

# Early generative linguistics and empirical methodology

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## 1. Introduction

Early generative linguistics is here defined as the period from Noam Chomsky's first publication in 1953 to the end of the 1960s. During the formative years in the 1950s few others than Chomsky himself were active in developing transformational-generative theory. Therefore an analysis of the relation between early generative linguistics and corpus linguistics is largely a study of the development of Chomsky's methodological practices, especially of how he has used corpus observation methods, native speaker intuitions, and the linguist's own intuitions. Six main chronological phases are discernible: (i) Chomsky's earliest publications 1953-1955 where the seeds of generative grammar already are to be seen, (ii) his 1955 dissertation which contains the basic outline of generative syntax but was not published until 1975, (iii) the important publications from 1956 leading to *Syntactic Structures* 1957 and almost immediate widespread international attention, (iv) work by Chomsky and others now joining him in the period 1958-1964, making the theory more mature and introducing the first comprehensive grammar fragments, ultimately leading to (v) *Aspects of the Theory of Syntax* (1965), the full-blown version of what came to be called the Standard Theory; and finally, (vi) the late 1960s when the generative community was split and generative semantics appeared. Our focus in this overview is on syntax which has always been the central concern of generative linguistics.

When Chomsky entered the trade the immediate linguistic scene he saw was that of North American structuralism. Key conceptions of language and linguistics were reliance on corpora as the starting point of linguistic analysis, emphasis on description rather than on theory formulation, inductivistic discovery procedures, classification of elements, separation of levels in the grammar, insistence on biuniqueness of phonemic transcriptions, physicalistic concept formation, and non-mentalistic manifested especially as an aversion for semantics. When this approach was taken to its extremes, a grammar of a particular language was considered to be an inventory of elements (phonemes, morphemes, constructions, etc.), and linguistics was basically conceived as a classificatory type of scholarship.

In judging the data-acquisition methods of any (ordinary working or theoretical) grammarian, transformational-generative ones included, it is important to keep in mind that the following three types of phenomena are ontologically distinct: (i) language data in the form of sentences (utterances), (ii) the mentally represented competence of the native speaker-hearer, i.e. his/her grammatical intuitions (tacit knowledge of the language), and (iii) the spatio-temporal performance processes underlying his/her speaking and understanding. Language data (i) are accessible by observation, i.e. corpus work done for example by authors of comprehensive reference grammars, and elicitation, typically conducted by a field linguist working with an informant, both backed up by introspection in order to ensure that the language specimens so obtained are indeed

grammatical. Competence (ii) is accessible by introspection, elicitation, experimental testing, and indirectly by observation of language data. Performance processes (iii) are accessible by observation of language data and by experimental testing, both surely guided by introspective consultation of competence.

## 2. The early Chomsky (1953-1955)

In his earliest papers, Chomsky adheres (at least on paper) to the empiricist and inductivistic ideas of Zellig S. Harris, with an emphasis on formalization. Thus, Chomsky (1953, 242-244) inquires “into the formality of linguistic method and the adequacy of whatever parts of them can be made purely formal”. He wants to “reconstruct the set of procedures” by which the linguist establishes the statements of his/her grammar “from the behavior of language users”, which in practice is taken to be “a fixed sample of linguistic material upon which the primitives of the system are experimentally defined”.

There has been much confusion as to what the ultimate object of generative description is. As we just saw, this confusion is in evidence on the first page of Chomsky’s first publication where he equates the behavior of language users with samples of linguistic material, i.e. corpus data. Taken at face value, the profile of the earliest Chomsky thus somewhat surprisingly is that of a dedicated corpus linguist. But in practice he does not commit himself to the primacy of natural data. The basic corpus of Chomsky (1953) is the constructed “six-sentence text” (1) which is taken to be part of a “reasonably limited sample”:

(1) ab, cb, de, fe, axd, cyf

In a footnote Chomsky rejects the idea that the “whole language” would be available as data but he makes some brief general remarks on the feasibility of applying distributional methods to “this situation”. The argumentation here builds upon Harris (1951) to whom several references are made.

The second important aim of Chomsky (1953) is to develop an adequate notion of syntactic category to deal with the problem of syntactic homonymy. The explicit treatment of this is one of the cornerstones of generative grammar which consequently was in a germinal stage as early as 1953: “a syntactic analysis will result in a system of rules stating the permitted sequences of the syntactic categories of the analyzed sample of the language, and thus generating the possible or grammatical sentences of the language” (ibid., 243). As far as I know, this is the first mention of generative grammar in the linguistic literature.

Chomsky (1954) is a critical review of a textbook on Modern Hebrew by Eliezer Rieger. Having noted that Rieger confuses prescriptive rules and real usage while being aware that the task of the grammarian is to describe the structure of the language at a given period, Chomsky (1954:180) then comments on a list of 225 errors collected by Rieger: “The technique by which these ‘errors’ were collected suggests a method that the linguist might be tempted to use in constructing a linguistic corpus. [...] But now, in place of the previous suggestion [to construct] a truly descriptive grammar, it is recommended that this list of ‘errors’ be used as a guide for a correctional teaching program.” This is one of the few places in Chomsky’s writings where he comments on the corpus-based work of ordinary working grammarians.

Chomsky (1955) is a critical comment on proposals by Yehoshua Bar-Hillel that linguists should pay more attention to recent advances in logical syntax and semantics. Chomsky sees no linguistic benefits in the purely formal approaches offered by logicians. There are several references to the notion “ordinary linguistic behavior” as central in linguistic description but the notion is not spelt out in detail and therefore one cannot know what Chomsky has in mind, e.g. corpus data

(sentences, utterances) or behavior proper as manifest in the processes of speaking and understanding.

