

METHODOLOGICAL BASES OF A PROGRESSIVE MENTALISM

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Chapter 1

PREAMBLE

Is it "legitimate" and "proper" to "impute existence to" or "attribute psychological reality to" the theoretical constructs of linguistic theories? This is one of the main questions considered by Chomsky in his recent article "On the biological basis of language capacities" (1976). Chomsky's discussion of this question may be seen as an attempt to clarify and justify the methodological bases of mentalistic linguistics. That these methodological bases are in need of clarification and justification has been argued over the years by various scholars.⁽¹⁾ Moreover, Katz (1977:564) has recently admitted that he does not fully understand Chomsky's position on the psychological reality of grammars. This admission by Katz is particularly significant.⁽²⁾ Recall that Chomsky and Katz co-authored a paper in which they attempt, among other things, to explicate the sense in which grammars may be claimed to be psychologically real.⁽³⁾

The present study deals with Chomsky's position on the methodological bases of mentalistic linguistics from two complementary angles.⁽⁴⁾ On the one hand, this position is critically analyzed and it is argued that Chomskyan mentalism has serious methodological defects. Since the above-mentioned attempt by Chomsky (1976) at clarifying and justifying the methodological bases of his mentalism constitutes his most recent systematic discussion of the issues involved, my critical comments are primarily aimed at this attempt. The general tenet of the criticism is that Chomskyan mentalistic theories are both ontologically and evidentially indeterminate and hence, in terms of Chomsky's own methodological theory, nonempirical. On the other hand, the present study attempts to eliminate the above-mentioned defects of Chomskyan mentalism. In attempting to do so, it explicitly articulates the most fundamental methodological bases of what may be called a (scientifically) progressive mentalism.

The general nature and potential contribution of the present study may be elucidated with reference to a distinction central to Laudan's (1977) theory of scientific growth: the distinction between empirical and conceptual problems. Laudan (1977:48) considers empirical problems to be

"first order questions about the substantive entities in some domain". Conceptual problems, by contrast, are "higher order questions about the well-foundedness of the conceptual structures (e.g. theories) which have been devised to answer first order questions". Laudan (1977:5) considers the cases where a scientific theory is in conflict with the methodological theories of the relevant scientific community as jointly constituting one of the major sources of conceptual problems.⁽⁵⁾ He (1977:59) argues convincingly that "the fate of most of the important scientific theories in the past have been closely bound up with methodological appraisals of these theories. It is for precisely that reason that perceived methodological weaknesses have constituted serious, and often acute, conceptual problems for any theory exhibiting them. It is for the same reason that the elimination of incompatibilities between a theory and the relevant methodology constitutes one of the most impressive ways in which a theory can improve its cognitive standing". In terms of Laudan's theory, the present study clearly deals with a set of interrelated conceptual problems in Chomskyan linguistics. In essence, it represents an attempt to "improve the cognitive standing" of the mentalistic approach to the study of language by eliminating incompatibilities between Chomskyan mentalism and the relevant methodological theory.

As regards its organization, in chapters 3 and 4 it will be argued that Chomskyan mentalism has serious shortcomings which spring from the fact that it is in conflict with the falsificationist methodology which Chomskyan adopt at a level of metascientific awareness. In an attempt to eliminate this conflict, chapter 5 develops the methodological bases of an alternative form of mentalism --- a progressive mentalism. Chapter 6 attempts to provide a general appraisal of what could be major weaknesses and contributions of the preceding chapters. The background to the discussion in chapters 3-6 is presented in chapter 2, where Chomsky's (1976) own characterization of the nature and import of his mentalism is outlined in generally neutral terms.

Chapter 2

OUTLINES OF CHOMSKYAN MENTALISM

2.1 Introduction

To see what Chomskyan mentalism is about, consider the sentence (1) and the questions (2) and (3).

- (1) Violins are easy to play sonatas on.
 (2) What violins are easy to play sonatas on?
 (3) What sonatas are violins easy to play on?

To illustrate the method of mentalistic linguistics, Chomsky (1976:7) considers the following problem in connection with these expressions: why is it that (3), unlike (2), is not well-formed as a question corresponding to (1)? Chomsky's (1976:7-9) tentative solution to this problem boils down to the following: wh-clauses are "islands" in the sense that a rule such as wh-movement --- which forms questions and relatives by moving such expressions as who, what, what sonatas, etc., to the left of a clause --- can generally not be applied to a second wh-expression within a wh-clause. At the stage where wh-movement applies in the derivation of the question (3), sonatas is a constituent of a wh-clause which may be represented as follows:

- (4) [_S which for PRO to play sonatas on t] ⁽¹⁾

Though Chomsky does not represent the fact explicitly in (4), sonatas is a wh-expression. Thus, in the derivation of (3), wh-movement moves a wh-expression, sonatas, out of a wh-clause, viz. an infinitival relative, and by so doing it violates the wh-island constraint. Consequently, the resulting question has to be ungrammatical. ⁽²⁾

At the surface, this explanation of the ungrammaticalness of (3) appears to be a fragment of a straight-forwardly nonmentalistic and formal grammar. A lawlike linguistic generalization, together with a number of specific

fact-asserting statements, functions as the explanans. From these a statement describing a problematic phenomenon --- the ungrammaticalness of (3) --- is deduced as the explanandum. Chomsky, however, takes a further step: he "imputes existence to" the theoretical constructs involved in the explanans. Thus he (1976:9) holds that "Tentatively accepting this explanation, we impute existence to certain mental representations and to the mental computations that apply in a specific way to these mental representations. In particular, we impute existence to a representation in which (12) [= our (4) above --- R.P.B.] appears as part of the structure underlying (5) [= our (3) above --- R.P.B.] at a particular stage of derivation, and to the mental computation that produces this derivation, and ultimately produces (5), identified now as ungrammatical because the computation violates the wh-island constraint when the rule of wh-movement applies to sonatas in (12). We attribute 'psychological reality' to the postulated representations and mental computations. In short, we propose (tentatively, hesitantly, etc.) that our theory is true. Have we gone beyond the bounds of what is legitimate and proper, in so doing?" By imputing existence to its theoretical constructs, Chomsky attempts to transform a fragment of nonmentalistic, formal grammar into a fragment of mentalistic grammar.⁽³⁾ And the crucial question, raised by Chomsky himself, is whether or not this is objectionable.

Chomsky's reply to this question is in the negative. However, a proper answer can be given only against the background of a clear and principled account of the methodological bases of mentalistic linguistics. Such an account will provide satisfactory answers to questions such as the following.

- (5) (a) What are the objects in the real world which mentalistic (linguistic) theories --- grammars as well as general theories --- are about?
- (b) What are the aims that these theories pursue in regard to the objects in question?
- (c) What is the epistemological status --- empirical or non-empirical --- which the claims expressed by mentalistic theories are supposed to have?
- (d) What is the evidence and the logic required for the validation --- i.e., confirmation and refutation --- of these mentalistic theories?

Collectively, Chomsky's answers to these and related questions constitute what may be called Chomskyan mentalism. It must be stressed that this study deals primarily with Chomskyan mentalism as distinct from other forms of mentalism, for example the mentalism of Fodor, Fodor and Garrett (1975), that of Katz (1977), that of Bresnan (1978), and that of Lightfoot (in press). As we proceed, some of the differences between these various forms of mentalism will be dealt with. But let us turn to the answers given, implicitly or explicitly, by Chomsky (1976) to the questions of (5).

2.2 Objects, aims, idealizations, abstractions

Chomsky deals with questions (5)(a) and (b) in a quite direct manner, thereby identifying the objects and aims of mentalistic theories.

As regards the general theory, or universal grammar, Chomsky follows Lenneberg (1967) in characterizing its object as "innate mechanisms, an underlying biological matrix that provides a framework within which the growth of language proceeds" (1976:2); as "the genetic program that enables the child to interpret certain events as linguistic experience and to construct a system of rules and principles on the basis of this experience" (1976:2-3); as "the genetically determined program that specifies the range of possible grammars for human languages" (1976:13). The aim selected by Chomsky (1976:2) for the general theory is to give "an abstract partial specification" of the object specified above.

As regards (particular) grammars, Chomsky once again follows Lenneberg in characterizing their object as "a component in the system of cognitive structures" (1976:2); as "a steady state of mind" (1976:3); as "a mental organ" (1976:3); as "the particular realizations of this schematism [i.e., the genetic program which makes language growth possible --- R.P.B.] that arise under given conditions" (1976:13). The aim of (particular) grammars is described by Chomsky (1976:3) as the giving of "a partial characterization" of the object identified above.

Chomsky (1976:3) provides the following integrated account of the objects and aims of mentalistic theories: "To put the matter in somewhat different but essentially equivalent terms, we may suppose that there is a fixed, genetically determined initial state of mind, common to the species

with at most minor variation apart from pathology. The mind passes through a sequence of states under boundary conditions set by experience, achieving finally a 'steady state' at a relatively fixed age, a state which then changes only in marginal ways. The initial state of the mind might be regarded as a function, characteristic of the species, which maps experience into the steady state. Universal grammar is a partial characterization of this function, thus a partial characterization of the initial state. The grammar of a language that has grown in the mind is a partial characterization of the steady state attained".

In regard to this account of the objects and aims of mentalistic theories, a further question should be considered here: what exactly are the ways in which the characterization offered by mentalistic theories of their objects is "abstract" and "partial"? First, as pointed out by Chomsky (1976:3-4), these characterizations are "abstract" in the sense that they idealize their objects. In the actual process of language acquisition or growth the cognitive system characterized by the general theory interacts with other cognitive systems. Similarly, in actual linguistic performance the cognitive system characterized by a particular grammar also interacts with other cognitive systems. Both the general theory and a particular grammar, however, disregard this interaction. By so doing, these mentalistic theories abstract from the contribution of the cognitive systems which interact with their respective objects, viz. the child's language acquisition faculty and the speaker's linguistic competence. A non-abstract characterization of this faculty and this competence would, among other things, give an account of the interaction of these two cognitive systems with other cognitive systems.⁽⁴⁾ Second, according to Chomsky (1976:9), the characterizations offered by the general theory and particular grammars of their respective objects consist of "abstract conditions that unknown mechanisms must meet". That is, these characterizations do not describe such "actual mechanisms" as those functioning in the brain. By implication, a nonabstract characterization of the cognitive systems in question would, somehow, specify "actual mechanisms".

The characterizations which mentalistic theories offer of their objects are therefore abstract in a dual sense: in the sense of "abstracting from the contribution of other cognitive systems", and in the sense of "being descriptive of nonactual mechanisms". To the extent that these characterizations are abstract, they are "partial" as well.⁽⁵⁾ The obvious ques-

tion is: how does Chomsky's choice of objects, aims, idealizations and abstractions for mentalistic theories bear on the legitimacy and the propriety of the step by which he imputes existence to theoretical linguistic constructs? Specifically: is this choice such that it renders Chomsky's imputation of existence to these constructs illegitimate and improper? To these questions we return in §3.2.7 below. We must first consider the epistemological status of mentalistic theories as well as the nature of the logic and the evidence pertinent to their validation.

2.3 Epistemological status, logic of validation, evidence

To consider the epistemological status of mentalistic theories as well as the logic and evidence required for their validation is to dwell on questions (5)(c) and (d), respectively. As regards the question of epistemological status, Chomsky (1976:3, 10, 20), once again following Lenneberg, repeatedly stresses the point that the existence or ontological claims made by mentalistic theories must be empirical. Thus, with regard to the general theory, Chomsky (1976:20) states that "... Lenneberg was quite right to take the trouble to emphasize that 'the discovery and description of innate mechanisms is a thoroughly empirical procedure and is an integral part of modern scientific inquiry' and to insist that there is no room here for dogmatism or a priori doctrine". From these and similar remarks by Chomsky on the epistemological status of mentalistic theories, we may draw the following conclusion: if imputation of existence to theoretical linguistic constructs were to yield nonempirical mentalistic claims, then this imputation of existence would have to be considered "illegitimate" and "improper" by Chomsky. In this context a mentalistic claim is an existence or ontological claim expressed by a linguistic theory about some or other relevant state of the language faculty.

Several important questions arise at this stage. What is the content of Chomsky's notion "empirical"? When analyzed within a principled philosophical framework, is this content free of objectionable aspects? A direct approach to providing adequate answers to these and related questions would entail carrying out three sorts of steps. The first of these would be to specify explicitly the conditions which (ordered sets of) scientific statements in general have to meet in order to qualify as "empirical". The second would be to give a justification for a particular choice of condi-

tions on empiricalness from among the alternatives proposed in the literature.⁽⁶⁾ The third would be to show in a systematic way that the mentalistic claims made by Chomsky do in fact meet the conditions chosen.

In the article under consideration, unfortunately, Chomsky does not adopt such a direct approach to providing a clarification of and a justification for the content of his notion "empirical". I know of no principled philosophical context within which it is informative and insightful to say only that "empirical" means 'nondogmatic' and 'non-a priori'. In a later paper, Chomsky (1978b:9) is slightly less vague about the content of his notion "empirical". He equates "empirical" with "falsifiable in principle"; and by so doing indicates that he adopts the conventional sort of approach to the question of criteria for empiricalness.⁽⁷⁾ However, Chomsky fails to spell out the attributes which a hypothesis or theory must possess in order to be falsifiable in principle. That is, he has merely substituted one unclear notion for another one. In §5.4.1 we will consider three of the minimal criteria which a hypothesis or theory must meet to be falsifiable in principle in the conventional sense.

This brings us to question (5)(d) about the evidence and logic required for the validation of mentalistic theories. Chomsky does not, within some principled metascientific framework, deal explicitly and directly with the conditions that have to be met by this evidence and logic. Rather, as in the case of question (5)(c), Chomsky's approach to question (5)(d) is an indirect one. Specifically, he takes three indirect steps to clarify and justify the empirical status and the nature of the evidence and logic pertinent to the validation of mentalistic theories. First, he constructs an analogy between linguistic inquiry and a particular form of physical inquiry, viz. astrophysical inquiry. Second, he presents a case against the position of those scholars who have criticized his mentalistic theories for having an evidential basis which is insufficiently wide. Third, and once again with the aim of clarifying and justifying the methodological bases of his version of mentalism, Chomsky constructs a second analogy, one between what mentalist linguists (and psychologists) do and what neurophysiologists apparently do. It is obviously only after a critical consideration of these three steps that a judgment can be made about the methodological well-foundedness of Chomskyan mentalism.

