supports a major aspect of his theory, the claim that

language-acquisition is not inductive, with the observation that infants acquire perfect knowledge from imperfect and partial input. This is objectionable: infants do not possess perfect control over any language; no one does; the perfect speaker of Chomsky's theory is an ideal speaker-hearer. Idealization is commendable, and it is well within the scientific tradition ever since Galileo instituted it. Yet it always has a price to pay, and Galileo stressed this. For example, Galileo's own idealization, the one that ignores friction when describing the effects of gravity, is refuted by the fall of a feather or a parachute, and by the flight of birds and gliders. It is therefore not surprising that, however admired it was, it was both corrected and supplemented with a theory of air friction. I will not dwell on this point, but merely notice that the correction, due to Newton, is also idealized, and both the original and the corrected version can be improved by the addition of friction factors. Not only the idealization has its costs; also the correction does: the addition of the correction due to friction, even if correct, adds to complication and makes the theory at times too cumbersome. I stress all this in order to say that I do not object to Chomsky's idealization, merely to his glossing over the loss it incurs when arguing against opponents, thus giving the impression that much more has been accomplished than the facts warrant.

The pity of it is that Chomsky has contributed something to the idealization that invites appreciation. The idealization is due to Saussure, of course, and Chomsky does full justice to him. He also has converted the distinction between language and speech to the ideal and the real language user (or speaker-hearer). Now the use of an ideal language differs from it: languages are ideal to begin with, in the sense that they are abstract entities, yet the ideal language use (or user) is concrete but minus some characteristics; the streamlined concrete is still not so abstract as to be totally unobservable. For example, Galileo's theory of gravity is a description of concrete

motions and so experiments that are streamlined (feathers falling in a vacuum tube) will fit better. Similarly with speakers: they behave within the bounds of a given language, no matter how these bounds are drawn, so that they may be identified as ones who speak faultlessly. They are then less idealized as ones who speak faultlessly a given dialect of a language than as ones who speak it faultlessly across the board. Hence, we can decide how much of reality we wish to iron out in the process of idealization. I stress this, as Chomsky does not: observations that ideal language user report are problematic, and so are the observations made that student of language make concerning the verbal conduct of ideal language users — more problematic than the observations of frictionless free fall. The advantage of the ideal language user over language, therefore, is not noticeable without notice of the problematic character of this advantage. Hence, sales talk too is both profitable and costly. Unless we discuss this openly we do not know if sales-talk pays.

Chomsky advertises ideas not only by presenting his own ideas in a superior light but also by presenting his opponents' ideas in an inferior light. Consider his critique of the view that sentence formation proceeds not linearly, since there are, for example, nested sentences. Surely, no one ever said that all sentences are constructed linearly, and everyone knows that some sentences are so constructed, since we often say half a sentence without knowing as yet how we will construct the second half. What was presented is information theory, and information theory, as it handles signs, not symbols, cannot consider such things as nested sentences, and it was then judged natural for it to take strings of signs linearly, though later on, with the rise of needs to select described portions from tremendously long strings, random approaches were introduced as well. Information theorists showed, in the early days of the subject, how surprisingly easy it is to generate linearly strings of signs that

resemble to us some written texts full of misprints, if certain probability distributions and dependences are built into the algorithm for the generation of these strings. As such this is uncontested, and it was never presented as a description of any aspect of any natural language.

Chomsky did a similar thing when he criticized the linguistic theories of the Vienna Circle. It is very hard for me to criticize him on that account since I appreciate his ideas and do not appreciate theirs. Yet the fact is, he was unjust to them. They developed a program of constructing artificial languages by developing syntax first and semantics after; that is, by making first rules of sentence formation, rules by which to generate well-formed formulas, and of sign transformation, and only then giving to signs and sentences meanings and truth values. Surely this is cockeyed and was meant as an abstract exercise, not as anything resembling anything natural. More than that, it is even in the abstract most distasteful, since the rule for sign transformation include rules of inference and without prior attention to semantics these rules will never become semantically acceptable. The uselessness of the exercise of starting with syntax and only then adding semantics is easily revealed by the absence of any syntactical ground for the endorsement of the *modus ponens* or the rule that all well-formed formulas are admitted into any inconsistent set (that is, any set which includes or admits any formula of the form "*a-and-not-a*", where "*a*" is any well-formed formula). Yet Chomsky has criticized this program, and from observations of natural languages, which are, of course, *ab initio* not too relevant to the exercise.³