### 3. “The Logical Structure of Linguistic Theory” (LSLT, 1955-56)

In the genesis of transformational-generative grammar, Chomsky’s (1975 [1955-1956]) 570-page book *The Logical Structure of Linguistic Theory* (LSLT) occupies a peculiar position. On the one hand, it is the foundational work underlying the whole theory, on the other it was not published until 1975. Chronologically its central parts predate Chomsky’s important papers from 1956 as well as *Syntactic Structures* (1957 a). In some respects, LSLT still dwells within the tradition of North American structuralism, especially as regards the discussion of discovery methods and substitution procedures in Chapter V. From the viewpoint of corpus linguistics the following programmatic statement in a footnote is highly interesting:

- (2) “All of our discussion is based on the assumption that the data have been collected — that the grammar is based on an adequate corpus. We have not discussed the very important question of *how* a corpus is put together and how the linguist obtains the information about linguistic behavior. See Lounsbury, “Field methods and techniques in linguistics” [Lounsbury 1953]; Harris and Voegelin, “Eliciting” [Harris/Voegelin 1953].” (Chomsky 1975 [1955-1956], 227; emphasis in the original)

At this stage of transformational-generative theory Chomsky indeed seems to have regarded the availability of adequate representative corpora as self-evident points of departure for linguistic description, along with the presumed information about “linguistic behavior”. As evidenced by the references to Lounsbury (1953) and Harris/Voegelin (1953), Chomsky basically had in mind the structuralist field methodology of corpus collection based on informant elicitation. Of course this methodology was mainly designed for research on ‘exotic’ languages not previously known to the field linguist and therefore much of it is not directly relevant to grammatical work on well-known languages with long written traditions and established traditions of basic grammatical description.

It is a striking fact that Chomsky mentions this supposition only in a footnote on page 227, after having made tens of references in passing to the importance of corpora. Some examples: “given a corpus of linguistic material”, various proposed grammars can be compared and the best of them selected (p. 61); “given a corpus”, a set of compatible descriptive levels may be constructed (68); in grammatical description, “we have [...] only a finite corpus of utterances out of an infinite set of grammatical utterances” (78); “[we] have suggested that a grammar is justified by showing that it follows from application to the corpus of a properly formulated general theory” (86); “[the] grammar must generate a set of grammatical sentences on the basis of a limited corpus” (94); “given a corpus of utterances for which we know in advance that there is some grammar” (166); “given a corpus of sentences”, the linguist must determine which of these utterances are phonemically distinct (129); “the set of grammatical sentences cannot be identified with the linguist’s corpus of observed sentences” (129); “we must project the class of observed sentences to the [...] infinite class of grammatical sentences” (129); “suppose that [...] *look at the cross-eyed man* does occur in the corpus” (133); “We are given a corpus *K* which we take to be a set of strings of words.” (134); “We define the *distribution* of a word as the set of contexts in the corpus in which it occurs.” (137); “Let us suppose [...] that all the sentences of the corpus are of the same length.” (140); “in actual linguistic material, the selectional restrictions on distribution are extremely heavy” (141); “Given a corpus of sentences, we define the set *G* to be the set of sentences conforming to the rules established for

describing this corpus [...]" (147); "The method of §35 cannot furnish a complete answer to the problem of projecting the corpus to a set of grammatical utterances [...]" (153); "Having developed the level **P** abstractly, we can now attempt to determine its effectiveness by applying it to the description of actual language material." (223); "Given a set of first-order grammatical categories, and a linguistic corpus, we have a set of sentences generated." (227); "Applying the methods of Chapter V to a linguistic corpus, we [...]" (518).

Thus, there is no doubt that in LSLT Chomsky took the structuralist corpus gathering methodology for granted as a self-evident integral component in the toolbox of emergent generative linguistics. But it is also a fact that here, as in later works, he never himself applies this methodology, nor does he pose the question whether the transformational-generative approach to linguistics actually would need an explicit new corpus methodology. Rather, without any principled discussion in LSLT, Chomsky introduces the method of using (more or less) ungrammatical (or otherwise strange) made-up examples, coined by himself on the basis of his native grammatical intuitions, to be used as evidence in his grammatical argumentation. Here is an assortment of examples of this type in LSLT (in 1955-56, the conventions of starring or question-marking ungrammatical or weird examples were not yet in use, the earliest use of stars for indicating ungrammaticality I am aware of is R.B. Lees (1957, 402) who, when discussing compound formation in English, gives examples such as *a book for cooking* vs. *\*a cooking book*):

(3)

Colorless green ideas sleep furiously.

Furiously sleep ideas green colorless.

Sincerity admires John.

Golf admires John.

The admires John.

Of had lunch with Tom.

Look at the cross-eyed from.

The sincerity scratched by John was [...]

The table manifested by John was [...]

Himself was seen in the mirror by John.

Misery loves company.

old my book

victory's toothache

Victory has a toothache.

a talkative harvest

an abundant man

the considered a fool person

It seems John's.

It seems barking.

He seems forgiven.

John was tired and applauded.

At the clown, everyone laughed.

The office was worked at by John.