2.4 Retrospect

The exposition of Chomskyan mentalism given in the preceding paragraphs may be reduced to the following points:

1. Chomskyan mentalism --- as opposed to forms of nonmentalism --- entails the imputation of existence to or the attribution of psychological reality to the theoretical constructs of linguistic theories.
2. In terms of its existence claims, the general (linguistic) theory aims to give an abstract and partial characterization of the genetically determined program that specifies the range of possible grammars for human language.
3. In terms of their existence claims, particular grammars aim to give an abstract and partial characterization of the particular realizations of this genetically determined program as these arise under given circumstances.
4. The characterizations given by linguistic theories --- both general theories and particular grammars --- are abstract in a dual sense:
 - (a) they abstract from the contribution of other (cognitive) systems to language growth and linguistic performance;
 - (b) they do not describe actual mechanisms.
5. Though abstract and partial, these characterizations must nevertheless be empirical (probably in the sense of refutable in principle).
6. If these characterizations were nonempirical, then Chomsky's imputation of existence to the constructs of his linguistic theories would have to be improper and illegitimate.
7. Though Chomsky gives some indication of the content of his notion "empirical", he takes no direct steps to spell out explicitly the conditions which have to be met by the logic and evidence required for the validation of mentalistic theories.

Chapter 3LINGUISTICS, PHYSICS, NEUROPHYSIOLOGY:
TWO MISLEADING ANALOGIES3.1 Introduction

In §2.3 above, it was indicated that there are two obvious approaches to the clarification and justification of the methodological bases of a form of mentalism. On the one hand, for the purpose of such clarification and justification the direct approach employs explicitly formulated theses or minimal conditions which are systematically motivated. On the other hand, the indirect approach refrains from the use of such theses or conditions. Rather, the means which it employs to achieve its aims of clarification and justification are indirect ones, such as analogies and comparisons. The present chapter critically analyzes two analogies constructed by Chomsky: an astrophysical analogy and a neurophysiological one. From this analysis three general points emerge rather clearly. First, Chomsky's analogies are misleading in the sense that they obscure fundamental differences between the methodological bases of his form of mentalism on the one hand and those of astrophysics and neurophysiology on the other hand. Second, in virtue of the existence of these differences it may be claimed that Chomsky's imputation of existence to theoretical linguistic constructs is "illegitimate" and "improper" because it entails the making of nonempirical ontological claims. Third, because of their potentially misleading nature, analogies of the kind in question are generally speaking, of limited value in the clarification and justification of the methodological bases of a given form of mentalism.

3.2 The astrophysical analogy3.2.1 Outlines

The essence of Chomsky's (1976:4ff.) astrophysical analogy may be reduced to four main points. First, like the physicist endeavouring to determine the nature of the thermonuclear reactions that take place in the interior of the sun, the (mentalist) linguist too investigates hidden mechanisms,

viz. the apparatus of the language faculty. Second, like the physicist, the linguist constructs his hypotheses on the basis of indirect data about these hidden mechanisms. In the case of the physicist, these indirect data relate to light emitted at the outermost layers of the sun; in the case of the linguist, they are derived from linguistic behavior. Third, if doubts are raised about the existence of the hidden mechanisms postulated by either the physicist or the linguist, he can react in one of two ways. He can repeat the original evidence and show once more how this evidence is explained by the hypotheses postulating the hidden mechanisms. Or, he can look for a more direct manner of investigating the hidden mechanisms in question. In the case of the physicist, the more direct manner of investigation takes on the form of the experimental study of neutrinos released by the thermonuclear reactions in the solar interior. Fourth, in neither the physicist's nor the linguist's case can the evidence yielded by the more direct investigation really meet a challenge about the existence of the postulated hidden mechanisms. This evidence has no privileged status and cannot conclusively show that these mechanisms really exist.

This astrophysical analogy, as presented by Chomsky, appears to be quite sound. This appearance is deceptive, however. In a note, Chomsky (1976:4) claims that "The analogy is modeled on an account given by Bahcall and Davis (1976)". It is this apparently innocent note which is fatal to the analogy. For, a close study of Bahcall and Davis's paper --- "Solar neutrinos: a scientific puzzle" --- reveals the existence of various differences between their astrophysical and Chomsky's mentalistic methodology. Some of these differences will be seen to be so fundamental that they undermine Chomsky's analogy, thereby rendering it useless as a means of clarifying and justifying the epistemological and logical bases of Chomskyan mentalistic linguistics. As we proceed, it will become clear that the differences in question belong to different categories. The first four may be called "hidden" differences: they cannot be identified only by a reading of Chomsky's 1976 article, since in Chomsky's account, the methodology of Bahcall and Davis's inquiry is "regularized" or "adapted". Two other differences may be called "trivialized" differences: Chomsky does mention them, but attempts to play down their importance. A final difference is a "potential" difference: a difference about which Chomsky has nothing to say.

3.2.2 Guiding question

A first "hidden" difference relates to the basic question to which Bahcall and Davis's inquiry seeks an answer. From Chomsky's account, one may be led to assume that this is an ontological question, a question of existence. Thus, Chomsky's account (1976:4) creates the impression that this question (re-)appears in the form of a blunt challenge to the physical reality of the entities postulated by the theory of solar energy generation.⁽¹⁾

"... but how do you know that the constructions of your theory have physical reality ...?"

Bahcall and Davis, however, give a different characterization of the nature of the basic question which has instigated and guided their inquiry. To them, this is not an ontological question representing a blunt challenge to the physical reality of the particular theoretical constructions. Rather, this question springs from a "disagreement" or "discrepancy" between theory and observation. Thus, they (1976:264) state that "For the past 15 years we have tried, in collaboration with many colleagues in astronomy, chemistry, and physics, to understand and test the theory of how the sun produces its radiant energy (observed on the earth as sunlight). All of us have been surprised by the results: there is a large, unexplained disagreement between observation and the supposedly well established theory. This discrepancy has led to a crisis in the theory of stellar evolution; many authors are openly questioning some of the basic principles and approximations in this supposedly dry (and solved) subject". Thus, counter to the impression created by Chomsky, the astrophysical inquiry involved in his analogy is not directed at or guided by an ontological question about the existence of theoretically postulated entities in a real world. When considered in isolation, this difference between Chomsky's account of Bahcall and Davis's astrophysical methodology and these physicists' own account of their methodology does not appear to be significant. We will see below, however, that this difference ties in with a second difference in a significant manner.

3.2.3 Epistemological aim

A second "hidden" difference concerns the general nature of the epistemological aim of the inquiry undertaken by Bahcall and Davis. Chomsky characterizes this aim in terms of "truth" and related notions. Thus, he (1976:

4) contends that the form of physical inquiry under consideration attempts to find an answer to the question "... how do you know that your theory is 'true'?" The view that this inquiry is essentially truth-oriented is expressed indirectly in the following remarks by Chomsky (1976:5) as well: "we can only say that with our more direct and more conclusive evidence, we may now be more confident than before ... that the theoretical statements ... are in fact true."

A close study of Bahcall and Davis's paper, however, destroys the impression that their inquiry was truth-oriented. The epistemological aim of this inquiry is nowhere characterized by them in terms of such justificationist notions as "truth", "conclusive evidence", and so on. Rather, Bahcall and Davis present their inquiry as one whose epistemological aim it is to "test" a theory in order to uncover defects, errors, faults, limitations of understanding and the like. Thus, they (1976:264) state that "... no one has found an easy way to test the extent of our understanding ...". Moreover, in the concluding section of their paper, they (1976:267) state that "Another experiment is required to settle the issue whether our astronomy or our physics is at fault. Fortunately, one can make a testable distinction". We may therefore conclude that, counter to what is suggested by Chomsky, the epistemological aim of Bahcall and Davis's inquiry is of a falsificationist sort. The difference between this falsificationist epistemological aim of Bahcall and Davis and the justificationist one attributed to them by Chomsky is of crucial importance, as we shall see in §3.2.4 below.

Let us now consider the manner in which the first two "hidden" differences between Bahcall and Davis's methodology and Chomsky's account of this methodology are interrelated. Chomsky's attribution of an ontological guiding question to Bahcall and Davis's inquiry allows him, with the aid of a further assumption, to ascribe to this inquiry a truth-oriented epistemological aim. The further assumption is that an epistemological question such as "Is the theoretical statement S true?" is equivalent to an ontological question such as "Do the theoretical entities postulated by S really exist?". That Chomsky operates with this equivalence is clear from questions and statements such as the following: "... but how do you know that the constructions of your theory have physical reality --- in short, how do you know your theory is true?" (1976:4); and "We attribute 'psychological reality' to the postulated representations and mental computations. In short, we propose (tentatively, hesitantly, etc.) that our theory is

true" (1976:9). Notice that Chomsky presents no justification for his assumption of this equivalence relation; it is a quite arbitrary assumption within the context of his discussion. From a philosophical point of view this is a serious omission. For the purpose of the present study it is not necessary, though, to pursue this matter further.

3.2.4 Logic of validation

A third "hidden" difference between Chomsky's account of Bahcall and Davis's methodology and the methodology which they in fact employ concerns the logic of validation. Chomsky claims that this logic provides for two ways in which a challenge to the physical reality of theoretical constructs --- or the truth of the ontological claims using these constructs --- can be properly met. The first, according to Chomsky (1976:4), entails that "The astronomer could only respond by repeating what he had already presented: Here is the evidence available and here is the theory that I offer to explain it. The evidence derives from investigation of light emitted at the periphery." The second, according to Chomsky (1976:5), entails "... that an ingenious experimenter hits upon a more direct method for studying events taking place at the interior of the sun: namely, study of the neutrinos that are released by the thermonuclear reactions in the solar interior and that escape into space."

However, this account of the logic of validation appropriate to the form of physical inquiry practised by Bahcall and Davis contains a fictitious element. A close reading of their paper makes it quite clear that Chomsky's first way of responding to a challenge --- viz. repeating the original evidence --- is neither employed nor considered by them. Moreover, this indirect approach cannot be a proper component of their logic of validation. In fact, taken as a whole, Bahcall and Davis's inquiry is an instantiation of the second, more direct and definitive method of testing. Thus, they (1976:264) state that "The theory of solar energy generation is sufficiently important to the general understanding of stellar evolution that one would like to find a more definitive test. There is a way to directly and quantitatively test the theory of nuclear energy generation in stars like the sun." In addition, Bahcall and Davis (1976:267) explicitly specify that their inquiry is to be followed by one which must also be of the second, direct type: "Another experiment is required to settle the issue of whether our astronomy or our physics is at fault".

Had Bahcall and Davis chosen Chomsky's first way of repeating the original "evidence" in response to a "challenge", they would have acted in a non-rational manner. Remember that they pursue the epistemological aim of "more definitive testing". And, obviously, a repetition of the original evidence cannot, in principle, contribute anything to the realization of this aim. This brings us to the interrelatedness of the second and third "hidden" differences between the methodology of Bahcall and Davis's inquiry and Chomsky's account of this methodology. Chomsky's ascription of a truth-oriented epistemological aim to this methodology requires --- or allows --- him to provide for a particular form of argument in the logic of validation of this methodology: a form of argument by means of which challenged truth claims can be confirmed. And it is for this purpose that Chomsky ascribes to Bahcall and Davis's methodology the indirect manner of response, a manner of response which Chomsky considers appropriate for meeting challenges to truth claims. Clearly, Bahcall and Davis's method of direct and more definitive testing cannot be appropriately used for this purpose --- it is a method not for attempting to establish truth but for attempting to establish falsity. Thus, Chomsky's modification of the epistemological aim of Bahcall and Davis's methodology allows/forces him also to modify the logic of validation of this methodology.

3.2.5 Weight of the evidence

A fourth "hidden" difference between the methodology followed by Bahcall and Davis and Chomsky's account of this methodology concerns the status or weight of the evidence yielded by the method of more direct testing. Chomsky creates the impression that, within the context of the sort of inquiry conducted by Bahcall and Davis, this evidence would be of limited value. Thus, he (1976:5) argues as follows: "Has this more 'direct' investigation of events in the interior of the sun now answered the original objections [which are represented in a modified form by Chomsky --- R.P.B.]? Are we now entitled to attribute 'physical reality' to the constructions only postulated before? Not really. No empirical evidence can be conclusive."

Bahcall and Davis (1976:264), by contrast, place a much higher value on the evidence (to be) yielded by their more direct testing. To them their experiment and, by implication, the evidence yielded by it are "crucial": "Thus an experiment designed to capture neutrinos produced by solar thermo-

nuclear reactions is a crucial one for the theory of stellar evolution". Thus, as regards the weight of the evidence yielded by more direct investigation, Chomsky's representation of the methodology of Bahcall and Davis's inquiry is rather distorted.⁽²⁾ This distortion ties in with his incorrect ascription of a truth-oriented epistemological aim and with his erroneous attribution of an indirect component to the logic of validation of Bahcall and Davis's methodology. If one adopts a truth-oriented epistemological aim and, as a consequence, an indirect method of confirming challenged truth claims, then one cannot assign more than minimal weight to new evidence furnished in support of challenged truth claims. This is so, because the form of argument within the framework of which evidence is presented for the truth of a statement is nondemonstrative in principle.⁽³⁾ This latter fact entails that no evidence for the truth of a claim can be conclusive. In §3.2.9 we return to the implications of the four "hidden" differences considered above.

3.2.6 Nature of the evidence

Let us turn now to two further differences between Bahcall and Davis's astrophysical methodology and Chomsky's mentalistic methodology: two differences which Chomsky does mention, but which he attempts to trivialize. Having insisted that his imputation of existence to theoretical linguistic constructs is neither illegitimate nor improper, Chomsky (1976:9) proceeds as follows: "Granting the vast differences in the nature of the evidence, the depth and explanatory power of the postulated principles, etc., still the argument sketched seems to me analogous in the relevant respects to that of the physicist postulating certain processes in the interior of the sun. Of course, there are differences; the physicist is actually postulating physical entities and processes, while we are keeping to abstract conditions that unknown mechanisms must meet. We might go on to suggest actual mechanisms, but we know that it would be pointless to do so in the present stage of our ignorance concerning the functioning of the brain. This, however, is not a relevant difference of principle." Let us assume for the sake of argument that the "vast" difference in depth of explanatory power alluded to by Chomsky does not seriously harm his analogy. Then there still remain two other differences, a difference relating to the nature of the evidence and a difference involving the nature of the postulated mechanisms. The former difference will be considered directly below, the latter in the next paragraph.

