

Zeitschrift: Studies in Communication Sciences : journal of the Swiss Association of Communication and Media Research

Herausgeber: Swiss Association of Communication and Media Research; Università della Svizzera italiana, Faculty of Communication Sciences

Band: 2 (2002)

Heft: 2

Artikel: Chomskyan linguistics and the sciences of communication

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DOI: <https://doi.org/10.5169/seals-790908>

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CHOMSKYAN LINGUISTICS AND THE SCIENCES OF COMMUNICATION

Chomskyan linguistics does not enjoy great popularity in the communication sciences, despite the importance of linguistic description in both disciplines. In part this is caused by misunderstandings about the nature of Chomskyan linguistics. Therefore, before addressing the interaction with communication sciences, these misunderstandings are addressed and the research programme underlying Chomskyan linguistics is explained as a basis for progress in a scientifically sound field within linguistics. The consequences of this research programme for some other domains of linguistics are then sketched. On the basis of this overview it is argued that Chomskyan linguistics is compatible with research in communication sciences and that the adoption of a Chomskyan perspective on language constitutes an attractive option.

Keywords: Human language, language acquisition, psycholinguistics, language change, sociolinguistics

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1. Introduction

The relationship between Chomskyan linguistics and communication sciences is not as tight as might be expected on the basis of their subject fields. Despite the intimate connection between the subject fields of language and communication, representatives of Chomskyan linguistics and communication sciences tend to disregard each other's work or at least to be highly suspicious of each other's general orientation. From the perspective of communication sciences, three properties of Chomskyan linguistics can be identified which have greatly contributed to this perception:

- the distinction between competence and performance and the ensuing characterization of competence as the central theme of linguistic study;
- the increasing complexity of the theory, which together with the highly theory-internal nature of many arguments renders discussions within Chomskyan linguistics opaque to outsiders;
- the repeated profound changes in the theoretical framework which make even in-depth knowledge of the theory obsolete after a certain period of time.

In this contribution I intend to clarify the nature of the relationship between communication sciences and Chomskyan linguistics. As a preliminary, section 2 will show how each of the above observations emerges from a coherent general view of language and linguistics in line with Chomskyan linguistics. In section 3 I present some brief case studies showing how the Chomskyan view of language affects the study of language-related fields other than the core area. In section 4 I turn to the position of communication in Chomskyan linguistics and point out the extent to which peaceful coexistence and fruitful interaction are possible.

2. The Nature of Chomskyan Linguistics

In this section I will discuss what type of entity is denoted by the term *Chomskyan linguistics*. I will first consider the link to Noam Chomsky, then the relationship to different stages of theories, and finally I will argue that the characteristic properties of Chomskyan linguistics reside in the criteria for the evaluation of theories.

2.1. *Chomsky*

The name *Chomskyan linguistics* suggests a tight relationship between the type of linguistics concerned and Noam Chomsky. It can indeed legitimately be said that Chomsky 'invented' Chomskyan linguistics. This does not mean, of course, that *Chomskyan linguistics* designates whatever linguistic theories are entertained by Chomsky. One reason why this is sometimes believed may be found in the remarkable changes in the theoretical framework adopted in Chomskyan linguistics. To an outside observer this may suggest that fashion or the whim of one linguist determines the course of linguistics.

The impression that Noam Chomsky determines the course of Chomskyan linguistics single-handedly is reinforced by what may be called the 'sociology of the field'. As sketched by Newmeyer (1986), the rise of Chomskyan linguistics and its taking over the field from Post-Bloomfieldian linguistics in the late 1950s and early 1960s was not the result of the conversion of many established Post-Bloomfieldian linguists to the new framework, but rather that of the attraction the new framework exerted on talented students. At a time when linguistics departments at many universities in the US were founded or expanded, many of the best young linguists available for the posts had been educated in the Chomskyan orientation.

While this accounts for the sociological phenomena involved in the rise of Chomskyan linguistics, it does not account for the specific type of development, with its numerous revisions of existing theory, some of them quite radical. At least in part the nature of this development is due to the context in which research is carried out. In linguistics, as in many other sciences, a substantial portion of research is carried out in the preparation of Ph.D. dissertations. A concentrated bachelor's and master's programme may bring students up to the level of knowledge in Chomskyan linguistics necessary to elaborate a specific issue at the forefront of current research. Of course the contributions of different Ph.D. dissertations are not always compatible. This means that competing proposals to modify certain aspects of the theory coexist for some period. As many students of linguistics want to study at MIT and with Noam Chomsky, many of the best Ph.D. dissertations are written at MIT, and Chomsky has a good opportunity to influence their direction of research and to get to know their results long before publication. As a consequence, Chomsky has a

rather unique position of knowledge, both in the historical depth and in the broad range of current alternative proposals at any time, and the work in Ph.D. dissertations in Chomskyan linguistics often has a fairly shallow historical perspective.