Despite the many programmatic references to the importance of corpora, they are not used in LSLT, not even in the form of sporadic authentic examples. But neither does one find an explicitly formulated break with structuralist corpus methodology. Notice, in passing, that Newmeyer (1986, 66) claims that Chomsky's earliest books and papers are filled with polemics against the empiricist

conceptions of science held by the structural linguists. I fail to find anything of this in Chomsky's writings prior to 1956.

On the other hand, LSLT also contains many references to the concept of linguistic intuition. In the beginning of the summary chapter, Chomsky (ibid., 61-62) declares that his theory "will shed some light on such facts as the following" which include (i) the capability of the speaker to produce an indefinite number of new utterances which are immediately acceptable to other members of the speech community, and (ii) the capability to have "intuitions about linguistic form", in particular to identify phoneme membership of sounds, to perceive morphological affinities (such as *see* : *sight*), to identify related sentences (such as declaratives and the corresponding questions), to identify sentence schemata (such as various instances of transitive clauses), and to perceive constructional ambiguities (e.g. *They don't know how good meat tastes.*).

A grammar of the language L attempts to deal with such problems in terms of the formal properties of utterances. A theory which defines grammaticality, generates only grammatical sentences when "applied to a finite sample of linguistic behavior", and demonstrates that they are in harmony with native speaker intuitions, corresponds to the intuitive sense of grammaticality of the native speaker and is a "rational account of this behavior, i.e., a theory of the speaker's linguistic intuition" (ibid., 95). Taken at face value, these declarations provide the missing link between corpus data and intuition as input or raw material for the generative description, but we are still left with the fact that corpora are not used in actual practice.

#### 4. The 1956 papers and "Syntactic Structures" (1957)

*Syntactic Structures* (Chomsky 1957 a) was not originally planned to be a monograph on the international linguistic scene, being on the one hand a condensed version of undergraduate lectures that Chomsky had given at MIT, on the other a summary of ideas that he had published in 1956.

The length of Chomsky's (1956 a) article "On the Limits of Finite-State Description" is only a page and a half but its repercussions have been enormous, especially as they were communicated to the research community in practically the same form in Chomsky (1956 b) and, above all, in *Syntactic Structures*. Chomsky advanced the claim that the syntax of natural languages, as exemplified by English, is not describable by grammars with finite-state power, whereas context-free grammars according to him do have the requisite formal properties. For evidence Chomsky called upon mirror-image languages with sentences like aa, bb, abba, baab, aabbaa, ..., and asserted that English sentences have this property. The arguments runs as follows: Let  $S_1, S_2, S_3, \dots$  be declarative sentences of English. Then the following are all English sentences:

- (4) (i) If  $S_1$ , then  $S_2$ .
- (ii) Either  $S_3$ , or  $S_4$ .
- (iii) The man who said that  $S_5$ , is arriving today.

These sentences have dependencies between "if" and "then", "either" and "or", and "man" and "is". But any of  $S_1, S_3$ , and  $S_5$  in (4i), (4ii), and (4iii) may be chosen as any of (4i), (4ii), and (4iii) themselves. "Proceeding to construct sentences in this way, we arrive at sentences with dependency sets of more than any fixed number of terms [...]. English is therefore not a finite-state language" (ibid., 65). This is the hypothesis of unrestricted center-embedding. Suffice it here to note that the examples (i), (ii), and (iii) are artificial. No independent empirical data were offered in support of the hypothesis. This is the first (but not last) argument in the history of generative grammar resting on intuitively constructed data the grammaticality of which is debatable. This argument is then repeated

as such in Chomsky (1956 b, 115-116) and, above all, in *Syntactic Structures* (1957 a, 20-23) where generations of linguists have made their first acquaintance with it.

Chomsky (1956 b, 113) states that a primary concern for the linguist is to discover simple and revealing grammars for natural languages and, through analysis of such grammars, to arrive at a general theory of linguistic structure. Grammars are said to be “based on a finite number of observed sentences (the linguist’s corpus)” and they “‘project’ this set to an infinite set of grammatical sentences by establishing general ‘laws’ (grammatical rules) framed in terms of such hypothetical constructs as the particular phonemes, words, phrases, and so on”. If a “large corpus of English” does not contain either of (1) *John ate a sandwich* or (2) *Sandwich ate John*, “we ask whether the grammar that is determined for this corpus will project the corpus to include (1) and exclude (2)”.

*Syntactic Structures* reiterates the same ideas: “given a corpus of sentences”, linguistic theory should provide a method for selecting a grammar (11); a language is “a (finite or infinite) set of sentences” (13); one way to test the adequacy of a grammar is to determine whether the sentences it generates “are actually grammatical, i.e., acceptable to the native speaker”, which is a “behavioral criterion for grammaticality” (13); a grammar is “related to the corpus of sentences” it describes (14); “the set of grammatical sentences cannot be identified with any particular corpus of utterances obtained by the linguist in his field work” (15), etc.

Corpora figure prominently — in principle — also in the chapter titled “On the goals of linguistic theory” where Chomsky discusses the relations of grammars and corpora to discovery procedures, decision procedures, and evaluation procedures. When dealing with the explanatory power of linguistic theory, he remarks in passing that a grammar designed by the linguist generates “all and only the sentences of a language, which we have assumed were somehow given in advance” (85). This remark runs counter to the many statements e.g. in LSLT boosting the importance of corpora but also confirms the observation already made that no systematic (or even sporadic) attention is paid to corpora.