Chomsky calls the difference in the nature of physical and linguistic evidence "vast". However, he makes no attempt to spell out in precise epistemological terms what this "vast" difference entails. This failure on Chomsky's behalf is unfortunate since various scholars have argued that it is precisely the nature of linguistic evidence --- evidence derived from linguistic intuitions --- which casts doubt on the view that generative grammar is a form of empirical inquiry.⁽⁴⁾ Specifically, it has been argued that, given a statement presenting what is claimed to be a fragment of intuitive evidence, there is no adequate, non-ad hoc measure for checking the correctness of this statement.⁽⁵⁾ In the absence of an adequate measure of this sort the kind of evidence with which generative grammarians confront their hypotheses would be nonempirical. Consequently, the hypotheses themselves would be nonempirical as well. If this were the case, the difference in the nature of linguistic and physical evidence would be "vast" in a sense which would completely undermine Chomsky's astrophysical analogy.

The few remarks which Chomsky offers on this issue are quite unilluminating. Thus, consider the following statement by Chomsky (1976:10): "Some linguists have been bemused by the fact that the conditions that test the test [i.e., an experimental test of acceptability --- R.P.B.] are themselves subject to doubt and revision, believing that they have discovered some hidden paradox or circularity of reasoning (cf. Botha 1973; Ney 1975)". Chomsky's reference to "Botha 1973" is difficult to comprehend. That study makes a large number of fairly explicit and precise claims about the problematic nature of linguistic intuitions and the puzzling variability of these intuitions. Against the background of the nature and variability of linguistic intuitions, the question of determining whether or not a given linguistic intuition is both genuine and correct is discussed at length. For example, it is argued in detail that Chomsky's clear case principle is multiply defective and, consequently, cannot be used as the basis of arguments for or against the correctness of statements presenting intuitive evidence.⁽⁶⁾ The defects of other similar principles, measures or strategies are likewise discussed in depth.⁽⁷⁾ The study in question does not make claims about the nature of linguistic evidence and related matters in terms of such unclear notions as "conditions that test the test", "hidden paradox" and "circularity of reasoning". What is strange is that Chomsky makes no attempt to rebut some of the many clear, specific claims made in

that study. Had Chomsky attempted such a rebuttal, he could have made a contribution to the discussion of the issue of whether generative grammar is or isn't a form of empirical inquiry.⁽⁸⁾ But, being as vague as they are, his remarks on the nature of linguistic evidence seem intended to serve only one purpose: to trivialize the "vast differences" between linguistic and physical evidence. Probably counter to Chomsky's intentions, these remarks in effect serve no other purpose than to raise further doubts about the soundness of his astrophysical analogy.

3.2.7 Ontological import

The second difference between Chomskyan mentalism and astrophysics trivialized by Chomsky in the quote presented at the beginning of §3.2.6 above concerns the nature of the postulated mechanisms, i.e. the nature of the theoretical entities to which existence is attributed. Physicists, according to Chomsky (1976:9), postulate actual mechanisms. Chomskyan mentalists do not postulate actual mechanisms but rather "abstract conditions that unknown mechanisms must meet". Chomsky attempts to trivialize this difference by calling it "not a relevant difference of principle". But is this difference really as trivial as Chomsky would like it to be? This is not an easy question to answer. For, on the one hand, Chomsky fails to make clear the circumstances under which he would be willing to consider a difference to be "a relevant difference of principle". And, on the other hand, Chomsky fails to make clear what meaning the expressions exist and existence convey to him. Thus, he makes no attempt to explain what exist would mean in a statement such as "Mental representations and mental computations exist as nonactual mechanisms".

In spite of these obscure aspects of Chomsky's position, it is possible to argue that there is a clear sense in which the difference between actual physical mechanisms and (abstract conditions on) nonactual mental mechanisms is one of principle. At an abstract level this argument --- which is based on considerations presented in §2.3 --- runs as follows:

- (1) (a) An ontological or existence claim which is in principle neither directly nor indirectly refutable is nonempirical.
- (b) An existence claim which is ontologically indeterminate is in principle not refutable.

- (c) An existence claim which postulates mechanisms that cannot be uniquely identified is ontologically indeterminate.
- (d) Whereas actual physical mechanisms are uniquely identifiable, nonactual mental mechanisms are not.
- (e) Hence, whereas astrophysical existence claims such as those made by Bahcall and Davis are empirical, mentalistic existence claims such as those made by Chomsky are not.

This argument, if compelling, would clearly establish a difference of principle between astrophysics and Chomskyan mentalism. Recall, that in §2.3 above it was found that if the imputation of existence to theoretical linguistic constructs were to yield nonempirical mentalistic claims, this imputation of existence would have to be "illegitimate" and "improper" for Chomsky.

The question, then, is the following. How compelling is the argument (1)? It will become clear that within the context of the present discussion the first three premises, (1)(a)-(c), are not in need of special justification. They represent principles of the conventional falsificationist approach to scientific inquiry. This approach may be incorrect or misguided, as has been argued by various scientists and philosophers of science over the years.⁽⁹⁾ This point, however, is irrelevant to the present discussion because, as we have seen in §2.3, there are rather clear indications that Chomsky still subscribes to this approach at a level of metascientific awareness. The premise of the argument that is in need of special justification is (1)(d). If this fourth premise can be justified, the conclusion (1)(e) appears to be inescapable.

The justification of the fourth premise of (1) and the elucidation of the other three may be approached by comparing the physical claims (2)(a) and (b) with the mentalistic claims (3)(a) and (b). The former claims are taken from Bahcall and Davis's paper (1976:264); the latter, of course, are due to Chomsky (1976:9).

- (2) (a) The sun's heat is produced by thermonuclear reactions that fuse light elements into heavier ones, thus converting mass into energy.

- (b) The basic solar process is the fusion of four protons to form an alpha particle, two positrons (e^+), and two neutrinos (ν); that is $4 \text{ } ^1_1\text{p} \rightarrow \text{}^4_2\text{He} + 2 \text{ } e^+ + 2 \text{ } \nu$.
- (3) (a) [$_{\text{S}}$ which for PRO to play sonatas on t] exists as a component part of a mental representation underlying the question What sonatas are violins easy to play on?
- (b) wh-movement exists as a component part of the mental computations by means of which the question What sonatas are violins easy to play on? is derived.

Consider first the two physical claims (2)(a) and (b). They describe a physical state of affairs which is uniquely identifiable. That is, the solar process described in these statements and the mechanisms involved in this process --- e.g. sun, light elements, heavier elements, protons, alpha particles, positrons and neutrinos --- have such clearly understood properties that physicists can recognize these entities as such on the basis of a knowledge of their properties. That is, presented with an arbitrary entity a physicist can decide in a nonarbitrary manner whether or not it is an instance of one of the listed kinds of mechanisms.

Two other conditions are strictly not entailed by the requirement that a state of affairs must be uniquely identifiable. On the one hand, this requirement does not entail the condition that the state of affairs or entity must in some simple way be directly observable. As is well known, many kinds of physical entities are not directly observable but can nevertheless be uniquely identified via their causal effects or their interaction with other entities.⁽¹⁰⁾ The textbook example is that of atoms which, though not directly observable, can be identified by means of the tracks they leave in cloud chambers.⁽¹¹⁾ Another paradigm case is that of electrons: though not directly observable, they are identifiable in the sense that they can be given a kick with the aid of a magnetic field --- and experiments show that they kick back.⁽¹²⁾ On the other hand, the requirement of unique identifiability does not entail the condition that logical or mathematical proof must be given of the existence of the state of affairs or entity. In empirical inquiry, of course, no such proof can be furnished.⁽¹³⁾ This formal consideration, however, does not undermine the requirement of unique identifiability which merely states that unless

a given entity can be recognized as such in a nonarbitrary manner this entity cannot be granted existence.

The fact that the (astro-)physical entities or mechanisms listed above can be uniquely identified contributes in no small way to the ontological determinacy of the existence claims which refer to them. An existence claim cannot be ontologically determinate unless it is perfectly clear (a) what the entities or mechanisms are to which it refers in reality, and (b) what the properties are that it attributes to these entities or mechanisms. The two physical claims (2)(a) and (b) are ontologically so determinate that the process described by them can even be reproduced experimentally in terrestrial fusion reactors, as is pointed out by Bahcall and Davis (1976:264). Moreover, the description given by these two existence claims of the astrophysical process in question can be made highly precise: the reactions produced by the basic solar process can be quantified, as in fact they are by Bahcall and Davis (1976:265). It is obvious that if the entities involved in the existence claims (2)(a) and (b) were not uniquely identifiable, these claims could not have been ontologically determinate. An existence claim simply cannot express a precise assertion about a mechanism or entity which scientists are unable to recognize unambiguously in the real world.

Had the physical claims (2)(a) and (b) been ontologically indeterminate, they would not have been refutable in principle. For an ontological claim to be refutable in principle it must, first of all, be possible to identify accurately in the real world a state of affairs or entity which is clearly the intended referent of this claim. Moreover, it must be possible to ascertain whether this entity or state of affairs does or does not have the property or properties the claim attributes to it. In the case of ontologically indeterminate claims, it is not clear what entities or states of affairs in a real world would, if they existed at all, have properties that were or were not the ones these claims attributed to them. Thus, because of its lack of precision, an ontologically indeterminate existence claim would not be refutable in principle. Clearly, the condition of ontological determinacy is a subcase of the more general requirement --- to be considered in §5.4.1 below --- that, in order to be refutable in principle, the content of a claim must be so clear that precise test implications may be derived from it. Finally, had the physical claims (2)(a) and (b) not been refutable in principle, they would have been nonempirical in the

conventional sense of §2.3.

Let us now consider Chomsky's claims (3)(a) and (b) as existence claims about a mental reality. The mechanisms or entities postulated by these claims include a "mental representation" and a "mental computation" which have such aspects as PRO, t, wh, (wh-)movement, (wh-)island, (wh-island) constraint, etc. It is not at all clear that mental entities such as these can be uniquely identified by a mentalist linguist. That is, it is unclear how a mentalist linguist, when presented with an arbitrary entity, can decide in a nonarbitrary manner whether it is or isn't an instance of one of the listed kinds of mental entities. It is simply not clear which properties these kinds of entities have as mental entities. Chomsky does not even specify what the general make-up of a real mental world would be. He fails to specify what entities or mechanisms in such a world would correspond to "a computation" or "a representation". The expressions "computation" and "representation", as Chomsky uses them in this context, are at best metaphors, at worst completely contentless. Existence claims such as (3)(a) and (b), consequently, have to be ontologically indeterminate. It is not clear what referents linguistic concepts such as "PRO", "t", "wh", "wh-)movement", "wh-)island", "wh-island) constraint" (can) have in a real mental world.

Because mentalistic claims such as (3)(a) and (b) lack ontological determinacy, it is in principle impossible to reconstruct the mental state of affairs described by them experimentally; even if such a reconstruction were technologically possible. And, not unexpectedly, Chomsky gives no indication of what the quantification of these mentalistic claims would entail. Thus, compared to physical claims such as (2)(a) and (b), Chomskyan existence claims such as (3)(a) and (b) are imprecise and ontologically highly indeterminate. Consequently, these mentalistic claims are not refutable in principle, hence not empirical. It is just not clear what entities or mechanisms in a real mental world would, if they existed at all, have properties that were or were not the ones these claims attributed to them.

The fact, then, that whereas physics postulates "actual physical entities or processes", Chomskyan mentalistic linguistics does not postulate "actual mechanisms" has consequences of a principled kind. Chomsky has some suggestions to offer on how this difference in ontological import between

physical and mentalistic claims may be eliminated. According to him (1976:9), this difference may ultimately be reduced to a question of ethics: "If we were able to investigate humans as we study other, defenseless organisms, we might very well proceed to inquire into the operative mechanisms by intrusive experimentation, by constructing controlled conditions for language growth, and so on, thus perhaps narrowing the gap between the language example and the astronomical example. The barriers to this direct investigation are ethical". Chomsky is quite vague about the nature of this "direct investigation".⁽¹⁴⁾ Let us nevertheless accept the existence of the ethical barriers to which he alludes. Even if we do this, there is a more fundamental consideration which rules out the possibility of conducting such "intrusive experimentation" or "direct investigation" in a reasoned, controlled manner.

Normally, experimentation has the function of putting to test claims which are so determinate in their content and so precise in their formulation that they have clear test implications. Thus, determinacy and preciseness of content are preconditions for carrying out experiments. In the absence of clear, ontologically determinate and precise claims, there is simply nothing to test, nothing to direct "intrusive experimentation" at. Thus the fundamental barrier to "direct investigation" is a methodological one, not an ethical one. The ethical question arises only after it has become clear that Chomsky's "intrusive experimentation" is possible in principle. Aimless or poorly directed "intrusive experimentation" could, at most, contribute in a purely accidental manner to the precision and ontological determinacy of Chomsky's mentalistic claims. Thus, it is impossible to agree with Chomsky that the difference between the actual entities and processes postulated by the physicist and the (abstract conditions on) nonactual, "unknown" mechanisms postulated by him is not a difference of principle.⁽¹⁵⁾

The question which arises, then, is how it can be maintained at all that claims which are only "partial characterizations" or which represent only "abstract conditions" on "unknown", nonactual mechanisms describe psychologically real entities and processes. That is, is it in principle possible for a mentalistic claim which represents only an "abstract condition" which is not descriptive of an "actual mechanism" to be ontologically determinate? To questions such as these we shall return in §5.3 below. At this juncture it should be noticed only that if Chomskyan men-

talistic claims such as (3)(a) and (b) are indeed ontologically indeterminate, then Chomsky's choice of aims and idealizations for linguistic theories becomes problematic. For, it is the nature of these aims and idealizations which allows mentalist linguistics to make ontologically indeterminate, nonempirical claims. It is these aims and idealizations which allow the Chomskyan mentalist to characterize the objects of his inquiry in a manner which is "abstract" and "partial".⁽¹⁶⁾

Any defence of Chomskyan mentalism would have to argue against the conclusion that mentalistic claims such as (3)(a) and (b) are nonempirical. Let us consider two possible lines which such counter-argumentation may take.⁽¹⁷⁾ On the one hand, it may be pointed out that linguistic theories such as the one involved in the wh-explanation are continually refuted and revised in actual linguistic theory. This observation would be entirely correct, but beside the point. Notice that the conclusion drawn above is that mentalistic claims such as (3)(a) and (b) are nonempirical as existence claims about a real mental world. The conclusion is NOT that a nonmentalistic interpretation of linguistic theories such as the one involved in the wh-explanation is nonempirical as well. And the observation above would bear on the latter conclusion alone.