A further aspect of the development observed in Chomskyan linguistics is due to the general human characteristic which makes it difficult to accept that one's own earlier proposal is becoming obsolete. This is especially salient when the developments motivating the change do not belong to one's daily life. Linguists who fail to keep up to date with current trends at the forefront of research and continue to expand upon what they once did in their Ph.D. research will at some point discover that their original proposals have been abandoned for reasons they do not see as compelling. In fact, it is often the underlying assumptions which are overturned rather than the proposals developed in the Ph.D. themselves. As a consequence, many linguists have the impression that Chomsky has turned away from them when in fact the field has moved on.

A typical example illustrating Chomsky's advantage of being in a well-informed position is the proposal to consider *S* and *S'* [*S*-bar] as projections of *Infl* and *Comp*, respectively. First referred to in Stowell's (1981) Ph.D. dissertation, it is mentioned by Chomsky (1981) before most linguists outside MIT could even be aware of it. On other occasions, Chomsky rather follows the field. Abney's (1987) proposal to consider the noun phrase as a projection of *Det* was only accepted by Chomsky after most linguists specializing in the structure of the noun phrase had long adopted it. It also deserves to be mentioned that there exist influential alternative proposals, e.g. Rizzi's (1990) relativized minimality and Kayne's (1994) anti-symmetry, referred to but not adopted by Chomsky.

The position Chomsky has in Chomskyan linguistics can therefore be characterized as follows. First, he had the original idea of working on linguistics in a particular way. Second, he has been able to attract some of the best Ph.D. students, influence their research, and be the first to be informed of their results. Third, the state of knowledge about the history and current developments gives him an unmatched authority, especially among younger linguists. As argued also by Botha (1989), this does not mean that Chomskyan linguistics equals Chomsky's linguistics. An analysis along the lines of Murray (1994), who compares Chomsky's policy in 'managing' the field to Mao Zedong's cultural revolution, is by no means compelling.

2.2. *Stages of Theoretical Development*

The internal, theory-oriented history of Chomskyan linguistics can be divided into four main stages. For each of these stages, a major publication by Chomsky can be considered as the central reference point. The first stage is marked by Chomsky's (1957) *Syntactic Structures*. This period is characterized by a small group of people involved, by the provisional adoption of many theoretical devices from Post-Bloomfieldian linguistics, and by the search for a coherent theory. Developments in this period were fast and often occurred in response to discussions with Post-Bloomfieldians.

The second period is marked by Chomsky's (1965) *Aspects*. This book established a common basis in the new and booming field of Chomskyan linguistics. It takes stock of the achievements and problems of the preceding period and serves as an anchor point for linguists around Chomsky and opponents in generative semantics alike. The *Aspects*-theory is often referred to as the *Standard Theory* (ST). It assumes a deep structure generated by phrase structure rules and a surface structure produced by transformations, where deep structure serves as input to semantic interpretation and surface structure as input to phonetic realization. The name *Transformational-Generative Grammar* is quite appropriate for this stage of the theory. In subsequent developments, the role of deep structure is reduced and surface structure becomes more abstract.

The third period is marked by Chomsky's (1981) *LGB*. Instead of the individually stated phrase structure rules and transformations we find in *Aspects*, in *LGB* there are only general rules restricted by general principles. Thus individual transformations such as found in *Aspects*, e.g. passive, are replaced by move α ('move anything anywhere'), constrained by such principles as government and binding. This stage of the theory is often referred to as *GB-Theory*, after the title of Chomsky's (1981) book. Characteristic of this period is the spread of Chomskyan linguistics outside the USA. More research is being carried out by native speakers of languages other than English than was previously the case. The differences between languages found in such research are accounted for by parameters in the general principles, which can have different values for different languages. Another term for the theory at this stage is therefore *Principles and Parameters* (P&P-theory).

The fourth and latest period is marked by Chomsky's (1995) *Minimalist Programme* (MP). As opposed to ST and GB-theory, MP is a

programme outlining the direction the theory should take rather than a fully-fledged theory. There are still general principles, but they are economy principles, more general in nature than the principles of GB-theory. A typical difference with GB-theory following from these economy principles is that move *a* is replaced by movement as a last resort measure. This means that every instance of movement has to be motivated.

Comparing the centrepieces of the four different stages, one gets the impression of profound differences separating them. The actual transitions, however, were rather more gradual. In the case of the development from *Aspects* to *LGB*, the emergence of principles can be observed from the early 1970s onwards, with Chomsky's (1970) statement of basic X-bar theory and subjacency proposed in Chomsky (1973). In fact, when *LGB* appeared, it was a general description of the theory which had developed in the preceding period rather than a revolutionary new work.

Nevertheless, the transition between each pair of stages has been represented as a revolution by some people. Often these are people who fail to appreciate the progress Chomskyan linguists claim for such a transition. Matthews (1993) describes himself as an adherent of Chomsky's in the ST period, which he considers as "Chomsky's classic period" (1993:205f.), but sees GB-theory as involving many promises at the cost of making the theory "no longer directly vulnerable to conflicting evidence." (1993:237). Newmeyer (1998:28) rather takes GB-theory to represent Chomsky's classical period and fails to see the merits of MP.