## 5. From “Syntactic Structures” towards “Aspects”

Chomsky (1957 b) is a review of Roman Jakobson and Morris Halle’s book *Fundamentals of Language* and concerned above all with the relationship of phonetic substance to phonological representations. Chomsky develops his fairly critical evaluation as a combination of inductive and deductive elements. The former is represented by “a set of utterances” and “a given corpus” subjected to segmentation and phonological classification, the latter by loosening the structuralist biuniqueness requirement in favor of abstract phonological representations worked on by phonological rules. In addition to corpora Chomsky (1957 b) also invokes “the linguistic behavior of an individual” as something to be accounted for by the grammar and the theory it is based on.

Chomsky (1957 c) is a review of Charles F. Hockett’s book *A Manual of Phonology*. Here some surprising claims about the status of intuition are made:

- (5) “One cannot quarrel with Hockett’s assertion that intuitive mastery of a language is, in fact, a great aid to a linguist, just as familiarity with his data is an aid to any other scientist. And it is probably true that very little can be said about how one acquires such familiarity, how one ‘empathizes’ and acquires a ‘feel’ for a language. But it is important to emphasize that the whole purpose of methodological investigations is to show how, in principle, and in crucial cases, intuition can be avoided. We can [... recognize ...] that study of the intuitive process of discovery (constructing hypotheses, gaining familiarity with the data, and so forth) is really outside the domain of linguistic method proper, and that linguistic theory itself must scrupulously avoid all intuition-based concepts. In other words, when we turn to the question

of justification, which is, after all, at the heart of theoretical and methodological study, such notions as ‘empathy’ can play no role. Such operational devices as the paired utterance test, which Hockett mentions incidentally as an aid to field work, form, in fact, the empirical cornerstone of phonological theory. Compared with the problem of developing objective methods of this sort, discussion of intuitive procedures is of minor importance. [...] I can see no justification for the position that objectivity in linguistics is in principle something different from objectivity in physical science, and that the basic methods in linguistics are empathy and intuition. [...] It may be that grammatical research can best be described as the attempt to reconstruct precisely and explicitly the ‘linguistic intuition’ of the native speaker. But it does not follow from this that grammatical theory itself must be based on intuition. In fact only a completely objective theory in which empathy, prejudices, unanalyzed notions of ‘phonetic realism’, and so on, play no part will have any real value as an explanation of ‘linguistic intuition’.” (Chomsky 1957 c, 228, 233-234)

My reading of this passage is that Chomsky confuses intuitions<sub>1</sub>, which constitute the tacit knowledge making native mastery of the language possible, with the totally different intuitions<sub>2</sub> which a competent scholar relies on when she designs scientific hypotheses, theories, tests, etc. It is perplexing to see that Chomsky here is so explicit in condemning the use of intuitions<sub>1</sub> in linguistics. After all, it is only because of his native-speaker intuitions<sub>1</sub> of English that Chomsky himself is capable of producing and judging e.g. the sentences (3) which do not emanate either from natural corpora or ‘linguistic behavior’ of naive native speakers. Of course, through the ages it has been part and parcel of the methodology of grammar-writing to allow grammarians to invent example sentences, especially ‘clear cases’ (or ‘bona fide sentences’: Lees 1960, 211) such as *John sleeps*, the ultimate source of which is precisely the intuitions<sub>1</sub> of the grammarian herself. Surely, regardless of theoretical and methodological convictions, everybody agrees that it would be an idle ceremony to require the grammarian to carefully document the sources of such self-evidently grammatical sentences.

The bottom line is that intuitions<sub>1</sub> constitute the irreducible kernel of language ability which must be taken as axioms (also cf. Itkonen 1978). Contrary to what Chomsky declares in (5), it is not possible to give an explication of intuitions<sub>1</sub> that does not invoke those same intuitions<sub>1</sub>. Without intuitions<sub>1</sub> (or something derived from them, e.g. elicited informant judgements) as primitive notions we simply do not know which one (if any, or perhaps both, or none) of *Colorless green ideas sleep furiously* and *Furiously sleep ideas green colorless* is syntactically well-formed. This confusion has led to an inconsistent ontological and methodological self-conception of many generative grammarians. On the one hand, the use of intuitions<sub>1</sub> is condemned, leading to claims that generative grammars and generative theory would be based on corpora or ‘linguistic behavior’. On the other, the real practice of generative grammarians relies precisely on intuitions<sub>1</sub>, usually coupled to an outright disregard of natural corpora. — Lees (1957, 376; 379), in his review of *Syntactic Structures*, does give an adequate characterization of the importance of intuitions, and grammar writing as an explication of those intuitions, as does Chomsky in several of his later writings.)

Chomsky (1957 d, 284) defines a grammar of a language as “a theory of the set of sentences constituting the language”, i.e. with an explicit ontological commitment to language as sentences. Note that here there is no emphasis on intuitions as the real object of study. Chomsky (1958 a, b, 1959 a, b) are landmarks in the theory of formal languages but contain nothing of corpus-linguistic relevance.

Chomsky (1959 c, 576) is the famous review of B. F. Skinner’s book *Verbal Behavior*. There is a surprising statement concerning the object of study: “The behavior of the speaker, listener, and learner constitutes, of course, the actual data for any study of language.” Chomsky then concedes that a generative grammar for a language only indirectly characterizes these abilities, but even so,

given the context where the claim is made, it must be considered a category mistake. The basic data of grammatical theory and description are (real) sentences (utterances) and intuitions about them. The behavior of the speaker, listener, and learner is studied in empirical psycholinguistics, first-language acquisition research, etc.