On the other hand, it may be argued that a mentalistic linguistic theory can be empirical even if some of its existence claims --- (3)(a) and (b) in this case --- are nonempirical. This argument may be based on various distinctions, one of which is the distinction between "atomistic falsificationism" and "holistic falsificationism". "Atomistic falsificationism" would entail that a theory could be considered empirical only if every one of its ontological claims is refutable. This brand of falsificationism may be rejected as unrealistically strong. The weaker and more realistic "holistic falsificationism" would consider falsifiability to be an attribute of a theory as a whole, an attribute which a theory may have even if some of its ontological claims are not refutable in principle. However, for various reasons this line of argumentation fails to unsettle the conclusion that Chomskyan mentalistic claims are nonempirical.

First, even if a theory were to be empirical in some holistic sense, it could be tested only via the test implications of (certain) individual hypotheses. There is simply no way in which a theory can be tested as a whole such that its testability is not a function of that of its component parts. Consequently, it must be possible to distinguish on a principled basis

(a) between those mentalistic claims which must have clear, controvertible test implications and those which need not have such test implications; (b) between the circumstances under which mentalistic claims without such test implications reflect negatively on the empirical status of the theory as a whole and the circumstances under which they do not. Unless these two distinctions can be drawn on principled grounds and be made to apply in a nonarbitrary manner to the mentalistic claims (3)(a) and (b), the distinction between "atomistic" and "holistic falsification" must be viewed as nothing but a protective device of a most undesirable sort. (18)

In the absence of the former distinctions the latter distinction is essentially a device for concealing a fatal methodological defect of Chomskyan mentalism. Second, suppose that the line of argumentation under consideration could be provided with a principled basis. Even then it would be of "academic" interest only. For, it could simply be pointed out that there is no indication that Chomsky does not view the mentalistic claims (3)(a) and (b) as typical existence claims. And there is no indication that he does not require these two typical mentalistic claims to be refutable in principle.

In sum: the difference in nature between actual physical mechanisms and (abstract conditions on) nonactual mental mechanisms cannot be denied the status of "a relevant difference in principle"; this difference is reflected by a difference in empirical status between physical existence claims and mentalistic existence claims.

3.2.8 Systematic import

This brings us to a further potentially important difference between Chomskyan mentalistic linguistics and (astro-)physics, a difference not touched on by Chomsky at all. It relates to the systematic import of physical claims such as (2)(a) and (b) and that of mentalistic claims such as (3)(a) and (b). Bahcall and Davis (1976:264) point out that the theory of stellar ageing by thermonuclear burning, central to which are the physical claims (2)(a) and (b), "... is widely used in interpreting many kinds of astronomical information and is a necessary link in establishing such basic data as the ages of the stars and the abundance of the elements". In short, the physical claims (2)(a) and (b) have considerable systematic import: they are multiply interconnected with other scientific claims, some from related

fields. That is, the physical claims (2)(a) and (b) are well-integrated within the body of accepted scientific knowledge. This fact, of course, adds to their credibility.

What, now, is the status of mentalistic claims such as (3)(a) and (b) in this regard? Do they function as component parts of more inclusive (networks of) theories? For example, do such mentalistic claims --- along with other principles --- play a role in the explanation or interpretation of data about speech perception, speech production, language acquisition, sociolinguistic variation, language pathology, etc.? Chomsky makes no attempt to show that mentalistic claims such as (3)(a) and (b) have systematic import and derivative additional justification of the sort in question. In this respect as well, these mentalistic claims appear to differ from the physical claims (8)(a) and (b).

The question that arises is whether this is a difference of principle. It may be argued that this difference simply reflects a historical fact: the fact that, compared with physics --- which is one of the most advanced fields --- mentalistic linguistics is still in its infancy. And --- so the argument may continue --- as mentalistic linguistics grows, its claims will become (better) integrated within the total body of linguistic knowledge. Consequently, this difference between Chomskyan mentalism and physics will gradually disappear. This argument sounds reasonable enough. However, in §4.4 it will be argued that there is a complication, viz. Chomsky's position on the width of the evidential basis of mentalistic linguistics. This position appears to be such that the difference in question between Chomskyan mentalism and (astro-)physics could well be(come) one of principle.

3.2.9 Implications

In the preceding paragraphs we have considered various differences between Chomskyan mentalism and (astro-)physics as practised by Bahcall and Davis. The pertinent question, of course, is: how important are these differences in relation to Chomsky's attempt to clarify and justify the methodological bases of his mentalism? Let us approach this question by taking a look at the implications of the differences in question.

First, reconsider the four "hidden" differences between Bahcall and Davis's methodology and Chomsky's account of this methodology. Suppose that mentalistic linguistics as practised by Chomsky had a methodology which was analogous to Chomsky's account of the methodology employed by Bahcall and Davis in four relevant respects. That is, suppose that Chomskyan mentalistic linguistics (a) had as its guiding question an ontological one, (b) had as its general epistemological aim one which was truth-oriented, (c) had a logic which incorporated both an indirect and a direct method for responding to challenges of its ontological/truth claims, and (d) had a criterion in terms of which the evidence yielded by direct investigation was assigned little weight. In this event, the methodology of Chomskyan mentalistic linguistics would differ in four fundamental respects from that of the form of physical inquiry actually conducted by Bahcall and Davis. Consequently, there would be no real, deep analogy between these two methodologies. This would imply that Chomsky's attempt to clarify and justify the methodological bases of his mentalism by stressing their similarity to those of the form of physical inquiry under consideration failed completely. And, ultimately, Chomsky's imputation of existence to theoretical linguistic constructs would have to be judged "improper" and "illegitimate" to the extent that it derived its justification from the undermined astrophysical analogy. This is the first important implication of the four "hidden" differences under consideration: they undermine Chomsky's astrophysical analogy and, by so doing, raise serious doubts about the "legitimacy" and "propriety" of the step by which he imputes existence to theoretical linguistic constructs.

The "hidden" differences in question have a second important implication, an implication which adversely affects the strength of the case which Chomsky presents for rejecting the position that the evidential basis of his form of mentalism is insufficiently wide. In §4.4.1 we shall see that the strength of this case is codetermined by the accuracy of his account of the methodology employed by Bahcall and Davis. It will be argued that the four "hidden" differences considered above seriously erode the philosophical basis of Chomsky's case for rejecting the above-mentioned position.

Second, consider once again the two trivialized differences between Chomskyan mentalism and Bahcall and Davis's (astro-)physics. The first involved a "vast" difference in nature between physical and mentalistic evidence; the second concerned a marked difference in ontological determinacy between the existence claims of physics and those of mentalis-

tic linguistics. These two differences have two relevant implications as well. On the one hand, they further destroy Chomsky's astrophysical analogy and, by so doing, further weaken Chomsky's attempted justification of the methodological bases of his mentalism. On the other hand, these differences --- and particularly the one regarding ontological determinacy --- force one to conclude that as a mentalistic approach Chomskyan linguistics is a nonempirical enterprise. If one keeps in mind Chomsky's repeated claims to the contrary, the importance of this conclusion is clear.

3.3 The neurophysiological analogy

3.3.1 Outlines

The second analogy used by Chomsky to clarify and justify the methodological bases of his form of mentalism is a neurophysiological one. This analogy is insightful not for the positive contribution that it makes to such a clarification and justification. Rather, it is insightful because it clearly shows how obscure and infirm the methodological bases of Chomskyan mentalism are. It is therefore worthwhile to take a closer look at this analogy.

In an attempt to counter certain points of criticism levelled at that part of his (and Lenneberg's) mentalism which is also known as "nativism", Chomsky (1976:21-22) argues as follows: "Furthermore, assumptions similar to those of the "neonativist" psychologists and linguists are proposed without special comment by neurophysiologists quite regularly. To cite one case, in a recent review of research on vision two neurophysiologists formulate what they call the 'principle of restricted potential' in the following terms: 'By this we mean to emphasize that the developing nervous system is not a tabula rasa, free to reflect whatever individual experience dictates. Rather, the development of the nervous system is a process sharply constrained by a genetic program. At certain points, the genetic program permits a range of possible realizations, and individual experience acts only to specify the outcome within this range' (Grobstein and Chow, 1975). In particular, they suggest, 'there appears to be a small range within which individual experience operates to assure proper binocular fusion', though the general character of binocular vision in cat and monkey is

genetically determined; and 'there is some genetically determined range of possible orientation specificities for an individual neuron within which the actual orientation specificity is realized by experience'. I have no independent judgment as to whether these suggestions are correct. My point, rather, is that no one would argue that by thus attributing some general restrictive principles to the genetic program they are violating some methodological canon, turning a problem into a postulate, aborting further inquiry, etc. Why then should we take a different stance when it is proposed that universal grammar, genetically determined, permits 'a range of possible realizations' and individual experience acts only to specify the outcome --- namely, as a particular grammar and performance system --- within this range? The answer is: We should not"

This argument by Chomsky is less than convincing. For, a close study of Grobstein and Chow's paper, "Receptive field development and individual experience" (1975), reveals fundamental differences between their "nativist" neurophysiological claims and Chomsky's "nativist" linguistic claims.⁽¹⁹⁾

3.3.2 Ontological import

A first difference relates to the general ontological import and the ontological determinacy of the two kinds of "nativist" claims. This difference may be illustrated with reference to the neurophysiological claim (4) and the mentalist claim (5).

- (4) The possible orientation specificities for individual neurons are genetically determined, that is, innate.
- (5) The wh-island constraint is a genetically determined, that is, innate, mental mechanism --- an aspect of the initial state of the language faculty.⁽²⁰⁾

Compare now the general ontological import of these two existence claims. The "nativist" neurophysiological claim (4) by Grobstein and Chow (1976: 356) is a claim about specific components of a physically realized system: neurons in the visual cortex, which, in turn, forms part of the nervous

system. The entities or mechanisms about which the neurophysiological claim (4) is made --- that is, neurons --- are known, as a class, to exist independently of any particular theory of vision. Moreover, as is clear from Grobstein and Chow's article, neurons have well-known neurological/neurophysiological properties which can be ascertained experimentally with a high degree of accuracy. As is typical of neurophysiological existence claims, (4) deals in a specific manner with one of the properties of neurons: the property designated by the expression "orientation specificity".

In contrast to (4), Chomsky's (1976:9, 11) "nativist" linguistic claim (5) does not "suggest an actual mechanism". It is a claim about "an unknown mechanism" in a system, the mind, from the physical realization of which Chomsky abstracts away.⁽²¹⁾ The "unknown" and "nonactual mechanism" about which the linguistic claim (2) is made is not known to exist independently of any particular transformational linguistic theory. Furthermore, it is unclear what "mental" properties the "unknown" and "nonactual mechanisms" of the kind in question may have. Not surprisingly, there is no established manner of ascertaining the properties of any specific mechanism of this kind. Consequently, whereas the "nativist" neurophysiological claim (4) is about entities which are uniquely identifiable, the "nativist" linguistic claim (5) is not. And, whereas the former claim is ontologically highly determinate, the latter is not.

3.3.3 Epistemological status

The second difference between the neurophysiological claim (4) and the linguistic claim (5) concerns their epistemological status and is a function of the first difference. As a "nativist" claim, the neurophysiological claim is testable in principle --- in practice as well --- and, therefore, clearly empirical. To begin with, it is a specific claim about a clearly denoted property of a uniquely identifiable class of objects. Moreover, there is a standard procedure for experimentally testing "nativist" claims of this type. As is explained by Grobstein and Chow (1975:353ff.), the question whether neurons do or do not have specific properties can be decided by means of microelectrode sampling. In rabbits and cats, this sampling can be done before eye-opening, that is, before the young animals have had any visual experience. If a given pro-

perty is found to be characteristic of neurons before eye-opening, it is clear that this property has to be innate.

The epistemological status of the linguistic claim (5), as a "nativist" claim, is different. This claim is ontologically indeterminate, as was shown above. Hence, of course, it is impossible in principle to subject this claim to testing. Moreover, there is simply no procedure which will both test the "nativist" import of this claim and stand comparison with the microelectrode sampling mentioned above. Consequently, viewed as "nativist" claims, the neurophysiological claim (4) and the linguistic claim (5) differ fundamentally in regard to testability. To conclude: it is perhaps not superfluous to stress the point that it is not claimed here that in some nonmentalistic interpretation a claim to the effect that the wh-island constraint is a property of language in general would be nonempirical as well.

3.3.4 Implications

We may now consider the implications of the two differences between typical, "nativist" neurophysiological and linguistic claims. Specifically, how do these differences affect the soundness of Chomsky's neurophysiological analogy and the strength of the argument which he bases on this analogy? From these differences it is clear that this analogy suggests, misleadingly, that making "nativist" linguistic claims is essentially the same thing as making "nativist" neurophysiological claims. Let us assume that what the neurophysiologist does is perfectly proper: making "nativist" claims which are not only ontologically highly determinate but, also, testable. This assumption obviously does not make it proper for the linguist to make "nativist" claims which are neither ontologically determinate nor testable. But Chomsky's (1976:21-22) analogy misleadingly suggests the contrary, as is clear from his rhetorical question: "Why then should we take a different stance when it is proposed that universal grammar, genetically determined, permits 'a range of possible realizations' and individual experience acts only to specify the outcome --- namely, as a particular grammar and performance system --- within this range?" Because of its misleading nature, Chomsky's neurophysiological analogy, like his astrophysical analogy, makes no positive contribution to the justification of the methodological bases of his mentalism.

3.4 Retrospect

The findings of the preceding paragraphs may be summed up as follows:

1. There are essential differences of principle between, on the one hand, the methodology of Chomskyan mentalism and, on the other hand, the methodology of astrophysical and neurophysiological inquiry.
2. Chomsky's astrophysical and neurophysiological analogies, consequently, lack a sound basis and therefore fail to contribute to the clarification and justification of the methodological bases of his form of mentalism.
3. Since Chomsky's existence claims do not postulate actual mechanisms which are uniquely identifiable these claims are ontologically indeterminate and hence nonempirical.
4. Because of the fact that the former analogies break down and in virtue of the nonempirical nature of the latter claims, Chomsky's step of imputing existence to theoretical linguistic constructs is not legitimate and proper.
5. Analogies such as those employed by Chomsky are potentially misleading in that they may obscure relevant differences of principle and, for this reason, are inadequate as a means of clarifying and justifying the methodological bases of a form of mentalism.