In the absence of an underlying reason, any transition seems haphazard. While for many linguists working in the field, the transition may in practice simply be the adoption of whatever Chomsky proposed, it would be a serious epistemological problem for Chomskyan linguistics if there were no underlying reasons. The most important type of argument for practising linguists is that a new theory solves problems the old one could not solve. Such arguments are necessarily theory-internal. In order to develop their full force, these arguments require sufficient knowledge of the preceding stage of the theory and preferably a personal history of unsuccessfully exploring the ways to account for the data in question. This is the place where shortcuts in the education of new students are made to bring them up to the current level of theory as soon as possible. In the next section I will concentrate on conceptual arguments, which are more accessible without in-depth theoretical knowledge.

2.3. *The Unity of Chomskyan Linguistics*

In order to perceive the succession of four stages sketched above as a rational development we have to turn to the underlying body of assumptions characterizing Chomskyan linguistics. A central assumption of Chomskyan linguistics concerns the nature of language. Language is considered as a type of knowledge. Given this assumption, Chomsky formulates the questions in (1).

- (1)
 - a. What constitutes knowledge of language?
 - b. How is knowledge of language acquired?
 - c. How is knowledge of language put to use?

While this particular formulation was taken over from Chomsky (1986:3), the same list of questions with minor variations in formulation can be found throughout Chomsky's work.

Language is a type of knowledge not accessible to direct, conscious investigation. The answer to question (1a) can therefore only be found indirectly by looking at the effects of this knowledge. These effects constitute the set of data of Chomskyan linguistics. The data set thus includes corpora of written and/or spoken language, grammaticality judgements (whether introspective or not), psycholinguistic experiments, and other types, some of which will be discussed below. The central point to be considered when using these data is that they are *indirect* effects of the knowledge to be described. This implies that the 'noise' intervening between this knowledge and the observed data has to be factored out. Only to the extent that this separation can indeed be made are the data reliable indications of what the knowledge of language really is. It is in this light that the distinction between competence and performance has to be interpreted.

- (2) "We thus make a fundamental distinction between *competence* (the speaker-hearer's knowledge of his language) and *performance* (the actual use of language in concrete situations)." [Chomsky (1965:4), original emphasis]

The distinction in (2) is also found throughout Chomsky's work, though less frequently than the questions in (1), because (2) is only invoked depending on the type of challenge Chomsky faces. The proper use of performance data, as available in corpora, in the investigation of question (1a) suggested by (2) is to filter out the effects of factors other than the competence that are apparent in order to discover properties of the com-

petence. Sometimes it is straightforward to identify such factors. A slip of the tongue should be treated differently from a grammatical sentence. There are of course many borderline cases. Similar considerations apply to other data types. No single type of data is free of problems, but grammaticality judgements have a number of relative advantages. Thus, depending only on the creativity and skill of the linguist, any number of 'experiments' can be carried out quite easily and with examples which are exactly to the point. It is a misunderstanding, however, if grammaticality judgements are taken to be privileged as data in some meta-theoretical sense.

Answering question (1a) means describing the knowledge a person has of his or her language in terms of a grammar. There has been a lot of discussion about what exactly it means that such a grammar should be "generative". Chomsky (1965:4) identifies generative with "explicit". This should not be understood in the sense of formulating an entire grammar as formally as a system of logic. A formal grammar of this type would generate a set of sentences, rather than describe a knowledge component. Instead, a generative grammar should be opposed to traditional grammars which depend heavily on the linguistic intelligence of the reader. A generative grammar describes this linguistic intelligence rather than assuming it.

The central problem in answering (1a) is not that it is so difficult to devise a grammar consistent with all the data gathered for a particular language, but rather that there are too many such grammars. It is a well-known result of formal language theory that there are infinitely many context-free grammars for any finite set of sentences. Even though the data in Chomskyan linguistics are not sentences, but various types of indications on what the knowledge of language is, the infinity result cannot be avoided as long as linguistic investigation is based on the study of a (at any given point necessarily finite) set of data.

In order to overcome this problem, Chomsky uses question (1b). The appeal to language acquisition as a way to choose the proper description of the knowledge of language has been a constant feature of Chomsky's work, explicitly so at least since his (1959) review of Skinner (1957).

Question (1b) arises because the knowledge of language found in a speaker includes various types for which no direct or indirect evidence can be supposed to be available in the acquisition process. We cannot only interpret and produce sentences we have never heard before, i.e. for which direct evidence is missing in the acquisition process, but also agree

on the grammaticality and interpretation of sentences which are so marginal that the underlying knowledge cannot be based on analogical reasoning. A well-known example of the latter is the phenomenon of parasitic gaps, as in (3).