The first detailed application of generative grammar to a sizeable morphosyntactic problem was R.B. Lees' (1960, xvii) *The Grammar of English Nominalizations*. Lees defines the task of generative grammar to be to propose and validate maximally simple rules to account for the grammatical structure of an "ever expanding corpus of English sentence types". At the same time, his study is intended to explicate grammatical details "in accordance with our intuitive mastery of the mechanisms we use to construct new English sentences". In the preface to the third printing of the book, Lees (1963, xxvix pp.) notes that there has been widespread confusion in the literature concerning the question: "exactly what does a [generative] grammar purport to describe" (emphasis in the original)? As we have seen, the early Chomsky has not been consistent on this issue when invoking corpora, intuitions, and behavior. Lees' answer is simply that "a grammar describes how the correctly put utterances of a language are put together". In a secondary and indirect manner, a grammar, once made, also is a description of the tacit intuitive knowledge possessed by native speakers. Lees emphatically stresses that grammars are not descriptions of the gross linguistic behavior of speakers. In my opinion, these statements are perfectly correct, and the only possible conclusion to draw from them is that corpus observation supplemented with consultation of correctness notions (intuitions) are the indispensable basic methods of grammatical theorizing and description. This is not the conclusion which Lees draws because next he belittles the requirement "that a serious linguistic study should concern itself with 'real' sentences" and rather defines his object of study by downgrading it to "the principles in accordance with which I in fact construct the real, well-formed sentences of my dialect of English", thereby taking dangerous steps in the direction of solipsistic grammar writing. Note, in passing, that when Lees needs authentic material, he draws upon the copious data-oriented grammars of Curme and Jespersen.

In his review of Lees (1960), Matthews (1961, 205-207) takes issue with Lees' confession that intuitions are indispensable in grammatical analysis. Matthews warns against any use of intuition because that would be impossible to distinguish from a straight appeal to meaning. Matthews also gives a detailed description (of which there are not many in the generative literature) of the basic techniques of transformational analysis. The first step is to "take a text, say (i) the dog was bitten by the cat". But surely this very step presupposes that Matthews consults his intuitions<sub>1</sub> to ensure that the text (obviously constructed by himself) is grammatical in the first place, and not e.g. *the the by bitten was dog cat*.

Chomsky (1961 a, 121; 127-128) still talks pro forma about corpora: "we ask how a linguistic theory [...] can be constructed so that given a corpus, grammars chosen by the evaluation procedure [...] meet the given empirical conditions of adequacy", but in practice he uses his intuitions<sub>1</sub> to coin examples as needed, e.g. *many more than half of the rather obviously much too easily solved problems* and *Why has John been such an easy fellow to please?*

Chomsky (1961b, 221-223; 233-239) offers several important corpus-related remarks and also treats degrees of grammaticality. He makes a distinction between data and facts. The linguist's data consist of observations about the form and use of utterances. The facts of linguistic structure that he hopes to discover go "well beyond" these observations. A grammar of a particular language is a hypothesis about the principles of sentence formation in that language. The truth and falsity of the hypothesis is judged i.a. by considering how well the grammar succeeds in organizing the data and how successfully it accommodates new data. A linguist who confines herself only to data (in the sense defined) has severely limited the scope of her research. A grammatical description that gives only "a compact one-to-one representation of the stock of utterances in the corpus" (here Chomsky cites Harris 1951, 376) is defective. Chomsky remarks that on the level of syntax the intuitive

character of grammatical descriptions is most obvious and that, ultimately, the collection of data is concerned with finding a basis for intuitive judgements. He offers the following list of types of data that generative grammarians utilize:

- (6) a. phonetic transcriptions;
- b. judgements of conformity of utterance tokens;
- c. judgements of wellformedness;
- d. ambiguity that can be traced to structural origins;
- e. judgements of sameness or difference of sentence type;
- f. judgements concerning the propriety of particular classifications and segmentations;

However, Chomsky also emphasizes that such data are used specifically for determining the validity of particular proposed grammars and linguistic theory, not for construction of or choice among grammars. This remark in conjunction with the list (6a-f), where only (6a) represents intersubjective data strongly downplays the role of corpus data in the form of real language material. Data such as (6a-f) can also be complemented with results from experimental or behavioral tests. These two approaches are not alternatives but they also do not presuppose one another.

In Chomsky (1961 b, 234) the concept “grammatical regularity” is used, as far as I can see, for the first time in his writings, even if it is not made clear if something else is intended than what is normally referred to by grammatical rules. When discussing the nature of deviant sentences, Chomsky cites two authentic examples, Dylan Thomas’ *a grief ago* and Thorstein Veblen’s *perform leisure*. I have not come across more than a handful of authentic examples in Chomsky’s writings from the 1950s and 1960s, certainly much fewer than there are programmatic references in the earlier writings to the use of corpora as input to grammatical analysis. Chomsky notes that *a the ago* and *perform compel* are more deviant than *a grief ago* and *perform leisure*. There is a brief reference to corpora: “It is also easy to drop the restriction [...] that the corpus be finite” (ibid., 388).

Chomsky (1964 a [1962]), a paper originally presented at a conference in 1958, states that a grammar should characterize all the utterances of the language. In this paper Chomsky does not in any way mention or invoke the intuitions of the native speaker nor those of the linguist. When discussing iterative applications of transformations, he picks up the method (introduced in *Syntactic Structures*, cf. (4)) of making up overly complex examples and claiming full grammaticality for them, here e.g. *My being prompted to try to visualize myself forcing him to come by this event* (ibid., 239-245).