The criticism itself is very amusing; it has done much to popularize Chomsky. It is the observation of syntactic ambiguity: we do not first listen to the syntax of a sentence and then to its semantics but at times decide its semantics and then decide

on its syntax. It sounds odd, since it is the case of the chicken and the egg: we need both. But Chomsky offers examples. The funniest and best known example, I do not know who has invented it, is the famous sentence "time flies like an arrow" where the first word "time", may be a noun, as most people will at once suppose, but it may be an adjective qualifying the noun "flies", thereby offering us a compound noun "time flies" akin to the compound noun "fruit flies" while rendering the preposition "like" into a verb. And, finally, the word "time" may be a verb in the imperative mood, to make the sentence mean the request to time flies the way one times arrows. (No, we do not know how to time arrows; this is exactly why we ignore the option of reading the sentence as an imperative.)

Why is this exercise so special? After all, ambiguity abounds. The answer is that this is a syntactic ambiguity, cleared by semantics, contrary to the Vienna Circle's claim that the road to semantics is via a complete syntax. Except that they never said this, and, indeed, they must have been familiar with syntactic ambiguity, since many of them had classic education and so were familiar enough with Latin: it has them in much greater an abundance and they are more conspicuous as it is a foreign language.

The place of Idealization in Science

This is not to dismiss Chomsky's criticism. As every abstraction, every idealization, has its price, we remember, it is undertaken in the hope that the cost is outweighed by the benefit. Hence, the question is, what is the benefit of the abstractions attempted by the Vienna Circle? The answer is that the benefit was entirely philosophical, not impinging in any way on reality, and so it is barren, and so it is better not undertaken. I think Rudolf Carnap, the philosopher whose name was most closely associated with the program attacked by Chomsky, died upholding it and hoping to see what he

deemed its benefits. He said, he still hoped that an artificial language will one day be constructed, in which no metaphysical utterance can be well formed. This program is defunct on many grounds, most relevant to us today is the Sapir-Whorf hypothesis, since Chomsky has said the last word on it.⁴ I think the program was finally rejected as useless by Carl G. Hempel, perhaps the last of the Vienna Circle, though he denied that, saying at the time he was too young to fit that epithet. I am not able to say this definitely, as I am never clear about what Hempel says and what he only suggests as a passing thought, and he did say, after Herbert Simon and his associates have published their program BACON that there is a need now to reconsider the standard objection to inductivism from the claim that ideas do not emerge from factual information. In any case, even if Hempel's remark was only made in passing, it enhances Chomsky's critique. But to see that one has to go into more detail than Chomsky has, and so his critique looks more brilliant than it is. But then brilliance is often a matter of salesmanship.

Even apart from its being a critique, Chomsky's observations on syntactic ambiguities are brilliant. The reason is that syntactic ambiguities have many aspects; whereas generally they stare us in the face, demanding to be removed, and are removed unthinkingly, in the usual Chomskyan literature they are not noticed until shown. Why then show them? Because they indicate the way the human mind works unthinkingly in efforts to make sense of what is said: the whole context in which a sentence is uttered may contribute to its comprehension. This explains the notorious fact that quoting out of context may always distort. This is a standard mode of complaint by which people attempt to evade the charge that they had said something they should not have said. Hence, the complaint is always possibly true but not always true. If Quine's hypothesis is true that there are never any fully adequate

translations and paraphrasing, then perhaps all such complaints are *a priori* true. Nevertheless, somehow, grammarians have seldom paid attention to all of this. Perhaps they simply did not know what to do with this, and they may feel vindicated in their oversight of this fact, as their task is to discuss forms, not contents. What role does syntactic ambiguity have in Chomsky's system other than as a criticism of the Vienna Circle?