(3) Which documents did you file #₁ without reading #₂?

The two object positions marked # in (3) are both interpreted as coindexed with *which documents*. Sentences such as (3) are not found in text corpora (unless they contain linguistic articles), but there is widespread agreement on their grammaticality. Therefore they must be an automatic, unintended side effect of language acquisition. For this reason they have been important in theoretical discussions (cf. Culicover & Postal 2001 for an overview).

In view of the fact that not all knowledge of language a speaker has can be learned on the basis of input data, Chomskyan linguistics assumes that there is a genetically determined component to language acquisition, so that some parts of the knowledge need not be learned. At the same time, of course, a child does acquire the language of its environment, independently of its genetic predisposition. A Scandinavian child growing up in a Swahili-speaking community will have a white skin and be a speaker of Swahili. Therefore, there must also be an experience component involved in language acquisition, absent in the complexion.

The coexistence of genetic and experiential elements in language acquisition is an essential assumption of Chomskyan linguistics. It creates a tension between the goals of explanation of learnability and description of all languages. The former tends to reinforce the genetic component, but this complicates the statement of grammars for individual languages. The latter tends to weaken the genetic component, but this complicates the explanation of language acquisition. In the same way as a grammar is meant to describe the knowledge of language of a particular person, the universal grammar (UG) is meant to describe the genetically determined component involved in language acquisition, common to all human beings.

The transition from ST as found in *Aspects* to GB-theory can be understood in terms of the search for a better solution to the problem of language acquisition. In ST, the emphasis is on the descriptive component. The acknowledgement that ST is inadequate as a theory of acquisition is implicitly present in Chomsky's (1965:25) statement in (4).

- (4) “As a long-range task for general linguistics, we might set the problem of developing an account of th[e] innate linguistic theory that provides the basis for language learning.”

It is logically impossible to learn a particular set of phrase structure rules and transformations on the basis of input sentences. Yet there are few further constraints in ST which can be supposed to be part of UG. Therefore the fact that the knowledge of language different speakers have is so similar remains mysterious. The model of principles and parameters in GB-theory is an attempt to strengthen the genetic component to such an extent that language acquisition becomes at least logically conceivable. According to Chomsky, whereas a theory of language acquisition in 1965 is “a long-range task”, in 1981 “we can begin to see the glimmerings of what such a theory might be like” (1981:4).

The transition from GB-theory to MP can also be explained in terms of the tension between descriptive and explanatory demands on a theory of language. Research based on the statement of principles and parameters had led to such a proliferation of parameters and theoretical entities (e.g. functional categories) that questions of how to constrain them became more and more pertinent. This led to the statement of economy principles, including the reversal of perspective concerning the possibility of movement.

In sum, then, Chomskyan linguistics has the goal of describing the knowledge of language of individual speakers in a grammar and explaining the phenomenon of language acquisition by describing the genetic component involved in a universal grammar. These simultaneous goals cause a tension in terms of which the historical development of the theoretical frameworks can be explained. Chomskyan linguistics is therefore not a theory, but a more general research programme characterized by a field of study and evaluation criteria for theories proposed in this field.

3. Core Areas and Periphery in Chomskyan Linguistics

The study of language and languages has in the course of its history developed into a multiplicity of specialized subfields. It is natural that a research programme such as Chomskyan linguistics will concentrate on some of these subfields rather than on others. At the same time, if it is intended as a general approach to language, all areas of the study of language have to be given a position in the overall picture. Thus major

insights from areas such as the history of the Indo-European language family and the social aspects of bilingualism have to be incorporated in some way. This does not mean that they have to be incorporated in the way specialists in these areas are used to looking at them, nor does it imply that they have to receive a purely linguistic explanation, but they must be given a place in an overall structure compatible with the view of core areas as specified in Chomskyan linguistics.

In this section, four case studies are presented which show a range of different types of interaction between Chomskyan linguistics and what from their perspective are non-central fields within the domain of language studies. For language acquisition and psycholinguistics, discussed in sections 3.1 and 3.2, a correct understanding of the research programme of Chomskyan linguistics results in a somewhat different form of integration than what is often expected. When we shift our perspective from personal to social aspects of language, we encounter a view of what constitutes "a language" in Chomskyan linguistics which diverges from the one often assumed elsewhere (section 3.3). Using this concept of language in the area of language change, section 3.4 shows how Chomskyan linguistics proposes an explanation for and at the same time draws insights from a phenomenon which remained outside its scope for a long period.

3.1. Language Acquisition

The emphasis on question (1b) in describing the research programme of Chomskyan linguistics suggests that language acquisition should be a central area for attention. It has often been observed that the study of language acquisition does not receive the attention which might be expected on this basis. Pinker (1982), for instance, criticizes Chomsky for ignoring studies of the acquisition process.