In contradistinction to Chomsky (1964 a [1962]), Chomsky (1962, 533), a paper read in 1960, emphasizes that a formalized grammar is a theory of the linguistic intuition of the native speaker. Operational tests for grammaticality and a description (theory) of English structure must converge on the linguistic intuition of the native speaker. The general theory can be evaluated by determining how well its structural descriptions accord with the intuitions of the native speaker. “[...] there is an enormous variety of perfectly clear cases that provide a very strong, though indirect, empirical condition of adequacy for this general theory. Failure to meet this general condition means that the theory must be revised.” Chomsky (1964 b, 928) even claims that the theory of generative grammar can suggest an explanation for the speaker’s linguistic intuition.

Lees/Klima (1963, 18; 21) are concerned with generative rules for English pronominalization. The difficulties with strongly intuition-based methodology are dawning upon the authors. They have misgivings about their data as witnessed by statements like “the rules we formulate [...] characterize sentences in our own dialect only” and “there will be readers who judge differently certain examples we quote”. A humbly submissive attitude is reflected in the statement that it “is also best, no doubt,” to reject such sentences as <sup>(\*)</sup>*John is shaved by himself*, where the parentheses around the star inform that the authors are genuinely uncertain about how to interpret the (obviously made-up) sentence.

Chomsky (1963, 326) contains (to my knowledge) his first mention of the notion competence. In this article the use of ungrammatical sentences plays an important role in the argumentation, e.g. \**John saw the play and so did Bill the book*; \**That one is wider than this one is wide* (ibid., 378). Miller/ Chomsky (1963, 471) claim full grammaticality for sentences and phrases such as *That the fact that he left is unfortunate is obvious* and *the cover that the book that John has has even though it is mentioned that they are preferably transformed into It is obvious that it was unfortunate that he left and John's book's cover*.

Around 1963 the generative reliance on the linguist's intuitions in making up example sentences clearly overstepped the confines of what is methodologically defensible (i.e., to make up clear cases such as *Sue sleeps* on the basis of the linguist's intuition). Thus, Chomsky/Miller (1963, 286-287) say that the English sentence:

(7) The rat the cat the dog chased killed ate the malt.

“is surely confusing and improbable but it is perfectly grammatical and has a clear and unambiguous meaning”, and then they continue: “To illustrate more fully the complexities that must in principle be accounted for by a real grammar of a natural language, consider [8]. [...] Of course, we can safely predict that [8] will never be produced except as an example, just as we can, with equal security, predict that such perfectly well-formed sentences as *birds eat*, *black crows are black*, *black crows are white*, *Tuesday follows Monday*, etc., will never occur in normal adult discourse. Like other sentences that are too obviously true, too obviously false, too complex, too inelegant, or that fail in innumerable other ways to be of any use in ordinary human affairs, they are not used. Nevertheless, [8] is a perfectly well-formed sentence with a clear and unambiguous meaning, and a grammar of English must be able to account for it if the grammar is to have any psychological relevance.”

(8) Anyone who feels that if so-many more students whom we haven't actually admitted are sitting in on the course than ones we have that the room had to be changed, then probably auditors will have to be excluded, is likely to agree that the curriculum needs revision.

But intersubjective agreement on the status of artefacts like (7, 8) is of course hard to achieve. The grammaticality/acceptability status of such sentences is indeterminate as it lacks backing in real usage.

Chomsky (1964 c) is a revised and expanded version of a paper (Chomsky 1964 b) read at the Ninth International Congress of Linguists in 1962. A new corpus-related concept is introduced, “primary linguistic data”, which refers to authentic samples of speech confronting language-acquiring infants (ibid., 61-64). The important distinctions between three levels of success for grammatical descriptions are made: observational, descriptive, and explanatory adequacy. An observationally adequate level of success is achieved if the grammar presents the observed primary data correctly. The level of descriptive adequacy is reached when the grammar gives a correct account of the intuition of the native speaker. The explanatory level is achieved when the associated linguistic theory succeeds in providing a principled basis for deciding which one of several competing alternative grammars, each satisfying the criterion of descriptive adequacy, should be picked as the optimal one. Chomsky (1964 c, 79-81) contains an interesting, and one of the few explicit, discussions in the history of generative grammar of the topic “objectivity of linguistic data”. Chomsky emphasizes that introspective judgements are not sacrosanct nor beyond conceivable doubt, but that they can be neglected only at the cost of destroying the discipline. (Notice the contrast with the views expressed in (5).) Consistency among speakers of different backgrounds is relevant information, as is consistency for a particular speaker on different occasions. A key statement is this one: “The possibility of constructing a systematic and general theory to account for these observations is also a factor to be considered in evaluating the probable correctness of particular observations.” Operational

tests that consistently supported introspective judgements in clear cases would also be considered relevant in determining the correctness of particular observations.

The generative upgrading of the methodological status of linguistic intuition can largely be traced to these very paragraphs. In the next few years to come the theoretical and methodological discussion would mostly concern the levels of descriptive and explanatory adequacy and literally no attention was paid in generative works to the level of observational adequacy which would have been the domain of authentic examples and real language use.