The funny fact is that Chomsky himself did endorse the view that syntax precedes semantics. He did so because he thought he was obliged to assert that grammar is inborn — “deep grammar” he called it — but he did not wish to assert the existence of inborn knowledge: deep grammar is inborn competence, the very ability to speak. Translated to jargon this means, syntax is inborn but not semantics. What, then, did he do about syntactic ambiguity? He postulated that syntactic ambiguity is of common or garden syntax, not of the inborn one. The inborn one, I understand him to say, differs from the common one in that it is crystal clear. He had to distinguish between the two anyhow, since, naturally, the syntactic characteristics of observed languages differ, but the inborn syntax is one, as human nature is one. Hence, common language is sanctified by its very existence, whereas the hidden, inborn language is sanctified by its being indispensable for the evolution of common language. Unfortunately, this Chomskyan argument will not do — not even for deep grammar. It is clear that when the syntax is turned into a semantics the verbal transformations syntactically sanctified must also be inferences semantically sanctified: they must be truth preserving. Inevitably, this renders syntax semantically informative. Chomsky has not started grappling with this difficulty. An alternative to Chomsky's approach does exist, which avoids the difficulties he wishes to avoid without his deep grammar.

The first to have noted this is William Fowler, the author of the celebrated *Modern English Usage*, where the dictum is reaffirmed, that usage sanctifies use. This dictum has already been stated in the eighteenth century — by Dr. Samuel Johnson in the Preface of his classical *Dictionary* and by Dr. Joseph Priestley. Except that they did not know how to handle the problem involved with this dictum, which is, indeed, quite problematic: there are many usages, and we do observe incorrect ones, so that the question is, how do we distinguish the correct use observed from the incorrect ones also observed? Dr. Johnson spoke then of good taste, which is question-begging. Fowler appealed to comprehensibility: if it is comprehended then it is correct; it thereby even appeals to good taste, he added.

The test-case for Fowler's dictum is a new rule, and I think it was he who has discovered it: the rule of deletion. I do not know if Chomsky notices Fowler, but I will not enter matters of priority here. Suffice it to say that here, too, Chomsky uses an idea in a remarkably far-reaching manner, claiming that it is necessary to reconstruct and reinsert the omitted articles of speech in a sentence before it can be properly analyzed.

There is one more preliminary item to make before I can come to my point. It is Chomsky's review of B. F. Skinner's *Verbal Behavior*, which is deemed by many to be his — Chomsky's — most brilliant piece. As a public relations ploy it certainly did much to enhance Chomsky's reputation, but my concern is with matter: I am mentioning Chomsky's salesmanship only in order to put it out of the way and attend to the matter at hand. Chomsky's critique of Skinner is in part so impressive because it is not clear that the competition is here between two research programs.⁵ Thus, the question was, which of the two is more promising? I think it no longer is the question: after Karl Popper has demolished the very idea of induction in general and

after Konrad Lorenz has demolished the very idea of operant conditioning in particular, and after Quine's attempt to apply it to language acquisition has proved barren, it is now reasonably agreed that Chomsky's program was the more promising.⁶

This is not how things were understood at the time. At the time the common sentiment was expressed by careful Bar-Hillel, I think, who understood the review to proclaim a disproof of Skinner's theory, not the rejection of his program. Incidentally, Bar-Hillel thought, erroneously, that the claim is correct and the disproof valid. The chief characteristic of Skinner's program was to avoid speculations about the mental processes that go on inside one's skull. Since he is taken to be a materialist, and quite rightly so, readers regularly overlook that his research project is indifferent to the matter of the brain-mind interaction. Here, let me stress, Chomsky is exactly in the same boat. He too is a materialist, and he too nonetheless, and with full justice, presents a program indifferent to the matter of the brain-mind interaction. The salient difference between Skinner and Chomsky is this: Skinner was an inductivist and he identified learning by induction with operant conditioning. Chomsky rejects all operant conditioning and has a different theory of learning altogether. What is it? Does he agree with Skinner that humans and other animals learn the same way? Is his theory of learning one's first language the same as his theory of learning? I do not know, and take these to deserve investigations.

Significant Background Items

Chomsky stresses that from David Hume to B. F. Skinner, classical empiricist learning theory does not distinguish between the learning process of human and of other animals. He denies this and takes his cue from the all too obvious fact that only humans possess abstract language. This is a bit ambiguous. Of the various species

that are capable of learning, each exhibits different learning capacities. There are tasks that a dog can learn and a horse cannot, and *vice versa*. This may but need not answer the question, are their learning processes alike or not? Hume and Skinner say, yes, and so they are not disturbed by the fact that only humans can acquire abstract language. How does Chomsky stand on this issue?