In order to appreciate this divergence, it has to be kept in mind that at the core of Chomskyan linguistics is the description of the knowledge of language of individual speakers and the genetically determined basis common to all human beings. Language acquisition comes in as the real-life connection between the two. The actual process of language acquisition in a child involves a series of other factors which are not directly relevant to the core goals of Chomskyan linguistics.

Hornstein & Lightfoot (1981) emphasize the distinction between the logical problem of language acquisition and the realistic problem of lang-

uage acquisition. As the core of Chomskyan linguistics concentrates on the former, the often repeated idealization of instantaneous acquisition is not so paradoxical as Pinker (1982) suggests. This idealization, as formulated for instance by Chomsky (1986), presupposes that we are primarily interested in the initial state, corresponding to what UG should describe, and the stable state resulting from language acquisition, corresponding to what the individual grammar should describe. An abstraction is made from the path leading from one to the other.

In order to account for language acquisition in a realistic sense, factors other than just the initial and the stable states have to be considered, the central one being the learning strategy. While the amount of information required for the idealized view of language acquisition can be assessed, the actual strategy used by the child to infer this information from available input is much more difficult to reconstruct. An introductory text to the study of realistic language acquisition in Chomskyan linguistics is Atkinson (1992). It is remarkable that it concentrates at least as much on the evaluation of learning strategies as on the insights which can be used in the assessment of theories of grammar and of UG. McDaniel et al. (1996) collect a number of methodological papers, of which especially Jakubowicz (1996) focuses on the mutual impact of acquisition studies and Chomskyan linguistics.

In sum, the primary interest in language acquisition from within Chomskyan linguistics concerns the logical problem of language acquisition, for which the idealization of instantaneous acquisition is helpful. The study of the actual acquisition process concerns first of all the learning strategy. In this area, Chomskyan linguistics thus features far more in the role of the provider of background knowledge than that of the user of the resulting theories.

3.2. Psycholinguistics

There are certain parallels between the relationship of Chomskyan linguistics to language acquisition studies and that to psycholinguistics. There have been claims from both fields that Chomskyan linguistics should be concerned mainly with their specialty, but fails to do so.

From the 1960s, a group around George A. Miller started investigating consequences of theories proposed within the *Aspects* framework for psycholinguistic research. One example of this work is Slobin (1966). Assuming that a grammar is a description of a speaker's competence, they

set out to discover consequences of particular rules in the grammar for processing sentences in which these rules were thought to apply. In particular, transformations were thought to complicate processing, so that for instance passive sentences would take longer to process than their active counterpart. This is known as the Derivational Theory of Complexity (DTC). Fodor et al. (1974) give an overview of the motivation and results of this type of work.

It soon became clear that DTC-inspired experiments produced negative results, i.e. the number and complexity of transformations supposed to apply in the derivation of a sentence does not consistently influence the processing time. There were two types of reaction. One group of linguists claimed that the theory was wrong. Another group claimed that the experiments were misguided. The former group, whose point of view is presented by Bresnan (1978), includes some of the leading figures of what later became Lexical-Functional Grammar (LFG). It may at first sight seem somewhat surprising that Chomsky took the second position.

The argument why Chomskyan linguistics is not bound by negative DTC-results to change its theory contains a number of elements. Individual grammars and UG describe mental entities and should therefore be 'psychologically real', in the sense that they describe the actual psychological organization. However, such a description does not have to include the description of how this organization is used. This distinction between declarative and procedural knowledge had already been pointed out by Dresher & Hornstein (1976:378-396). A grammar in Chomskyan linguistics describes knowledge, question (1a), but not the way it is used, question (1c). Language processing involves a parser in the way language acquisition involves a learning strategy. As shown in more detail in ten Hacken (1997, 2000), by focusing on language processing in the way it does, LFG assumes a different research programme. What Chomsky (1980) rejects in particular is an a priori classification of data into two classes, one containing grammaticality judgements and the other psycholinguistic experiments, such that only the latter type of data can be used as evidence for the 'psychological reality' of a grammar. Instead, all data are equally used at any point, the only constraint being that auxiliary assumptions on issues such as the nature of the parser or the learning strategy are duly taken into account.

Within Chomskyan linguistics there is considerably less research on the nature of the parser than on the nature of the learning strategy in language acquisition. Chomsky (1991:19f.) questions the plausibility of

the assumption that an innate parser exists as a faculty of the mind, shared by all human beings. This has not stopped some researchers from applying versions of P&P-theories as a basis for parsers on a computer, e.g. Wehrli (1988), Crocker (1996). This type of work, however, is as far removed from Chomskyan linguistics as DTC-inspired experiments. In theoretical discussions, certain details of the theory can be left underspecified because they are not the focus of attention (cf. Ludlow 1992). In a computer programme, no such option exists. This means that choices have to be made even if no sufficient argumentation is available. As a consequence, the theory actually implemented differs quite substantially from the theory it was based on. As the human brain, studied at the level of linguistic principles, is quite different from a computer, this should not be surprising.