When Chomsky presented these ideas at the Ninth International Congress of Linguists in 1962, they provoked a lively discussion documented in Lunt (ed.) (1964). Halliday (1964, 988; 990) remarked that he, as a native speaker of English, found many of Chomsky's claims about English "counter-intuitive", e.g. the rule  $S \rightarrow NP VP$ , and derivations involving deletion. Halliday also pointed out that the full possibilities of observation-oriented taxonomic description had not yet been utilized. Chomsky's (1964 d, 990) reply did not address these remarks directly but emphasized the importance of constructing a substantive theory of language with sufficient clarity so that its "empirical adequacy" can be tested, and the choice between competing theories made on "empirical grounds". Pike (1964, 991) made the important remark that introspective judgements are less useful in dealing with preliterate cultures and their languages than the "study of objectively *observable* reactions of native speakers" (emphasis in the original). In his reply Chomsky (1964 e, 994) did not address this particular issue. At the same conference, Schachter (1964) read a paper on kernel and non-kernel sentences. In the discussion, E. Hahn (1964, 697) exclaimed: "I am shocked at the suggestion that we are to trust intuition! *Is this science?*" (emphasis in the original).

Paavo Siro (1964, 165) was the first Finnish linguist to become interested in generative grammar. He too attended the 1962 congress. Siro was concerned with designing a unified description of the Finnish system of local case forms, a problem which then-current generative grammar with its obvious Anglocentrism was not particularly well suited to tackle. At the end of his paper Siro makes the interesting remark that his model for the description of simplex sentences can be extended in several directions, but that the "choice of solutions must depend on empirical analysis of large linguistic materials." Such requests are not easy to find in the generative literature, neither in the early nor in the later one. In practice, Siro did not pursue this corpus-linguistic line of research.

Katz/Postal (1964, ix; 75; 123; 144; 148) distinguish sharply between language and speech. A language is a system of abstract objects analogous in significant respects to such a cultural object as a symphony. Speech is the actual verbal behavior that manifests the linguistic competence of someone who has learned the appropriate system of abstract objects. The methodology of using ungrammatical made-up examples sentences is in widespread use, e.g. in the discussion concerning the generative derivation of the imperative construction: *\*go home, did you; \*go home, must he; \*kill herself*. Controversial grammaticality judgements are easy to spot, e.g. *this washing of the car of John's*. Postal (1964, v) claims that generative grammar is a "methodological framework" which represents a proposal about the way linguistic research should proceed and the aims it should take. He then states that this framework is "empirically neutral" and excludes no possible claim about the nature of language. Postal talks about the importance of matching the theory with "empirical linguistic data" and "observed data" but nowhere does he spell out or use such data, apart from using examples made up by himself. The same goes for Fodor/Katz (1964 b, vii-ix) who repeatedly stress the empiricalness of linguistics and the importance of empirical evidence but fail to use anything but intuitive judgements and to mention what else the empirical evidence could consist of.

Klima's paper (1964, 264-265) on English negation became widely cited. It was one of the earliest in-depth studies of a complex syntactic-semantic problem. As usual the data are intuition-based. Klima is one of the first to note the occasional indeterminacy of intuitive data, and to resolve it by postulating two different idiolects, i.e. by going one step further than Lees/Klima (1963) who, as already noted, restricted their claims to certain (intuitively surmised) dialects of English. Thus, Klima

claims that in the less differentiated Idiolect A all negative pre-verbs allow a *neither*-tag, as in the sentence:

(9) Writers will seldom accept suggestions, and neither will publishers.

whereas in a second, more highly differentiated idiolect, Idiolect B, *neither*-tags are allowed to occur only with *not* and *never*, not with e.g. *seldom*. Thus, (9) would be grammatical in Idiolect A but ungrammatical in Idiolect B. Some of Klima's grammaticality judgements are controversial, e.g. the proclaimed ungrammaticality of *\*Did John drink any bourbon?* or *\*a not clear formulation* (a search of the Internet supplies several authentic examples of the latter type, e.g. *a not clear enough definition*). These measures of restricting debatable intuition-based generative grammaticality judgements and the theoretical claims resting upon them to dialects and even idiolects were a methodological decline.

## 6. "Aspects of the Theory of Syntax" (1965)

*Aspects* doubtless is the most significant contribution to linguistics made by Chomsky (and by generative grammar as a whole). Here the full-blown notion of competence is elaborated in an explicitly mentalistic framework. However, still prevailing are the somewhat contradictory views of the subject matter and the input data of linguistic theory and grammar writing. Chomsky (1965, 4; 8; 15; 20) thus states that the problem for the linguist is to determine "from the data of performance" the underlying system of rules which is a "mental reality underlying actual behavior". Similarly, a generative grammar "assigns structural descriptions to sentences" while it also deals with "mental processes that are far beyond [...] consciousness". Observation of data and introspection are both recognized as legitimate knowledge sources but the importance of observational data is now explicitly downgraded: "observed use of language [...] may provide evidence as to the nature of this mental reality, but surely cannot constitute the actual subject matter of linguistics, if this is to be a serious discipline." It is a "necessity to give [...] priority to introspective evidence and to the linguistic intuition of the native speaker". Furthermore, "sharpening of the data by more objective tests is a matter of small importance for the problems at hand". In view of this, it is no surprise that corpus-oriented methods play no role in *Aspects* (where the word "corpus" is mentioned in passing only once or twice). All examples are made up by Chomsky himself, many of them are of type (3).

A booklet closely related to *Aspects* is *Topics in the Theory of Generative Grammar* (Chomsky 1966, 21-35). This is largely a response to several criticisms of generative theory that had been voiced during the first half of the 1960s. There is an eloquent and irrefutable defense of the importance of intuitions as the indispensable starting-point of grammatical description. There are also a few mentions in passing of "empirically given data", and even of corpora of which three (somewhat hypothetical) examples are programmatically mentioned, the set of sentences in the New York Public Library, in the Congressional Record, and in a person's total experience of his native language.