Chomsky has stressed the difference between *a priori* knowledge and innate dispositions, innate capacities, including the capacity to learn. Unlike Wittgenstein and some of his followers, Chomsky does not identify knowledge with dispositions to act. Yet he refuses to assume that the inborn knowledge is knowledge of facts, since this would land him in the same problems and *impasses* that befell Kant's system. The difference between nativism and *a priorism*, Cartesian or Kantian, can best be described by a metaphor: we want the human mind to be as programmable as possible, with as much capacity for memory as possible, but born with as little programs as possible. Of course, some inborn programs are essential. So the question is, what is the initial program needed for humans to be able to acquire a language? Initially Chomsky said, the whole of grammar and the whole capacity to acquire language must be inborn. Later he said, if a human infant is able to learn one item and use this to increase its learning capacity, then that will do. But, evidently, humans are able to react to some speech by speech. Dogs, too, are born with the disposition to react to animal speech, and they can learn to react to human speech, but their reaction to speech is not speech. Why?

It is the greatest compliment to Chomsky that he has effected such a radical change on this matter: this question was asked long ago, already by La Mettrie; but traditionally it was not taken seriously — at least in the sense that it led no one to empirical research. Under Chomsky's influence such a study was conducted, and,

indeed, one of the animals on which the experiment was conducted was a chimpanzee called Chimsky. The experiment was conducted to test the hypothesis that the limitations on the apes was not in respect to their learning capacity but rather to their performance capacity. When they were given artificial means by which to use abstract language, the claim is that they were able to speak. This is controversial, of course, and it also does not help solve the question but forces us to restate it in gradual terms rather than in black and white: not, do other animals possess the capacity to acquire an abstract language? but, the abstract language that they can learn, how can it be?

I do not wish to make my appreciation seem assent. In particular, I think the fear that ascribing to humans inborn knowledge will land us in traditional philosophical problems is an error. Today we speak freely of the inborn knowledge of different animals, without pretence that calling this knowledge instinctive solves any problem. For, the inborn knowledge is not necessarily true; it is merely sufficiently close to the truth for its possessor to survive. This idea of knowledge differs from the classical idea of knowledge in two important aspects. First, some animals are able to modify their knowledge in the light of new experience. Second, human knowledge is conceptual. The idea that there is inborn knowledge capable of correction is more in line with what Chomsky wants his theory to do than his own suggestions. His first suggestion was unbelievably strong: newborn humans have inborn syntax that totally captures the deep syntax of all (natural?) human languages as well as the full language acquisition apparatus. Later he reduced the amount required for newly born, not out of empirical criticism but out of the recognition that the assumption is stronger than logic requires.

The idea that newly born humans are born with the complete verbal apparatus, like brand new computers, seems to be very much in accord with the imprinting theory of learning of Heinorth and Lorenz. According to this hypothesis, the learning mechanism is unchangeable after birth but is dormant and must be triggered for it to be able to operate and acquire knowledge. Moreover, the items learned, the data, are also triggers. For example, a newly hatched bird of one species learns to identify its mother by sound, and the first sound triggers both the learning mechanism and the ability to identify the mother by the sound she emits. Another example, in another bird species the trigger for the same learning process is the sight of movement, and the same trigger leads to the identification of the moving object as the mother. The second example is a bit more complex, since the identification it presents is not necessarily the motion and can be the image of the moving object, possibly its color. One way or another, the important point about the knowledge thus accrued is that though it is evidently not inborn, the learning process it involves is not in accord with the classical empiricist theory. The great success it has is in its ability to account for the fact that at times learning is the result of one observation, and at times it is beyond reach no matter how many time facts present themselves: the process of learning by repetition, that is the classical idea of learning by induction and of learning in school, is a rare phenomenon.⁷

The imprinting theory is weak: it leaves no room for learning afresh. Lorenz asked the question, can animals relearn? He showed that they can, though with great effort and only when no choice was left but to learn or die. He did not know how to incorporate this into his theory of learning by imprinting. It is Chomsky's debt to Lorenz that has made him declare that one learns one's mother tongue best.