Chapter 4

THE STATUS OF EXTERNAL EVIDENCE: A CHOMSKYAN PARADOX

4.1 Introduction

We can now turn to the second of the three indirect steps taken by Chomsky (1976) in his attempt to clarify and justify the methodological bases of his form of mentalism. As pointed out in §2.3, this step entails that Chomsky develops a case against the position of those scholars who have criticized his mentalistic theories for having an evidential basis which is insufficiently wide. The object of our critical scrutiny in the present chapter will accordingly be Chomsky's position on the nature of the evidence pertinent to the validation of mentalistic linguistic theories. This position will be reconstructed in terms of a number of evidential theses at the basis of which lies Chomsky's view that external (i.e., nonintuitive) evidence can play only a limited role in this validation. It will be argued that Chomsky's view gives rise to additional serious doubts about the empirical status of his mentalistic theories, grammatical as well as general linguistic. The obvious way of removing these doubts, it will then be argued, leads to the identification of a paradox in Chomsky's mentalistic-rationalistic approach to the study of language. In conclusion it will be shown that this paradox constitutes a further obstacle to agreeing that it is "legitimate" and "proper" for Chomsky to "impute existence" to theoretical linguistic constructs. (1)

4.2 Two fundamental distinctions

Chomsky's position on the evidence pertinent to the validation of mentalistic theories has to be analyzed with reference to two fundamental distinctions. The first distinction is that between intuitive and nonintuitive (linguistic) evidence. Chomskyans assign linguistic intuitions or so-called informant judgments the status of primary linguistic data. (2) These intuitions play a dual methodological role in linguistic inquiry. On the one hand, they constitute problematic data to be explained by particular grammars. On the other hand, they constitute

the basic source of evidence for validating --- that is, justifying and refuting --- such grammars. It has become conventional to denote the evidence yielded by linguistic intuitions --- or, in Chomsky's (1976:12) terms, the "evidence derived from informant judgment" --- by means of the expression "internal (linguistic) evidence". By contrast, nonintuitive linguistic evidence, of all kinds, is referred to by means of the generic term "external evidence". Internal evidence consists in data about the objects internal to the generative grammarian's linguistic reality as this reality is delineated by means of the abstractions and idealizations employed by him.⁽³⁾ External evidence, by contrast, consists in data about phenomena, objects or processes which, in terms of these same abstractions and idealizations, are external to this linguistic reality. External evidence comprises, for instance, data about the physical basis of the language capacity, data about the actual use of linguistic competence in performance, data about the genetic basis of the language capacity, data about linguistic change, data about speech pathology, etc.

The second distinction is the one between a mentalistic and a nonmentalistic (fragment of a) linguistic theory such as a grammar. This distinction may be elucidated with reference to Chomsky's wh-explanation outlined in §2.1 above. Observe that this wh-explanation is not inherently mentalistic: it is a straightforward fragment of formal, nuts-and-bolts grammar. Specifically, it makes no ontological claims about any underlying reality, whether mental or other. As presented above, the wh-explanation thus incorporates no element in virtue of which a nonmentalist linguist would be unable to present it as a potential solution to the problem of the ungrammaticalness of (3) in §2.1. This wh-explanation is simply an ordered set of statements: some of these collectively constitute the explanans from which a statement describing the problematic ungrammaticalness of (3) can be derived as the explanandum. The view of linguistic theories called "Platonism" or the "Platonist Position" by Katz (1977) may be taken to represent one form of nonmentalism. According to Platonism, "grammar is an abstract science like arithmetic" (p. 562). A Platonist grammar does not characterize real entities such as idealized mental objects or processing systems (p. 565-6). It rather depicts "the structure of abstract entities" (p. 566). Since, according to Katz, these entities are not "real" we will also use the expression "fictitious" to denote them.

In order to turn the inherently nonmentalistic wh-explanation into a fragment of mentalistic grammar, Chomsky has to add a number of claims to those already incorporated in this explanation. As we have seen in §2.1, the claims which Chomsky (1976:9) adds to the wh-explanation are those by means of which he "imputes existence to" or "attributes psychological reality to" the "mental representation" (4) and the "mental computations" involved in the derivation of the question (3).⁽⁴⁾ These existence or ontological claims made by Chomsky we have called "mentalistic claims". In sum: a nonmentalistic linguistic theory does not aim at describing a real object, mental or other; a mentalistic linguistic theory, by contrast, has the aim of describing the structure of a mental object or entity.

Against this background, it is now possible to examine Chomsky's position on the evidence pertinent to the validation of mentalistic linguistic theories. I will attempt to explicate this position in terms of four evidential theses. These represent my reconstruction of Chomsky's position --- he makes no attempt at giving such an explicit account of his position.

4.3 The sources of evidence

A first aspect of Chomsky's position on the evidence pertinent to the validation of mentalistic theories, and in particular grammars, may be reconstructed as follows.

- (1) The Varied Sources Thesis: Evidence bearing on mentalistic claims may be derived from many and varied sources.

The Varied Sources Thesis represents the core of the following remarks by Chomsky (1976:3): "We may impute existence to the postulated structures at the initial, intermediate, and steady states in just the same sense as we impute existence to a program that we believe to be somehow represented in a computer or that we postulate to account for the mental representation of a three-dimensional object in the visual field. Evidence bearing on empirical hypotheses such as these might derive from many and varied sources. Ultimately, we hope to find evidence concerning the physical mechanisms that realize the program, and it is reasonable to expect that results obtained in the abstract study of the system and its operation

should contribute significantly to this end (and in principle, conversely)". The "initial state" mentioned in this quote represents "a fixed, genetically determined initial state of mind common to the species" that makes language acquisition or "growth" possible, that is, the so-called faculté de langage or language acquisition device. The "steady state" represents "the grammar of a language that has grown in the mind", that is, the idealized linguistic competence of the adult speaker.

The Varied Sources Thesis --- implicitly adopted by Chomsky in earlier work as well⁽⁵⁾ --- appears at the surface to be nonobjectionable. Clearly, the more numerous and the more varied the sources of evidence for mentalistic claims, the more thorough would be the validation of these hypotheses. Moreover, what point could there be in restricting the evidence for mentalistic hypotheses to a single source, viz. native speaker intuitions? In spite of these apparently attractive aspects of The Varied Sources Thesis, it is problematic within the wider context of Chomskyan generative grammar. The problems spring from the abstractions and corresponding idealizations employed by Chomsky. Let us consider two of these idealizations as they bear on the study of the cognitive system known as "linguistic competence".

The first abstraction, and corresponding idealization, concerns the manner in which other cognitive systems interact with linguistic competence in the actual use of language. Thus, Chomsky (1976:3) points out that "When we speak or interpret what we hear, we bring to bear a vast set of background assumptions about the participants in the discourse, the subject matter under discussion, laws of nature, human institutions, and the like". He proceeds (1976:3-4) to point out that "In an effort to determine the nature of one of these interacting cognitive system [i.e., linguistic competence --- R.P.B.], we must abstract away from the contribution of others [such as the cognitive system of background assumptions --- R.P.B.] to the actual performance that can be observed".

This abstraction, and the resulting idealization, have two complementary consequences. On the one hand, because of this abstraction problematic data about the contribution which the above-mentioned "other" cognitive systems make towards actual performance are excluded from the domain of problematic data to be accounted for by the mentalist grammarian. On the other hand, this abstraction stipulates that such data are irrelevant in principle to the validation of mentalistic hypotheses about an idealized

competence. For example, by abstracting away from the manner in which a speaker's background knowledge interacts with his competence in actual performance, a mentalist linguist, as a matter of principle, stipulates that data about this knowledge and about its interaction with competence are irrelevant to the validation of mentalistic hypotheses about the idealized competence.

The second abstraction yields an idealization known as "the ideal-speaker listener". Chomsky (1965:3) states that "Linguistic theory is concerned primarily with an ideal speaker-listener in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance". In terms of this idealization, the linguistic reality studied by the Chomskyan mentalist includes pure, idealized competence alone, excluding such phenomena, objects or processes as those involved in idiolectal, dialectal and sociolinguistic variation, in the production and perception of utterances, in linguistic change, in speech pathology and errors, in pidginization and creolization, etc. Here, too, abstracting away from these phenomena, objects or processes has two complementary consequences. On the one hand, data about these phenomena, objects or processes fall outside the domain of problematic data to be accounted for by mentalistic theories. On the other hand, it is implied that these data are irrelevant in principle to the validation of mentalistic claims about an idealized competence.

Thus, Chomskyan idealizations such as the two mentioned above do not only restrict the domain of problematic data of mentalistic theories. These idealizations in principle restrict the sources of evidence for the validation of mentalistic claims as well. In fact, as a result of these idealizations, the sources of potential evidence for mentalistic claims are restricted to one only: data about pure linguistic competence, i.e. linguistic intuitions of native speakers. Notice, moreover, that not even all intuitive informant judgments about properties of linguistic units qualify as potential evidence for validating mentalistic claims. Only those intuitive judgments which are causal effects of linguistic competence itself are relevant to the validation of mentalistic claims. Scholars such as Bever and Katz have shown that certain intuitive judgments are causal effects not of linguistic competence, but of such psychological

mechanisms as perceptual strategies, etc.⁽⁶⁾ In terms of Chomsky's idealizations these intuitive judgments are irrelevant to the validation of mentalistic claims. That Chomsky accepts this consequence is clear from the following remarks by him (1978b:10): "... we often do not know what is the right kind of evidence. When we elicit judgments from informants, or conduct psycholinguistic experiments, we do not know a priori what we should attribute to grammatical competence as distinct from innumerable other factors".

Viewed against the background of the abstractions and idealizations employed by Chomsky, his Varied Sources Thesis is thus all but nonproblematic. The latter thesis allows for "many and varied sources" from which evidence may be derived for the validation of mentalistic claims. The former idealizations, however, restrict these sources to one: genuine linguistic intuitions. It is therefore not strange that Jerrold Katz --- one of the few generative grammarians who has given serious thought to the methodological bases of mentalistic linguistics --- is willing to accept evidence from this one source alone. The core of his (1977:563) position is that "Competencism claims that idealizations in grammar proceed only from intuitions of grammatical properties and relations. Data pertaining to the nature of events in tasks involving high speed operations, such as errors and reaction times, do not enter into the evidential constraints in grammar construction. Such events are different in kind from mental acts of inner apprehension [i.e. linguistic intuitions --- R.P.B.]. They reflect aspects of the way speakers exercise their knowledge rather than features of the knowledge itself. Accordingly, the competencist can give a priori grounds for considering the sorts of data that FFG [i.e., Fodor, Fodor and Garrett (1975) --- R.P.B.] use to argue their case against semantic representation to be just the sorts of data that a linguist should ignore in grammar construction ...".⁽⁷⁾ The data used by FFG and judged irrelevant by Katz comprise data about the use of semantic representations in performance tasks. From the quote given above, it is clear that Katz cannot accept Chomsky's Varied Sources Thesis.

The crucial question, then, is how it is possible for Chomsky simultaneously to employ the idealizations discussed above and to accept The Varied Sources Thesis. That is, how, within the Chomskyan approach, is it possible for data about phenomena, objects and processes from which these idealizations abstract away to be used for validating mentalistic claims about an idealized linguistic competence? For ease of reference, this problem may

be denoted by means of the expression "The Mentalist-Rationalist Paradox". The origin of the term "Mentalist" in this compound expression is obvious. The term "Rationalist" derives from the philosophy of science which underlies the use of the idealizations in question.⁽⁸⁾

4.4 The nonnecessity of external evidence

This brings us to Chomsky's second evidential thesis.

- (2) The Nonnecessity Thesis: It is not necessary, for the validation of mentalistic claims, to use, in addition to intuitive (= internal) evidence, other nonintuitive (= external), evidence.

Expressed in The Nonnecessity Thesis is the essence of the following remarks by Chomsky (1976:5-6): "Challenged to show that the constructions postulated in that theory [i.e., a theory about the initial/final state of the language faculty --- R.P.B.] have 'psychological reality', we can do no more than repeat the evidence and the proposed explanations that involve these constructions. Or, like the astronomer dissatisfied with study of light emissions from the periphery of the sun, we can search for more conclusive evidence, always aware that in empirical inquiry we can at best support a theory against substantive alternatives and empirical challenge, not prove it to be true". Within this context, the evidence which it is permissible to repeat, according to Chomsky, is intuitive evidence. The "more conclusive evidence" mentioned in the quote has to be nonintuitive, external, evidence.⁽⁹⁾ The crucial part of the quote, of course, is Chomsky's use of Or in the statement "Or, like the astronomer dissatisfied with ...". This use of Or clearly indicates that Chomsky does not consider the use of external evidence a necessity in the validation of mentalistic claims.⁽¹⁰⁾ Let us now turn to two of the objectionable aspects of Chomsky's Nonnecessity Thesis.

4.4.1 The astrophysical analogy

The first objectionable aspect of The Nonnecessity Thesis concerns the manner in which it is related to Chomsky's astrophysical analogy analyzed in §3.2. As is clear from Chomsky's remarks quoted above as well, this analogy forms part of the conceptual basis of The Nonnecessity Thesis.

Specifically, the latter thesis is clearly supposed to derive a measure of justification from the former analogy. In §3.2, the reasons why Chomsky's astrophysical analogy fails were discussed in detail. One of these reasons is that the analogy exists by virtue of Chomsky's misrepresentation of the methodology of the form of inquiry instantiated by Bahcall and Davis's (1976) testing of the theory of solar nuclear burning. Some of the respects in which Chomsky misrepresents this methodology bear directly on the acceptability of The Nonnecessity Thesis.

First of all, Chomsky fails to make clear that the epistemological aim of Bahcall and Davis's inquiry was not to justify the theory of solar nuclear burning, but to test it. Moreover, Chomsky suppresses the fact that Bahcall and Davis did not even consider the possibility of meeting the challenge to this theory by "repeating the evidence and proposed explanations". As may be expected, Chomsky consequently fails to point out that for Bahcall and Davis to have reacted to the challenge in this way would have been nonrational. Clearly, if the existing evidence for a theory is such that it leaves this theory open to serious challenges, there can simply be no point in repeating this evidence when the theory is actually challenged. Moreover, a theory cannot be tested in the sense of Bahcall and Davis by repeating existing evidence; for this purpose, new data are required. To find such new data was precisely the objective of Bahcall and Davis's inquiry. Thus, in terms of a distinction "internal-external", Bahcall and Davis's position is such that the testing of the theory in question cannot be carried out without recourse to "external" evidence. All of this implies that, insofar as Chomsky's Nonnecessity Thesis depends on his astrophysical analogy for its justification, this thesis is unfounded.

4.4.2 Evidential indeterminacy

The Nonnecessity Thesis has a second aspect which is even more objectionable. This aspect relates to the empirical nature of the mentalistic claims expressed in Chomskyan linguistic theories. It has been shown above that a fragment of grammar such as Chomsky's wh-explanation is not inherently mentalistic. To turn it into a fragment of mentalistic grammar, a mentalist has to add a number of claims to those already incorporated in this explanation. The claims added to those already incorporated in the

wh-explanation have to meet a specific condition: they must be empirical. Otherwise there would be no difference in refutable content between a mentalistic interpretation of this explanation and a nonmentalistic one. In the absence of such a difference in refutable content, the difference between a fragment of mentalistic grammar and a fragment of nonmentalistic grammar would be either terminological or metaphysical.