Taken as a whole, the corpus-related pronouncements in Chomsky (1965, 1966) confirm what had become established practice already in the 1950s, a shift in methodology to full reliance on introspection. Corpora and other empirical considerations might be mentioned but they are never elaborated nor put to use. When real-language data are needed, generative grammarians occasionally turn to the classics of descriptive grammar such as (for English) Curme, Jespersen, and Poutsma. Thus, Rosenbaum (1967, 114) notes that "traditional grammarians were very diligent. They present much data that are quite relevant to the construction of a [generative] grammar for the complement system."

## 7. The late 1960s

In the late 1960s the practice increased of using strange made-up examples the grammaticality and/or acceptability of which is unclear. (10) presents instances of sentences claimed to be fully grammatical but which are debatable, (11) of sentences claimed to be ungrammatical that rather should be considered grammatical because such structures do in fact occur in current usage (as manifested on the Internet):

(10)

It is believed by me that John has convinced Bill. (Rosenbaum 1967, 58)

What is believed by me is that John has convinced Bill. (ibid.)

There is believed by everybody to be three chairs in the room. (ibid., 64)

For there to be three chairs in the room was preferred by everybody. (ibid.)

I believe that John is honest is true. (ibid., 66)

That the plane flew at all was marveled at by them. (ibid., 83)

The giving of the lecture by the man who arrived yesterday assisted us. (Fraser 1970, 91)

The rumor that the report which the advisory committee submitted was suppressed is true is preposterous. (Langendoen 1970, 99)

It proves that it's true that Tom's thinking that it would be a good idea for him to show that he likes it here that he's told everyone that he's staying. (ibid., 101)

(11)

\*What an idiot I thought Tom was. (Postal 1968, 75; cf. Internet: What an idiot I thought the main character to be.)

\*the best of some sheep (Postal 1970 a, 60; cf. Internet: the best of some situations)

\*it which I ate (ibid., 74; cf. Internet: He brings the same root to it, which is Black American music.)

\*John will leave until tomorrow. (Lakoff 1970, 148; cf. Internet: I will leave until tomorrow.).

\*John's certainty (likelihood) to win the prize (Chomsky 1970, 189; cf. Internet: Kilbane's certainty to start on the left)

\*Physicists like himself don't often make mistakes (Ross 1970, 229; cf. Internet: Fields feels like himself."

\*Harry reminds me of himself. (Postal 1970 b; cf. Internet: Joe reminds me of himself.)

Related to these methodological problems is the subjective practice of marking deviant sentences not only with simple stars for ungrammaticality, but also with question-marks and even combinations of question-marks and stars. Thus, Ross (1968, 106-107) uses four markings of deviance in his widely cited PhD dissertation "Constraints on Variables in Syntax", without explaining their precise meaning and mutual differences: \*, ?, ??, ?\*.

## 8. Conclusion

At the end of section 1 I defined a number of data-acquisition methods appropriate for the study of (i) language data such as sentences and utterances, (ii) speaker-internal intuitive language competence, and (iii) the behavioral real-time processes of speaking and understanding. The methods are:

(12)

observation ('corpus work'),  
elicitation ('field work'),  
introspective consultation (of native competence),  
introspective construction of fully grammatical sentences ('clear cases'),  
introspective construction of ungrammatical sentences,  
introspective construction of questionable sentences,  
experimentation ('psycholinguistic testing'),

where observation and introspective consultation (checking whether the observed material accords with intuitions) normally go together, and introspective construction of ungrammatical and questionable sentences are closely related.

Now let us consider how data are acquired by typical practitioners of various types of the grammar trade. An author of simple school grammars relies mainly on introspective construction of fully grammatical sentences, i.e. the grammarian herself constructs clear cases like *John runs*, *The bottle is on the table*, etc. Occasionally she might use observation, i.e. she spots a relevant example in real texts or discourse and decides to use it, having first introspectively consulted her competence to check that the example is fully grammatical. Authors of comprehensive scholarly oriented reference grammars such as Curme (1931) and Huddleston/Pullum (2002) use observation and introspective consultation (i.e. do critically minded corpus work) to a much larger extent than authors of elementary school grammars but they surely also introspectively construct fully grammatical sentences. Field linguists mainly use elicitation techniques. Often a field linguist does not have native-like competence in the language under study and therefore he is not entitled to use introspective consultation (except for generating hypotheses to be tested with the informant). Psycholinguists typically perform experiments, grammarians (of any type) typically do not.

As we have seen, corpus methodology was rejected by the early Chomsky in practice long before he rejected it in principle (which happened in the early 1960s). From 1955 onwards, Chomsky was relying on intuitions while he continued to say how important empirical data was. This contradictory methodological stance was further complicated when no clear distinction was made between data in the sense of sentences (utterances) vs. (the undefined category of) "linguistic behavior". Generative grammarians introspectively constructed fully grammatical and acceptable sentences, clear cases, much like all grammarians have been doing through the ages. The distinct generative methodological innovations as for data-acquisition were introspectively constructed ungrammatical and questionable sentences. The former proved fruitful in sharpening grammatical argumentation, cf. (3). But the method of introspective construction of questionable sentences often had detrimental consequences, especially when full grammaticality was claimed for very strange made-up sentences (e.g. (8)) which then served as data for strong theoretical claims.

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