There is of course a level at which the human brain does have similarity to a computer. Being physically implemented, any faculty of mind has to be related in some way to the firing of neurons. In fact, Chomsky (1988:3) adds a fourth question to the three in (1), focusing on the physical mechanisms implementing language in the brain. As argued by Uriagereka (1998), however, this need not imply that the neural level of language gives interesting insights into the nature of grammar. The relationship is probably as remote as between atoms and life or between the individual letters of genetic code and the working of the digestive system.

In sum, psycholinguistic results can be used as data in Chomskyan linguistics with due precautions. Neurolinguistics is related to the level of description central to Chomskyan linguistics only rather remotely, in the sense that there are several layers of generalization in between the two.

3.3. *Italian versus Pavarotti's Language*

In Chomskyan linguistics, language can be considered from two perspectives. On the one hand, language is a knowledge component in the mind/brain of an individual, i.e. the competence to be described in a grammar. On the other hand, language is a property of the human species, i.e. the language faculty to be described in UG. Neither of these perspectives coincides with the sense in which English or Italian are languages. The question is then how to interpret sentences such as (5).

(5) Italian is the language of Luciano Pavarotti and Cecilia Bartoli.
It is immediately obvious that (5) is true in the commonsense interpretation. It is more difficult to figure out in what sense *Italian* as used in (5)

is a language in Chomskyan linguistics. It certainly cannot refer to language in the sense of UG, because it is used in contrast to other languages. In the individual sense, however, Pavarotti and Bartoli cannot share a single language, because their minds/brains are separate. So what kind of entity is referred to by *Italian* in (5)?

On closer inspection the concept of *Italian* in (5) is rather fuzzy. Pavarotti was born in Modena in 1935, Bartoli in Rome in 1966. They belong to different generations and come from different regions. Although their language competences have a large overlap, it would be quite surprising to find that they were exactly identical.

The fuzziness of the concept of *Italian* is quite fundamental in nature. It is not possible to formulate a set of necessary and sufficient criteria to determine whether someone's language is Italian or not. Italian has numerous dialects with highly marked distinctions between them. The borderline between Italian and Ladin is difficult to draw, but also the reason why Ladin is a separate language but some of the more marked dialects of Southern Italy and Sicily belong to Italian can hardly be purely linguistic (cf. Tosi 2001). An example of the partially political nature of such attributions is what happened to Skåne, a region in Southern Sweden which used to belong to Denmark. Until 1658 Skåne had a Danish dialect. In 1658, when Skåne passed to Sweden, people in Skåne did not change their language, but it was now called a Swedish dialect.

Italian in (5) is therefore neither a precise concept nor one which corresponds to a real-life entity. It is an epiphenomenon with a status in Chomskyan linguistics comparable to the status of the concept of a beautiful sunrise in astronomy. Chomsky (1997:14) formulated this as in (6).

- (6) "For Jones to have (know) a language is simply for the language faculty of Jones's mind to be in a particular state. If the state of your language faculty is similar enough to the state of mine, you may understand what I say."

The fuzziness of the concept of *Italian* in (5) is captured by "similar enough" in (6). In the same way as aspects of the beautiful sunrise can be explained in part by planetary constellations, physical theories concerned with colours, and biological and psychological theories of human vision, there is some degree to which this similarity between two languages can be accounted for in Chomskyan linguistics.

A language as a state of an individual's language faculty can be divided into a core and a periphery. The core consists of the genetically determined backbone of principles and the particular parameter settings. The periphery consists to a large extent of the lexicon. In the mind of an adult speaker, parameters are set one way or another as a result of the language acquisition process. Given a finite number of parameters, each with a finite number of possible settings, there are only finitely many core languages, as Chomsky (1981) explains in his preface. All other differences are due to differences in the periphery. It would certainly be wrong to identify the commonsense notion of *Italian* in (5) with a particular parameter setting, but the degree of perceived similarity for speakers is of course influenced by it.

3.4. *Language Change*

In many accounts of the history of linguistics, modern linguistics starts with the formalization of the insight that different languages might have a common origin. In the 19th century, the notions of language change and language family were at the core of linguistic study, leading to such generalizations as Grimm's law and Verner's law.

In Chomskyan linguistics, the results of this type of work cannot simply be taken over, because their very statement depends on a concept of language whose status was recognized as merely pre-theoretical in section 3.3. A simple statement such as (7) encounters the same problems of interpretation as (5) above.

(7) Italian and French are descendants of Latin.

In a perspective in which a language is embodied in the brain of an individual, new analyses have to be found for the spread and change of what is commonly perceived as a language. In order to clarify what this means in practice, I will take as examples here the spread of English to Ireland and the change of the position of the verb from Old French to Middle French.