We have seen in §2.1 that Chomsky appears to be aware of this difficulty. Though he fails to discuss this problem explicitly, he does make an attempt to add something to the content of the claims incorporated in the wh-explanation. Specifically, what Chomsky (1976:9) does is "to impute existence" to the theoretical constructs in terms of which these hypotheses are formulated. From the quote presented in §2.1, it is clear that Chomsky does this by adding to the claims incorporated in his wh-explanation ontological, mentalistic claims such as (3)(a) and (b) of §3.2.7, repeated here for the sake of convenience as (3)(a) and (b) respectively.

- (3) (a) [_S which for PRO to play sonatas on t] exists as a component part of a mental representation underlying the question What sonatas are violins easy to play on?
- (b) wh-movement exists as a component part of the mental computations by means of which the question What sonatas are violins easy to play on? is derived.

The question, now, is whether or not the ontological claims (3)(a) and (b) add refutable elements of content to the wh-explanation. That is, are the claims (3)(a) and (b) --- and other ontological claims of the same kind --- more than mere verbalisms or metaphysical statements? In other words, do the claims (3)(a) and (b) make a substantive difference in content between Chomsky's mentalistic interpretation of the wh-explanation and a nonmentalistic interpretation of it?

Mentalistic claims such as (3)(a) and (b) exhibit two problematic properties which indicate that they are nonempirical in the conventional sense of §2.3. The first property is that of ontological indeterminacy which was considered in §3.2.7 above. The second property, that of evidential indeterminacy, is directly related to the adoption of The Nonnecessity Thesis. To begin with, let us consider this property in abstract terms.

Suppose that there were two sets of claims A and B such that B incorporated

all the claims of A plus a number of additional claims. If these additional claims were to be empirical, then there would have to be a difference in the evidence that bore on A and B respectively. Thus all the evidence relevant to the validation of A would also be relevant to the validation of B. But there would have to be additional evidence that bore on B but not on A. Specifically, this additional evidence would have to bear on the additional claims of B. Since these claims were not incorporated in A, this additional evidence would simply be irrelevant to the validation of A. If it were impossible in principle to bring additional evidence of the appropriate kind to bear on the additional claims of B, then these claims would be evidentially indeterminate. This property would render the additional claims nonempirical. This is to say that there is no real empirical difference in the content of the sets of claims A and B, despite B's incorporating the additional claims in question. Note that evidential indeterminacy should be sharply distinguished from mere underdeterminedness by evidence. All empirical claims are underdetermined by the evidence that bears positively on them. This is so because positive evidence cannot in principle demonstrate or prove to be true, in a logical or mathematical sense, the claims on which it bears.⁽¹¹⁾ In the case of evidential indeterminacy, by contrast, it is impossible in principle to bring any evidence of the appropriate kind to bear on the claims in question. Thus, whereas empirical claims are of necessity underdetermined by the evidence which bears positively on them, evidentially indeterminate claims are of necessity nonempirical.

It is clear that a nonmentalistic interpretation of Chomsky's wh-explanation can be taken to be a set of claims A, a mentalistic interpretation to be a set of claims B, and mentalistic claims such as (3)(a) and (b) to be the additional claims incorporated in B. Moreover, for Chomsky's mentalistic claims (3)(a) and (b) to have real empirical content, there must, in principle, be evidence which would bear on them but which would simply be irrelevant to the validation of the claims incorporated in a nonmentalistic interpretation of the wh-explanation. In the absence of such evidence, these mentalistic claims would be evidentially indeterminate and the difference between Chomsky's mentalistic interpretation of the wh-explanation and a nonmentalistic interpretation of it, would be either terminological or metaphysical. The question, then, is whether or not there is evidence which, in this sense, shows that the mentalistic claims in question are evidentially determinate and, thus, empirical.

Intuitive evidence --- or as Chomsky (1976:12) calls it "evidence derived

from informant judgment" --- clearly does not show mentalistic claims to be empirical. For, as is made clear by Katz (1977:565), this kind of evidence is just as relevant to the validation of nonmentalistic hypotheses as it is to the validation of mentalistic hypotheses.⁽¹²⁾ And this takes us to the heart of the matter: Chomsky's Nonnecessity Thesis allows the mentalist in principle to derive all the evidence he needs for the validation of mentalistic claims from informant judgments alone. This thesis, thus, effectively destroys the basis of an argument to the effect that there is an empirical difference between Chomskyan mentalism and (a form of) nonmentalism. For, if mentalistic claims have to be empirical, they must be responsible to a kind of evidence which is irrelevant in principle to the validation of nonmentalistic linguistic hypotheses. The fundamental problem with The Nonnecessity Thesis then is that, in an unqualified form, it reduces mentalistic claims such as (3)(a) and (b) either to mere verbalisms or to metaphysical speculations. The same point may be put differently: for ontological claims such as (3)(a) and (b) to have empirical content, Chomsky's Nonnecessity Thesis must be replaced by a Necessity Thesis. The latter thesis would state that mentalistic claims could not be validated without recourse to some or other kind of nonintuitive evidence which is in principle irrelevant to the validation of nonmentalistic hypotheses.⁽¹³⁾

Notice that the adoption of a Necessity Thesis aggravates the problem which was characterized above as "The Mentalist-Rationalist Paradox". In terms of the idealizations considered above, on the one hand, evidence not derived from genuine intuitions is disallowed in principle from being used to validate mentalistic claims. In terms of a Necessity Thesis, on the other hand, mentalistic claims must be validated with reference to such nonintuitive evidence in order to be empirical. To conclude this section, we return to the potential difference in systematic import between the ontological claims of Chomskyan mentalism and those of astrophysics. The reason why it was suggested in §3.2.8 that this difference could well be (come) one of principle derives from Chomsky's Nonnecessity Thesis. This thesis does not oblige mentalist linguists to search for external linguistic evidence for their ontological claims. Consequently, these linguists are not forced to organize their mentalistic hypotheses, along with other principles, into more inclusive (networks of) theories which attempt to account for external linguistic phenomena such as those considered above. As a result, the systematic import of Chomskyan mentalistic claims could remain minimal.

4.5 The nonprivileged status of external evidence

Chomsky's third fundamental evidential thesis may be reconstructed as follows:

- (4) The Nonprivileged Status Thesis: External evidence derived from such performance phenomena as production, recognition, recall, and language use in general may bear on mentalistic hypotheses, but (when it does) has no privileged status in relation to intuitive evidence.

This thesis represents the gist of the following remarks by Chomsky (1976: 11-12): "Suppose now that someone were to devise an experiment to test for the presence of a wh-clause in underlying representations --- let us say, a recognition or recall experiment. Or let us really let down the bars of imagination and suppose that someone were to discover a certain pattern of electrical activity in the brain that correlated in clear cases with the presence of wh-clauses: relative clauses (finite and infinitival) and wh-questions (direct and indirect). Suppose that this pattern of electrical activity is observed when a person speaks or understands (1) [= our (1) in §2.1 above --- R.P.B.]. Would we now have evidence for the psychological reality of the postulated mental representations?

"We would now have a new kind of evidence, but I see no merit to the contention that this new evidence bears on psychological reality whereas the old evidence only related to hypothetical constructions. The new evidence might or might not be more persuasive than the old; that depends on its character and reliability, the degree to which the principles dealing with this evidence are tenable, intelligible, compelling, and so on. In the real world of actual research on language, it would be fair to say, I think, that principles based on evidence derived from informant judgment have proven to be deeper and more revealing than those based on evidence derived from experiments on processing and the like, but the future may be different in this regard. If we accept --- as I do --- Lenneberg's contention that the rules of *grammar* enter into the processing mechanisms, then evidence concerning production, recognition, recall, and language use in general can be expected (in principle) to have bearing on the investigation of rules of *grammar*, on what is sometimes called 'linguistic competence' or 'knowledge of language'. But such evidence, where it is forthcoming, has no privileged character and does not bear on psychological reality in some unique way. Evi-

dence is not subdivided into two categories: evidence that bears on reality and evidence that just confirms or refutes theories (about mental computation and mental representations, in this case). Some evidence may bear on process models that incorporate a characterization of linguistic competence, while other evidence seems to bear on competence more directly, in abstraction from conditions of language use. And, of course, one can try to use data in other ways. But just as a body of data does not come bearing its explanation on its sleeve, so it does not come marked 'for confirming theories' or 'for establishing reality'."

Many of the quoted remarks by Chomsky appear to be quite sound. For example, it cannot be disputed that the weight of a fragment of external evidence depends on its relevance, reliability, and the theoretical principles involved in its interpretation. Moreover, such evidence cannot demonstrate the truth of the mentalistic claims on which it positively bears; a point to which we return in §4.6 below. Chomsky's Nonprivileged Status Thesis nevertheless has various questionable aspects, of which we shall consider the two most important ones.

4.5.1 Ontological indeterminacy

The first questionable aspect of The Nonprivileged Status Thesis relates to the ontological indeterminacy of Chomskyan mentalistic claims. Recall that in §3.2.7 we saw that Chomskyan mentalistic claims such as (3)(a) and (b) do not postulate actual entities or mechanisms which are uniquely identifiable. Consequently, as existence claims these mentalistic claims are (ontologically) indeterminate: they do not express precise assertions about independently known properties of mechanisms or entities which linguists are able to recognize unambiguously in a real mental world. Hence, Chomskyan mentalistic claims are nonempirical, that is nonrefutable in principle: it is just not clear what could count as counterevidence for claims that lack precision and ontological determinacy.

The important question now is what steps can be taken in order to reduce the ontological indeterminacy of the mentalistic claims under consideration? A first necessary step is to strip Chomsky's expressions "to impute existence to theoretical constructs" and "to attribute psychological reality to theoretical constructs" of their obscurity. A natural way of doing this entails developing one or more ontological conditions for (the entities postulated by) theoretical constructs involved in the mentalistic claims. The function

of such conditions is to specify the circumstances under which it would be proper to claim that an arbitrary theoretically postulated mental entity did or did not exist. Let us consider two examples of putative ontological conditions of this kind.

A first ontological condition for theoretical linguistic constructs may be derived from a particular view which Chomsky has repeatedly put forward. This is the view that linguistic competence, as described by a generative grammar, is in fact used in one way or another in linguistic performance. In the article under consideration here, Chomsky (1976:12) presents this view as follows: "If we accept --- as I do --- Lenneberg's contention that the rules of grammar enter into the processing mechanisms ...". And in their recent joint paper, Chomsky and Lasnik (1977:427), having related the linguist's grammar to the child's grammar, state that "The grammar *G* is embedded in a performance system that enables knowledge of language (competence) to be put to use in speech and understanding".⁽¹⁴⁾

From Chomsky's view as outlined above can be derived, in a natural manner, the following ontological condition.

- (5) The Performance Condition: A theoretically postulated mental entity cannot be granted existence, unless it "is put to use in speech and understanding" or unless it "enters into the processing mechanisms".

Various aspects of this ontological condition have to be clarified. For example, the content of the expressions "is put to use" and "enters into" must be explicated in clear, nonambiguous terms.

As formulated above, The Performance Condition is nevertheless sufficiently precise to illustrate the way in which the content of Chomsky's expressions "impute existence to" or "attribute psychological reality to" may be clarified with a resulting increase in the determinacy of Chomskyan mentalistic claims. In terms of The Performance Condition, the expressions "to impute existence to *X*" and "to attribute psychological reality to *X*" have the meaning "to claim that *X* is used in actual speech and understanding" or "to claim that *X* enters into the processing mechanisms".

The adoption of The Performance Condition has rather clear implications for the evidence needed for validating mentalistic claims. In terms of this condition, evidence about the use or non-use in performance of a particular theoretically postulated mental entity becomes crucial to the vali-

dation of the mentalistic claim which postulates the existence of this entity. To put it differently, The Performance Condition assigns a privileged status to (certain kinds of) performance evidence in the validation of mentalistic claims about an idealized competence.

It appears to me that many scholars have been under the impression that Chomsky in fact accepts The Performance Condition. It is these scholars whose views Chomsky (1976:6) characterizes as follows: "The literature takes a rather different view. Certain types of evidence are held to relate to psychological reality, specifically, evidence deriving from studies of reaction time, recognition, recall, etc. Other kinds of evidence are held to be of an entirely different nature, specifically, evidence deriving from informant judgments as to what sentences mean, whether they are well formed, and so on. Theoretical explanations advanced to explain evidence of the latter sort, it is commonly argued, have no claim to psychological reality, no matter how far-reaching, extensive, or persuasive the explanations may be, and no matter how firmly founded the observations offered as evidence. To merit the attribution of 'psychological reality', the entities, rules, processes, components, etc. postulated in these explanatory theories must be confronted with evidence of the former category".

Chomsky (1976:6, 12) goes on, however, to reject the view which assigns a privileged status to evidence from performance. Thus he (1976:12) states that "... evidence concerning production, recognition, recall, and language use in general can be expected (in principle) to have bearing on the investigation of rules of grammar, on what sometimes is called 'linguistic competence' or 'knowledge of language'. But such evidence, where it is forthcoming, has no privileged character and does not bear on psychological reality in some unique way".

These remarks by Chomsky give rise to a serious problem. In order to deny evidence from performance a privileged status, Chomsky has to reject The Performance Condition. For, it is by virtue of this condition that performance evidence has a privileged status. By rejecting The Performance Condition, however, Chomsky would make a mystery of his view that linguistic competence "enters into processing mechanisms" or is "put to use in speech and understanding". For, The Performance Condition follows in a natural manner from Chomsky's views on the use of competence in actual

performance. And, even more important, the rejection of The Performance Condition once again exposes Chomskyan mentalism to the challenge that it is nothing more than a terminological game or a metaphysical system. Recall that the function of The Performance Condition, as an ontological condition, is to enhance the ontological determinacy of mentalistic claims sufficiently to render these claims refutable.

The Performance Condition, of course, is not the only ontological condition that can fulfil this function. It may be argued that this condition should be replaced, or accompanied, by the following one:

- (6) The Physical Basis Condition: A theoretically postulated mental entity cannot be granted existence, unless it is somehow realized in the (physical) mechanisms of the brain.