(However, bilingualism is a counter-example to this point. Even adults can become genuinely bilingual; and at times they do.)⁸

Perhaps Chomsky views language as a whole as inborn in the wish to agree with those philosophers who consider languages as wholes. No matter how much the view of language altered since 1900, when the "new logic" was forged; this was the basic idea behind the change. It is clear that Leibniz entertained the idea of a universal language. But he had no thought of natural languages as separate and distinguished from the universal one, and so he did not say, what Frege and Russell later suggested, namely that logic offers the structure of all human languages, the essence of language. This idea, that there is a single essence of language, has stayed with Chomsky to date; and he now uses the imprint theory with a vengeance: humans are born with a template, he says, that once triggered, creates in every normal child the whole of language in one go. It is the mother tongue. The mother tongue, however, is a highly idealized abstract idea. This is very troublesome. At the very least, it does not tell us what makes native speakers acquire a dialect but not a foreign tongue. Chomsky spent much effort in the attempt to demarcate dialect from foreign language. His venture could not possibly succeed, as he had no criterion of success here: his program did not cover this aspect of the problem-situation.

Thus, Chomsky's theory of language-acquisition is neither entirely new or entirely correct. Since, so far, Chomsky did not respond to my argument to that effect, I must leave things as the stand until he picks it up, or someone else from his entourage decides to do so.⁹

Appendix

Chomsky's technique of analyzing sentences in order to elicit their "deep" structures is too complex to present here in anything like a systematic manner. This however

may be noted here. First, it is amazing how much liberty he takes by merely choosing the (kinds of) sentences to analyze and omitting those he prefers not to deal with. (He often presents his choices in a critical mood, which is lovely, but they soon become paradigmatic, and without any explanation.)¹⁰ Second, his disciples and critics alike usually follow his choice of examples quite uncritically. Third, there is no discussion and no systematization of the (kinds of) sentences that he has chosen to analyze, much less how these reflect the vagaries of his speculations. (Often the implication is that there is so much to do that any item is welcome. This is too facile.)¹¹

Yet this much has to be admitted: he usually contrasts the structure of a sentence with that of another, nearly identical with it, so as to inform clearly that as far as it goes his analysis is not arbitrary.

A famous example is his contrast of the structures of two nearly identical sentences with a difference between them of the verbs "promise" and "persuade": compare "x promises y to do z" with "x persuades y to do z". Assuming the identity of structure of all simple sentences with one word for a subject and one for a predicate, one might tend to declare that the same holds for the sentences of the two forms cited, yet their difference in structure is made manifest by translating them to more explicit sentences that are taken to be semantically equivalent: "x promises y that x will do z" and "x persuades y that y will do z". I cannot discuss here the question, why are these two expanded sentence forms different, and why the extended ones but not the regular ones represent the deep structures? These questions are relatively easily answerable in relatively simple cases, and they are subsequently unjustly neglected, but here is not the place to elaborate on this matter. The point of this Appendix is rather to offer a more obvious analogue to this exercise, and one that Chomsky systematically overlooks, possibly because (correctly or not) it seems to

run contrary to his fundamental assumption that every sentence in a natural language is partitioned into a subject part and a predicate part.

Compare "x and y are suitors" with "x and y are lovers". The first sentence is equivalent to the conjunction of two sentences of the form "x is a suitor". Not so the second: the conjunction "x is a lover" and "y is a lover" will not suffice, as it does not yet inform us that the lover of x is identical with the lover of y (or even the weaker sentences "x has a lover" and "y has a lover" that follow from that identity). To make the situation more dazzling, take "x and y are brothers", where the classical analysis holds if "brother" means a member of a religious order, but not where it means a sibling — at least not according to Frege and Russell, whose starting point was that the structure of simple two-subject sentences radically differs from that of simple one-subject sentences or of a compound two-subject sentence: both of them postulated the existence of n-place predicates that are irreducible to one-place predicates and that sentences employing them have n subjects each. This was meant to reflect the essence of language, and so to represent any natural language (idealized) Thus, the conflict which Chomsky has with Frege and Russell is clear-cut, yet he avoids mention of it.

(Semantically, for a symmetric relation R, "xRy" is synonymous with "yRx", whereas for an anti-symmetric R "xRy" is synonymous with "ySx", where S is the inverse of R. Chomsky cannot avoid making regularly use of this trivial part of the logic of relations. What he overlooks is that this renders both x and y the equally legitimate subjects of the two sentences — "xRy" and "yRx" in the symmetric case and "xRy" and "ySx" in the anti-symmetric case — in the "deep" sense of the word as the word "deep" is he regularly employs it. Hence, "xRy" has two subjects.)