As documented by Hindley (1990), Ireland was more or less homogeneously Irish-speaking at the start of the 19th century, but within a few generations it became an English-speaking country with a small Irish-speaking minority. In Chomskyan linguistics this phenomenon has to be explained in terms of the language of individual people. Given the nature of language acquisition, it is not possible simply to undo parameter set-

tings. In the lifetime of a speaker, the only changes to the language faculty concern the periphery. If language changes in a community over time, this is due to language acquisition by a new generation of speakers. Irish speakers did not stop knowing Irish, but they stopped speaking Irish to their children, giving them English input instead. The children developed their language on the basis of this input, constructing a more consistent system than could be derived mechanically from the analysis of the performance data produced by their parents, who had learned English as a second language.

The transition from Old French to Middle French is slightly more complex than the spread of English in Ireland. In Old French, as described by Rickard (1989), all permutations of subject, object, and verb are possible. SOV is not the most frequent order, but it often occurs in subordinate clauses and, for reasons similar to the argumentation adopted for Dutch and German, SOV is taken as the basic word order. In Middle French the SOV order is lost and the predominant SVO order is assumed to be the underlying one. As opposed to the transition from Irish to English in Ireland, the transition from SOV to SVO in French cannot be explained as the result of a conscious choice by bilingual parents. Instead, it results from the unconscious process of parameter setting in language acquisition under the influence of the language data available to the child.

The core language, including parameter settings, is supposed to be stable after puberty. While the adults' parameter setting does not change, the way they use their knowledge of language may. This will affect the frequency of use of certain constructions. Frequency of certain phenomena does not by itself constitute a part of the language, but it does determine what the child gets as input. Even in Old French, SVO was more frequent than SOV. The reasons for adopting SOV as underlying word order are based on the statement of the conditions under which alternative word orders can occur. A child growing up towards the end of the Old French period would get a lot of input with SVO word order. Once the proportion of SOV sentences drops below a certain threshold, the child fails to set the parameters such that SOV is basic and assumes an SVO word order instead. This does not mean that children and parents do not understand each other any more. In fact, there will be only a slight difference between the child's and the parents' language use, because the infrequent occurrence of SOV conditioned the language change in the first place. The difference is in the mental state of child and parents.

In recent years, there has been an increasing interest in historical linguistics from within Chomskyan linguistics. If language change is the result of parameter setting in language acquisition, the changes we know of can give valuable information about the nature of parameters and language acquisition. Earlier studies such as van Kemenade (1987) and Roberts (1993) concentrated on the expression of differences between different stages of a language in terms of parameters which had changed. In more recent work, the emphasis is on the process of change. Lightfoot (1999) gives an accessible overview of the issues involved. A textbook introduction to the transition from Old to Middle English from this perspective, concentrating on word order changes, is Fischer et al. (2000). Pintzuk et al. (2001) is a collection of articles on different issues, representing different views from within Chomskyan linguistics.

4. Communication

On the basis of the analysis of Chomskyan linguistics and its relationship to areas of language studies other than the study of grammatical competence, we can now turn to its relationship to communication sciences. It is generally accepted that there cannot be a theory of communication covering all its aspects in a unified account. Sperber & Wilson (1986) compare communication in this respect to locomotion, a comparison taken over by Chomsky (1991). Introductory texts such as Benoit (1995), Burkart (1998), and Merten (1999) distinguish various perspectives ranging from Shannon's (1948) mathematical model of information science to sociological analyses of the functioning of mass media. In looking for a link between communication and Chomskyan linguistics, the area of pragmatics provides the most straightforward interface.

4.1. Meaning and Pragmatic Competence

On the linguistic side, the relationship with pragmatics passes through the analysis of meaning. In Chomsky's writings, semantics plays a clearly subordinate role compared to syntax. Chomsky (1976) introduced the level of *Logical Form* (LF), which has since played an increasingly important role in his theory, but not as a full semantic representation. It is meant to include only information strictly determined by sentence grammar. In

fact, LF is a syntactic representation, which implies that the analysis of meaning proper does not belong to the study of language as such.

A slightly different, but not altogether incompatible, view is developed by Ray Jackendoff. Although it is sometimes difficult to relate his theory of conceptual structure to Chomsky's theory of syntax, Jackendoff (2002) presents it as firmly rooted in the research programme of Chomskyan linguistics. The major cause of divergence is the difference in focus. Jackendoff (1983) argues against a separate level of semantic structure between syntactic and conceptual structures, which would encode the linguistic aspects of the analysis of meaning. This is in line with Chomsky's separation of syntax and meaning. The architecture adopted by Jackendoff (2002) includes separate rule systems for building up parallel syntactic and conceptual representations, which are subsequently linked.

Pragmatics, indeed communication sciences in general, are centrally concerned with language use. Chomsky (1980) introduces the concept of *pragmatic competence*, as opposed to grammatical competence, an idea elaborated by Kasher (1984, 1991). That language and pragmatics are different types of competence is supported by case studies of impairment, in which only one of the two is affected. Kasher (1991) argues that pragmatics is not simply the study of the question of language use as in (1c). Instead, three questions analogous to (1) can be asked with regard to pragmatic competence. A central difference between pragmatic and grammatical competence is that the former belongs to the central mental information processing system, whereas the latter is an input system. In terms of Jackendoff's conception this means that pragmatics works on conceptual structures directly, whereas grammatical competence results in syntactic structures which are linked to corresponding conceptual structures.