This further ontological condition is intimated in such statements by Chomsky (1976:3) as the following: "Ultimately we hope to find evidence concerning the physical mechanisms that realize the program, and it is reasonable to expect that results obtained in the abstract study of the system and its operation should contribute significantly to this end (and in principle, conversely)". The view expressed in these statements is repeated by Chomsky (1976:23) in the following terms: "At the level of cellular biology, we hope that there will be some account of the properties of all organs, physical and mental". The gist of Chomsky's view is also to be found in an earlier paper by himself and Katz (1974:364): "... the grammar in the form it would take in models of speech production and perception must structurally correspond to some features of brain mechanism". From the latter quote it is clear that the physical mechanisms provided for in The Physical Basis Condition take on the form of neurophysiological entities and processes.

Notice that if The Physical Basis Condition were to be adopted, then (also) neurophysiological evidence would have a privileged status in the validation of mentalistic claims. This condition contributes to the ontological determinacy of mentalistic claims --- and, by implication, reduces the verbalistic or metaphysical nature of such claims --- by assigning the expression "to impute existence to X" the content "to claim that X is realized neurophysiologically".

Chomsky may reject The Physical Basis Condition as well, thereby denying

neurophysiological evidence a privileged status. Such a rejection, however, would leave him with problems analogous to those created by the rejection of The Performance Condition. First, claims such as the ones quoted above on the physical basis of grammars would become obscure. Second, mentalistic claims would remain ontologically indeterminate and, consequently, nonempirical.

This brings us to the crux of the matter: in order to make his mentalistic claims ontologically determinate enough that they will be empirical, Chomsky cannot do without ontological conditions such as The Performance Condition or The Physical Basis Condition. Whether or not the appropriate ontological condition(s) is/are one or both of these two conditions and/or one or more other conditions is immaterial to the argument. What is crucial is the fact that there is a need for conditions of this sort. But adopting one or more of these ontological conditions implies assigning a privileged status to one or more kinds of external evidence. Chomsky's Nonprivileged Status Thesis, however, by implication makes it impossible in principle to adopt any of these ontological conditions. Consequently, this thesis blocks the way to making Chomskyan mentalistic claims ontologically more determinate and, thus, empirical. This, then, is one of the two principal ways in which The Nonprivileged Status Thesis is questionable.

The conclusion that Chomskyan mentalism has to adopt one or more ontological conditions bears directly on The Mentalist-Rationalist Paradox. In terms of such conditions, the Chomskyan mentalist would have to use external evidence for validating mentalistic claims. This mentalist, moreover, would have to assign a privileged status to certain subtypes of this kind of evidence. As a result, the conflict between his mentalistic ontology and his rationalistic phenomenology would become even more significant. In chapter 5 we return to the basis and justification of ontological conditions.

4.5.2 "Reality" vs. "mental computation and mental representations"

The other questionable aspect of The Nonprivileged Status Thesis concerns its relation to a particular distinction drawn by Chomsky. Recall that, in his defence of The Nonprivileged Status Thesis, Chomsky (1976:12) makes the following statements: "But such evidence [i.e. performance evidence ---

R.P.B.], where it is forthcoming, has no privileged character and does not bear on psychological reality in some unique way. Evidence is not subdivided into two categories: evidence that bears on reality and evidence that just confirms or refutes theories (about mental computation and mental representations, in this case)". Appropriately interpreted, Chomsky's statement that evidence is not subdivided into two categories is correct. The appropriate interpretation is not, however, the one he seems to envisage. For, his allusion to two categories of evidence is based on an untenable distinction: "reality vs. mental computation and mental representations". Within the framework of Chomsky's mentalism, it is far from being clear in what nonbizarre sense "reality" is distinct from "mental computation and mental representations". That is, it is not clear in what sense a "mental computation" or "mental representation" can be anything other than one of the components of this "reality". So there cannot be two kinds of evidence: "evidence that bears on reality" as opposed to "evidence that just confirms or refutes theories (about mental computation and mental representations)".

The distinction involved in The Nonprivileged Status Thesis is, however, a different one. This is the distinction between, on the one hand, evidence bearing on a reality which includes "mental computation and mental representations" and, on the other hand, evidence that does not bear on this reality at all. The discussion above has made it clear that evidence of the former kind, viz. external evidence, does have a privileged status in regard to evidence of the latter kind, viz. intuitive evidence. It has been shown that intuitive evidence cannot serve as a basis on which to distinguish between Chomskyan mentalism and a nonmentalistic view of linguistic theories. Thus the Nonprivileged Status Thesis cannot derive any justification from the distinction drawn in the quoted remarks by Chomsky. This is not the distinction pertinent to the adoption of a Privileged Status Thesis.

4.6 The nonconclusiveness of external evidence

Chomsky's fourth evidential thesis does not bear directly on The Mentalist-Rationalist Paradox. However, to gain a fuller understanding of his position on the role of external evidence in the validation of mentalistic claims, it is necessary to consider this thesis briefly:

- (7) The Nonconclusiveness Thesis: The external evidence which --- derived from performance data, for example --- can be furnished in support of a mentalistic claim cannot conclusively show this claim to be true.

This thesis reconstructs the essence of remarks such as the following by Chomsky (1976:5-6): "Or, like the astronomer dissatisfied with the study of light emissions from the periphery of the sun, we can search for more conclusive evidence, always aware that in empirical inquiry we can at best support a theory against substantive alternatives and empirical challenge, not prove it to be true".

The Nonconclusiveness Thesis and the quoted remarks on which it is based appear, for the most part, to be beyond serious dispute. This thesis places severe limitations on the weight and potential usefulness of external evidence in the validation of mentalistic claims. For, what point would there be in appealing to such evidence if this evidence could not in principle contribute significantly to the support for mentalistic claims? There are, however, two respects in which Chomsky's discussion of the nonconclusive nature of external evidence is less than adequate. And these inadequacies reflect negatively on The Nonconclusiveness Thesis.

First, Chomsky fails to make clear that the nonconclusiveness of external evidence does not spring primarily from the external nature of such evidence. The nonconclusiveness of this kind of evidence springs from the fact that scientists in general do not have at their disposal any form of argument for demonstrating the truth of empirical hypotheses.⁽¹⁵⁾ The forms of argument which can be used to justify empirical hypotheses are nondemonstrative by their very nature. And these forms of argument have the property of nondemonstrativeness regardless of the kind of evidence furnished in support of empirical hypotheses within the framework of these arguments. In fact, therefore, The Nonconclusiveness Thesis conveys no information at all about external evidence as a distinct kind of evidence.

Second, Chomsky fails to make clear that external evidence will have greater weight when used as negative evidence for refuting mentalistic claims, than when used as positive evidence for confirming such claims. Although it is impossible to refute any theory of some complexity conclusively,⁽¹⁶⁾ the form of argument pertinent to such refutation is demon-

strative.⁽¹⁷⁾ It is the demonstrative nature of this form of argument which will add to the weight of the external evidence --- or, for that matter, any kind of evidence --- presented in such an argument to refute mentalistic claims.

In the article under consideration, Chomsky presents a quite unbalanced view of the validation of empirical claims. He depicts this validation as if it consisted almost entirely in providing support for such claims, furnishing justification for them, or demonstrating their truth. For all practical purposes the component of refutation, which is essential to such validation, is ignored by Chomsky.⁽¹⁸⁾ This, in sum, is the reason why The Nonconclusiveness Thesis is inaccurate as an assessment of the potential weight of external evidence in the validation of mentalistic claims.

Let us take a closer look at Chomsky's justificationist attitude before turning to the implications of the defects of his evidential theses. We have considered this justificationist-oriented methodology as it emerges from Chomsky's reflections on the methodology of linguistic inquiry at a level of metascientific abstraction. It is now significant that, even in practising linguistic analysis as a so-called working linguist, Chomsky fails to take into account the role which external evidence can play in the refutation of linguistic hypotheses. This point is illustrated by the position adopted by him and Lasnik (1977) on the nature of filters. They (1977:434, 436, 487) point out that filters seem to "facilitate" perceptual strategies. For example, the filter (8) is claimed to "facilitate" the perceptual strategy (9).

(8) * $\left[\begin{array}{c} \text{NP} \\ \text{NP tense VP} \end{array} \right]$ (Chomsky and Lasnik 1977:435)

(9) In analyzing a construction C, given a structure that can stand as an independent clause, take it to be a main clause of C.
(Chomsky and Lasnik 1977:436)

The filter (8) "facilitates" the perceptual strategy (9) in the sense that it rules out as ungrammatical cases of phrases which this strategy would have misanalyzed. According to Chomsky and Lasnik (1977:436), the following are two cases of such phrases:

(10) * $\left[\begin{array}{c} \text{S} \\ \text{he left} \end{array} \right]$ is surprising (C = S)

(11) * $\left[\text{NP } \underline{\text{the man}} \left[\underline{\text{was here}} \right] \right]$ is my friend (C = S)

In (10) and (11), according to Chomsky and Lasnik, the italicized phrases are potential independent clauses.

The interaction between filters and perceptual strategies is important to Chomsky and Lasnik. They (1977:444) take filters to be a device for expressing properties of the complementizer system. Moreover, they consider it natural that properties of complementizers should play a crucial role in the implementation of perceptual strategies by offering important cues for clause analysis. The apparent interaction between filters and perceptual strategies thus provides a possible "point of contact" between elements of linguistic competence and elements of the performance system. That there has to be such points is clear from Chomsky and Lasnik's (1977: 434) view that "The grammar G is embedded in a performance system that enables knowledge of language (competence) to be put to use in speech and understanding".

In terms of an ontological condition such as The Performance Condition (5), the fact that a filter "facilitates" a given perceptual strategy would provide external evidence for the existence of this filter. This is not explicitly claimed by Chomsky and Lasnik, but seems to tie in with their general approach. What is significant, however, is that Chomsky and Lasnik fail to deal explicitly with the status of a filter which has properties such that it does not, or even could not, facilitate any plausible perceptual strategy. An instance of such a filter would be one which did not express some property of the complementizer system. For such a filter there would be no external evidence. And this absence of external evidence ought to reflect negatively on such a filter --- at least within the framework of a balanced view of the validation of empirical claims. But, as working linguists, Chomsky and Lasnik fail to consider the status of such a filter at a general level.

They (1976:478) do, in fact, propose a filter which does not express a property of the English complementizer system.

(12) * $\left[\text{V adjunct NP} \right]$, NP lexical .

This filter expresses Chomsky and Lasnik's (1976:478) hypothesis that "In

general, no verbal adjuncts can separate a verb and a following lexical NP". By means of the filter (12), they account for the ungrammaticality of such sentences as the following:

- (13) (a) *I believe sincerely John.
 (b) *I like very much John.

In regard to the filter (12), Chomsky and Lasnik (1977:479) do point out that it "does not involve the COMP system, and is in this respect different from the others we have been discussing". Significantly, however, they fail to point out that, because of the property mentioned, it is unlikely that this filter could "facilitate" any perceptual strategy. And, as might be expected, they do not consider the possibility that the absence of external evidence for this filter may reflect negatively on it. This omission typically instantiates the justificationist approach by which Chomsky's assessment of the weight and potential usefulness of external evidence is rendered unacceptable. (19)

4.7 The Mentalist-Rationalist Paradox

Let us, in conclusion, take another look at the conflict between rationalistic and mentalistic methodological principles which was called above The Mentalist-Rationalist Paradox. At the basis of this conflict lie Chomsky's Varied Sources Thesis and his rationalistic idealizations. The former thesis allows for various possible sources of evidence for the validation of mentalistic theories. The latter idealizations restrict these sources to one only, viz. native speakers' linguistic intuitions. This conflict is intensified by the conclusion that Chomsky's Nonnecessity Thesis and Nonprivileged Status Thesis have to be replaced by theses which assert their exact opposite. As regards The Nonnecessity Thesis, it renders mentalistic claims evidentially indeterminate and thus non-empirical. Consequently, it has to be replaced by a thesis which asserts that mentalistic theories cannot be validated without recourse to non-intuitive, external evidence. The Nonprivileged Status Thesis, in turn, disallows the use of the ontological conditions which would make mentalistic claims ontologically so determinate that they are testable in principle. Consequently, this thesis must be replaced by a thesis which would allow the use of such ontological conditions and which, by implica-

tion, would assign a privileged status to one or more kinds of external evidence in the validation of mentalistic theories. This, in outline represents the anatomy of The Mentalist-Rationalist Paradox. The major implication of the (continued) existence of this paradox is clear: it makes it impossible to agree with Chomsky that his imputation of existence to theoretical linguistic constructs is both "legitimate" and "proper". For, as long as this paradox were to remain unresolved, the empirical status of the existence claims made by Chomsky would remain questionable.

4.8 Retrospect

The major findings of our analysis of Chomsky's position on the evidence pertinent to the validation of mentalistic linguistic theories may be summarized as follows:

1. Chomsky's Varied Sources Thesis --- which allows for many and varied sources of evidence for validating mentalistic claims --- is problematic in that it clashes with his rationalistic idealizations which restrict these sources of evidence to one only, thus creating a Mentalist-Rationalist Paradox.
2. Chomsky's Nonnecessity Thesis --- which states that it is not necessary to use other, i.e. nonintuitive (= external), evidence in addition to intuitive (= internal) evidence, for this validation --- has two objectionable aspects:
 - (i) it is in part dependent for its justification on Chomsky's unsound astrophysical analogy;
 - (ii) its adoption renders mentalistic claims evidentially indeterminate, hence nonempirical.
3. Chomsky's Nonprivileged Status Thesis --- which specifies that the external evidence that bears on mentalistic claims does not have a privileged status relative to intuitive evidence --- is defective in that:
 - (i) it disallows the adoption of the ontological conditions which are necessary to render mentalistic claims ontologically so determinate that they become refutable in principle;

- (ii) it is based on an untenable distinction between "reality" as opposed to "mental computation and mental representation".
4. Chomsky's Nonconclusiveness Thesis --- which asserts that external evidence cannot show the mentalistic claims on which it bears to be true --- misleadingly downgrades the role of such evidence in the validation of these claims because:
- (i) it depicts a defining property of confirmation, viz. the property of nondemonstrativeness, as if it were a property peculiar to external evidence;
 - (ii) it is based on a view of the logic of validation which fails to explicitly take into account that, in addition to confirmation, this logic has a second component, viz. refutation.
5. Unless the Mentalist-Rationalist Paradox could be resolved, Chomsky's imputation of existence to theoretical linguistic constructs would remain "improper" and "illegitimate".