This, however, is not to deny that deep structure is different from the structures that Frege and Russell discussed. This is clear from the study of the reduction of two-place predicates to one-place ones: compare "x runs", "x eats" and "x eats y", all of which are quite well-formed (as is not under dispute); Frege and Russell would not say that intrinsically the one-place predicate "x eats" resembles more the two-place predicate "x eats y" than the one-place predicate "x runs", even though the one-place predicate "x eats" is definable by the use of the two place predicate "x eats y": by definition, "x eats" if and only if there exists a y such that "x eats y". As far as Frege and Russell are concerned, "x promises y to do z", as well as "x persuades y to do z", is simply a three-place predicate, and they left it at that. So Chomsky has a point in showing that the two are different. This, however, raises the question of the uniqueness of the deep structure. He never discussed this uniqueness, though he implicitly ascribes it to any sentence (and is so understood). Nor does he discuss the transition from one deep structure to another, as from "x eats y" to "x eats".

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Notes

¹ See note 6.

² It was Barbara Hall Partee who contrasted Yehoshua Bar-Hillel's suggestion to use the insight into formal logic in linguistics with Chomsky's rejection of this suggestion. See Partee, (1973), 309.

³ It is a common error to ascribe this idea to David Hilbert. Yet he offered to view extant mathematical systems as devoid of meaning in order to check them for consistency, a characteristic that is semantic, of course. Thus, neither the idea of the Vienna Circle nor of Chomsky pertain to it.

⁴ See Carnap, 1956. For Chomsky on the Sapir-Whorf hypothesis, see his introduction to Adam Schaff, 1973, where he says, the metaphysics implicit in language *à la* Sapir and Whorf is not obligatory. He offers a stunning example by applying an analysis akin to that of Whorf of the tenses in English and concludes that English has no future tense and this is why it takes recourse to an auxiliary verb.

⁵ I am not eager to defend Skinner's ideas, and will not dwell on them. But I invite anyone interested in the case, to compare Skinner's book (1957) with Chomsky's review of it (1959), and see that in Skinner is much more tentative and cognizant of the incompleteness of his ideas in that book than one would surmise from Chomsky's review.

⁶ As to Lorenz, clearly he was an inductivist. But never mind that: his imprinting theory is certainly non-inductivist. As to Quine, what is said here of him accords with the common reading of his works. I do not know if that reading is true. I have too little information about Quine's view of psychology, and the little I know puzzles me. He endorses Popper's view of science as refutable, however reluctantly. (See, for example, *The Philosophy of W.V. Quine*.) Yet he says we need to endorse behaviorism as all we have as empirical evidence is overt behavior. (See his "Indeterminacy Of Translation Again" *Journal of Philosophy* January, 1987.) Now all evidence, being public, must indeed be of overt behavior. This alone, without the theory of operant conditioning, does not amount to behaviorism, or else Popper is a behaviorist too.

⁷ The empiricist or inductivist characterization of the induction as the repetition that, they say, is used in scientific research, is so traditional that it is very hard to document it. Nor need one trouble oneself to do so. The strange fact is that the theory of learning is by repetition was denied by Sir Francis Bacon, the father of modern inductivism, who called it "induction by enumeration", denounced it emphatically as unsure and as childish. (See Bacon, 1620/1960, "*Distributio Operis*", paragraph 9, and Book I, Aphorisms. 69 and 105). Nevertheless, it was accepted — on the authority of Newton. One can, of course, rescue inductivism by calling another process induction. This way one can alter one's views without admission, and it has, to use Russell's immortal expression, all the advantage of theft over honest toil. To clinch matters, Jaakko Hintikka ascribes Popper's methodology to Newton and dismisses Popper's critique of Newton's inductivism as "without any force whatsoever". See Hintikka, 1992, p. 40. Perhaps this marks the end of an era, but it is also truly thought provoking.

⁸ See Agassi, (1976), 33-46.

⁹ For more details of my critique of Chomsky, see Agassi (1977), Chapter 2.

¹⁰ Chomsky apparently meets the problem of how to choose paradigms by demanding a universal grammar, which would render grammar independent of all paradigms. See Harris, (1993). In particular, see there, Index, Art., "Restrictiveness and Relational Grammar".

¹¹ See the previous note.