That Chomskyan linguistics considers language as an individual mental component implies that psychological aspects of language understanding can be fruitfully studied, whereas language production at the individual level is subject to a notion of free will, of which Chomsky assumes that it is a mystery, i.e. a problem for which the solution transcends what we can expect to find out even in principle, given our human limitations. As Kasher (1991) observes, introducing the notion of pragmatic competence limits the extent of this mystery by identifying a subdomain whose description can be conceived of as a well-formed scientific problem.

4.2 *Relevance Theory*

An alternative approach to pragmatics is Relevance Theory (RT), as presented by Sperber & Wilson (1986). In RT the focus of attention is more strictly on communication rather than on language use, as is the case with Kasher. In fact, Sperber & Wilson argue that the linguistic form of communication, though common, is a limiting case. In communication the mutual cognitive environment is affected by the asymmetrically coordinated manipulation of what is manifest to the participants. This manipulation takes place in an ostensive-inferential process in which a stimulus carries informative and communicative intentions accompanied by an implicit guarantee of relevance.

The view that communication and language are in principle independent is shared by RT and Chomskyan linguistics. Language is not a tool for communication (although it can be used as such) and communication does not rely on language (although it usually uses it). This is significant because it precludes an entirely functionalist explanation of language. As far as the position of semantics is concerned, Carston (1999) suggests that there is a “semantic” representation, extracted from the syntactic one. To what extent this is compatible with Chomskyan linguistics depends on what exactly is meant by *semantic* in this context. If it can be assimilated to LF or conceptual structure, there is no serious problem. Central in this context is the relationship with the outside world. As long as this relationship is not represented in an absolute sense but as observation resulting in a cognitive representation of the world, a reconciliation seems possible. As pointed out in ten Hacken (to appear), a formalist approach, adopted in other approaches to pragmatics, e.g. Gazdar (1979), is incompatible with Chomskyan linguistics..

4.3 *Type and Degree of Interaction*

Compared to the areas discussed in section 3, the ties between Chomskyan linguistics and pragmatics are much looser. There is no single approach to pragmatics evolving from Chomskyan linguistics, but rather a range of compatible theories. Chomskyan linguistics does not provide a set of criteria strong enough to choose from among these theories. For other areas of communication sciences, the interaction with Chomskyan linguistics passes through pragmatics and is in general more remote.

In this light Chomsky's (1991) suggestion that the theory of linguistic competence is an important component of communication sciences is in need of explanation. What is apparently meant here is that given the role of language in communication, a descriptive theory of language is a necessary part of a general account of the knowledge people use in communication.

This situation also explains why in communication sciences other theories of linguistics are more common, in particular Lexical-Functional Grammar (LFG), as described by Bresnan (2001). In LFG the connection between the surface form of utterances, linguistic processing, and semantic interpretation is much more direct than in Chomskyan linguistics. Ten Hacken (1997) concludes from this that the question of processing takes a position in LFG corresponding to acquisition in Chomskyan linguistics, i.e. LFG reverses the order of (1b) and (1c). It is no surprise then that Kempson et al. (2001) in developing a syntactic framework specifically adapted for the interaction with RT, emphasize the affinity with LFG. The mutual impact between such theories and communication sciences may be more important, but it remains to be seen to what extent the metatheoretical background can be justified and provides a fruitful basis for the various fields in which Chomskyan linguistics has already proven its usefulness.

5. Conclusion

In this conclusion I would like to summarize the considerations which come into play in the question of whether or not to choose a perspective based on Chomskyan linguistics in the pursuit of communication sciences.

- First of all Chomskyan linguistics is compatible with a fairly broad range of common approaches to pragmatics, which provides an interface to other areas in the field of communication. It is incompatible mainly with the tradition of philosophy of language which considers language as an abstract formal device to be used as a code with a real-world denotation.
- Secondly, in using theoretical results from Chomskyan linguistics, it is necessary to take into account the relative position of these results in the overall theory. The longevity depends on the centrality of the insight. Important insights will be incorporated in new versions of the theory, if necessary reformulated so as to fit in.

- Finally, it is attractive for research in the communication sciences to adopt Chomskyan linguistics as its basis for the concept of language, because it is a powerful and widespread research programme with a plausible basis. By adopting it, the results obtained will be in line with a huge amount of scientific work ranging from studies of aphasia to language change.

Chomskyan linguistics can play a valuable role in a full account of human communication. The details of the relationship with mainstream communication sciences remain to be elaborated. This requires an interdisciplinary effort which will be of interest for researchers both in Chomskyan linguistics and in communication sciences.

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