Chapter 5

OUTLINES OF A PROGRESSIVE MENTALISM

5.1 Introduction

In its present form, Chomskyan mentalism is a nonempirical enterprise: its existence claims about a mental language faculty are either metaphysical or purely verbalistic.⁽¹⁾ These findings give rise to two questions. Should anything be done about Chomskyan mentalism? If so, what? In the present chapter, these are taken as the guiding questions, and an attempt is made to develop one of the possible responses to them. Before going into the details of this response, let us first, at a general level, survey some of the major alternative responses.

A first possible response to our guiding questions could be to accept Chomskyan mentalism as it is, that is, as a nonempirical enterprise, and to refrain from attempting to modify it. In support of this position various considerations may be adduced. For example, it may be contended that refutability in principle --- in the Popperian sense --- is not the hallmark of scientific rationality.⁽²⁾ And, it may even be argued that metaphysics is a perfectly respectable intellectual enterprise in its own right.⁽³⁾ To adopt this position, however, is to take an easy way out. It is much more interesting to take seriously Chomsky's repeated statements to the effect that mentalism should be an empirical enterprise.⁽⁴⁾

A second possible response to our guiding questions could be to turn Chomskyan mentalism into an enterprise which is empirical in a clear and non-objectionable sense of the term empirical. Two general strategies for doing this --- differing in their outcome --- suggest themselves. One of these would entail rejecting the mentalistic import of Chomsky's approach to the study of natural language, while retaining its formal machinery. That would amount to replacing Chomskyan mentalism by a form of Chomskyan nonmentalism. Within the framework of this alternative approach, Chomsky's formal machinery would still be used to make claims about natural language(s). Moreover, these claims, although they would lack psychological import, would be clearly empirical. Note that

such a response would be based on the assumption that it is in the nature of Chomskyan mentalism to be irredeemably nonempirical.

The other general strategy for changing Chomskyan mentalism would be directed at showing that this assumption is mistaken. Its aim would be to introduce changes of such a nature that Chomskyan mentalism, while remaining a form of mentalism, would become a genuinely empirical enterprise. This is the strategy that will be adopted in the present chapter. That is, an attempt will be made to develop the methodological bases of a form of mentalism which represents an empirical and fruitful approach to the study of natural language(s). As we proceed, it will become clear that several of these methodological bases were anticipated in preceding chapters. In the rest of this chapter, a form of mentalism which is both empirical and fruitful will be referred to as a progressive mentalism.

In chapter 3, it became clear that comparisons, analogies, etc. are ill-suited for the task of effectively clarifying and justifying the methodological bases of a form of mentalism. For the purpose of such clarification and justification, explicitly formulated theses and conditions are needed. These are the means that will be used below in articulating the methodological bases of a progressive mentalism.

5.2 Progressive mentalism vs. nonmentalism

Let us consider, then, the most fundamental of the conditions which any form of mentalism must meet in order to be progressive.

- (1) The Distinctness Condition: In order to be progressive, any form of mentalism must be distinct, in significant respects, from a methodologically non-objectionable form of nonmentalism.

Like Chomsky's mentalism, any form of mentalism which failed to meet The Distinctness Condition would, in essence, be either a metaphysical system or an elaborate terminological game. For convenience, we will use the expression (minimally) acceptable in the intended sense of "methodologically non-objectionable".

To appreciate the function of The Distinctness Condition, it is necessary to consider the essence of a minimally acceptable form of nonmentalistic. For the purpose of the present study, the view of linguistic theories called "Platonism" or the "Platonist Position" by Katz (1977:562ff.) may be taken to represent a form of nonmentalistic which is (at least) minimally acceptable. As pointed out in §4.2 above, according to Platonism "grammar is an abstract science like arithmetic" (p. 562).⁽⁵⁾ The goal of a Platonist grammar is not that of characterizing real entities such as idealized mental objects or processing systems (p. 565-5). Rather, it is that of depicting "the structure of abstract entities" (p. 566). This choice of goal entails that a Platonist grammarian does not impute existence to the theoretical constructs of his grammar or claim psychological reality for them.

The "facts" to which Platonist grammars are "required to respond" are provided by linguistic intuition (p. 565). The source of these data is taken to be psychological; not, however, their import. That is, on the Platonist view, it is not the case that intuitions convey information about psychological objects, states or events (p. 565). Platonists, accordingly, consider external data about on-line operations in sentence processing to be irrelevant to their grammars. This is to say that "information about errors and reaction times for performance tasks ... has the wrong import" (p. 566). Platonism represents a minimally acceptable, i.e., a methodologically non-objectionable, form of nonmentalistic in the following, dual, sense. First, its goal is clear; the import of its claims is clear; its conditions on evidence for or against these claims are clear. Second, nothing in its choice of this goal, this import or these evidential conditions precludes its claims from being testable in principle, hence empirical.

This brings us to the significant respects in which any form of mentalistic has to differ from a minimally acceptable form of nonmentalistic --- such as Platonism --- in order to be progressive. Specifically, what would these significant respects be? A given linguist's answer to this question will be codetermined by the particular philosophy of science to which he subscribes. Different philosophies of science or theories of scientific rationality/growth differ in what they single out to be the significant properties of science. Consequently, depending on whether he is an inductivist, a falsificationist, a "research programmist", or a "pro-

gressive problematist" --- to mention, indirectly, just a few different philosophies of science --- every linguist will give a different answer to the question stated above.⁽⁶⁾ Within the framework of certain philosophies of science, this question may even be considered to represent a pseudo-issue.⁽⁷⁾ Rather than to embark on a lengthy philosophical discussion of the contents and relative merits of various philosophies of science, we will consider this question in relation to the particular philosophy of science which Chomsky seems to subscribe to at a level of metascientific reflection. Be it noted in passing, however, that in his capacity of "working mentalist", Chomsky does not consistently adhere to the principles of his philosophy of science --- especially those relating to refutability.⁽⁸⁾

As is clear from chapter 2, two of the fundamental principles of Chomsky's philosophy of science are (ontological) realism⁽⁹⁾ and (epistemological) empiricism.⁽¹⁰⁾ In terms of these principles, there are three general respects in which a progressive mentalism must be distinct from a minimally acceptable form of nonmentalism: ontological import, responsibility to evidence, and heuristic fruitfulness. The required distinctness may be captured more precisely by stating, in addition to the fundamental condition (1) above, specific further conditions which any form of mentalism would have to meet in order to be progressive.

5.3 Ontological import

A first respect in which a progressive mentalism should be distinct from a typical form of nonmentalism is that of ontological import. No form of nonmentalism makes any ontological claims about an underlying reality; a progressive mentalism, however, must make ontological claims about a mental reality such that these claims are both clear and precise. Otherwise, such a mentalism would be no more than an exercise in verbalism. To ensure that a given form of mentalism will have proper ontological import, we formulate a number of conditions which it has to satisfy.

5.3.1 The real nature of mental entities

A first condition relates to the entities (objects, phenomena or processes) involved in the ontological claims.

- (2) The Reality Condition: In order for any form of mentalism to be progressive, its ontological claims must refer, ultimately, to entities which are both real and uniquely identifiable.

The Reality Condition has a dual function. First, it rules out the possibility that a progressive mentalism may make claims about abstract entities, where "abstract" means "fictitious". In this function, therefore, The Reality Condition draws a distinction between a progressive mentalism, on the one hand, and, on the other hand, a nonmentalism --- such as Platonism --- whose claims are about fictitious, nonreal objects. Second, The Reality Condition places a restriction on the abstractions and idealizations employed by a progressive mentalism. Notice, that this condition does not prohibit the use of ideal(ized) entities. In the formulation of The Reality Condition, the expression ultimately should accordingly be understood to mean "via one or more ideal entities (if necessary)". An ideal entity is not of the same kind as an abstract, fictitious, entity. In the case of an ideal entity there always exist (one or more) real entities from whose properties the theorist has abstracted in order to conceive of the ideal entity; in the case of a fictitious entity, however, no such real entities exist. In terms of its second function, The Reality Condition disallows the postulation of "ideal" entities that are not related, by way of explicitly specifiable abstractions, to real entities which are uniquely identifiable. An "ideal" entity which cannot be related to one or more such real entities is in fact an abstract entity in the Platonist sense of "fictitious", "non-real". And a mentalism whose ontological claims postulate entities which are abstract in this sense is simply a disguised form of nonmentalism.

Let us consider a number of concrete examples of Chomskyan mental entities which are disallowed by The Reality Condition. Chomsky (1976:7, 8, 9, 11, 12) repeatedly indicates that the ideal entities postulated by his mentalistic theories are "mental representations" and "mental computations". Consider, again, the following typical example relating to Chomsky's (1976:9) wh-explanation: "Tentatively accepting this explanation, we impute existence to certain mental representations and to the mental computations that apply in a specific way to these mental representations. In particular, we impute existence to a representation in which (12) [= [_s which for PRO to play sonatas on t] --- R.P.B.] appears as part

of the structure underlying (5) [= What sonatas are violins easy to play on? --- R.P.B.] at a particular stage of derivation, and to the mental computation that produces this derivation, and ultimately produces (5), identified now as ungrammatical because the computation violates the wh-island constraint when the rule of wh-movement applies to sonatas in (12)". In recent papers by Chomsky more such claims about "mental computation(s)" and "mental representations" are made. For example, in "A theory of core grammar" (1978b:16), Chomsky proposes two conditions which have to be met by principles of universal grammar. One of these conditions specifies that "they ought to be natural as principles of mental computation". Chomsky (1978b:17-18) proceeds to claim, for example, that whereas Ross' Island Constraints fail to meet this condition, Chomsky's own principle of subjacency satisfies it. (11)

Chomsky (1976:3-4; 1978b:7) does indicate that these "mental representations" and "mental computations" or "principles of mental computation" --- being component parts of an "abstract language faculty, idealized "mental organ" or "idealized system(s)" --- constitute ideal entities. What he fails to make clear, however, is what the real, uniquely identifiable, non-ideal entities are to which these ideal entities are related in terms of abstractions. Take as a concrete example the so-called "mental representation" [_S which for PRO to play sonatas on t]. What are the non-idealized, real entities corresponding to this "mental representation" and its component parts? A similar question may be raised in connection with the "mental computations" postulated in the quote given above or in connection with the "natural principle of mental computation" called "subjacency". That is, Chomsky fails to make clear that there are real, uniquely identifiable, non-ideal entities to which his ideal "mental" entities are related in terms of specifiable abstractions. For this reason, these ideal "mental" entities fail to satisfy The Reality Condition. And, for the reasons specified above, theoretical claims about ideal entities that fail to satisfy this condition ought not to be made by a progressive mentalism. (12)

Chomsky's entity called "the mind" appears to be essentially similar to his "mental representations" and "mental computations". He (1978b:22) makes claims of the following sort about "the mind": "We can assume that the mind in interpreting and forming questions and comparatives still sees the WH-phrase in the complementizer position of the embedded sentence so that the mind is unable to move the other WH-phrase into this position,

just as it is unable in the indirect question case of sentence (21)
 (= $\left[\begin{array}{c} \bar{S} \\ S \end{array} \right]$ COMP $\left[\begin{array}{c} S \\ S \end{array} \right]$ he noticed $\left[\begin{array}{c} \bar{S} \\ S \end{array} \right]$ who $\left[\begin{array}{c} S \\ S \end{array} \right]$ t saw the man]]] --- R.P.B.),

and then the principle of subadjacency applies to block further movement." What Chomsky fails to do, however, is to specify the nature and properties of the non-ideal, uniquely identifiable entities to which the ideal "the mind" is related in terms of abstractions. For this reason Chomsky's entity "the mind" ought to be disallowed as well. To say this, is not to champion overtly or covertly a form of anti-mentalism. It is merely to say that a mentalism cannot be progressive if it operates in such a facile manner with what ought to be a fundamental concept. A progressive mentalism would, then, attempt to replace Chomsky's concept "the mind" with a scientifically viable concept of mind.

Chomsky (1976:9) does not make his position more acceptable by pointing out that "... the physicist is actually postulating physical entities and processes, while we are keeping to abstract conditions that unknown mechanisms must meet. We might go on to suggest actual mechanisms, but we know that it would be pointless to do so in the present stage of our ignorance concerning the functioning of the brain". This quote suggests that the actual or real entities of which Chomsky's ideal "mental" entities are abstractions exist, hopefully, in the brain. But if it is impossible to relate an ideal "mental" entity uniquely to something in the brain, there is no point in attributing existence to this ideal entity. For, how would it be possible to test a claim about an object which could not be uniquely identified?

5.3.2 The determinacy of mentalistic claims

This brings us to a second condition --- complementary to the first --- relating to the ontological import of a progressive mentalism.

- (3) The Determinacy Condition: In order for any form of mentalism to be progressive, its ontological claims must be sufficiently determinate in regard to content.

The function of this condition is to ensure that the ontological claims made by a progressive mentalism are sufficiently specific and precise to

be testable.

In chapter 3 it was shown that, unlike the ontological claims of such fields as (astro-)physics and neurophysiology, Chomskyan mentalistic claims are quite indeterminate in regard to content. The former ontological claims assign quantitatively measurable properties to uniquely identifiable entities or processes. The latter ontological claims, by contrast, are quite vague in regard to content. Chomskyan mentalistic claims assert the mere fact of the "existence" or "reality" of some "mental" entity, an entity representing according to Chomsky (1976:9) an abstract condition on an unknown mechanism. And, recall, that Chomsky fails to specify in clear and precise terms the content of his expressions "to impute existence to theoretical constructs" and "to attribute psychological reality to theoretical constructs". This failure is, in no small measure, responsible for the lack of ontological determinacy of Chomskyan mentalistic claims. Obviously, no mentalism can be progressive if its claims are inherently ontologically indeterminate.

A first positive step that might be taken to enhance the ontological determinacy of mentalistic claims would be to rid the Chomskyan notions "to impute existence to theoretical constructs" and "to attribute psychological reality to theoretical constructs" of their vagueness. As indicated in §4.5.1, this first step may be attempted by stating one or more conditions that specify the circumstances under which the mental entity postulated by a theoretical construct is to be granted or denied existence. These ontological conditions may refer to matters such as the following: the physical basis of the ideal mental entities; the manner in which these entities are used in linguistic performance; the way(s) in which these entities are acquired in actual, non-idealized language acquisition; the ways in which these entities may be modified by linguistic change; the manner in which these entities may be affected by language pathology; specific components of the genetic programme underlying the innateness of certain of these entities.

In §4.5.1 we considered two typical examples of the ontological conditions under consideration here:

- (4) The Physical Basis Condition: A theoretically postulated mental entity cannot be granted existence, unless it is somehow realized in the (physical) mechanisms of the brain.

- (5) The Performance Condition: A theoretically postulated mental entity cannot be granted existence, unless it "is put to use in speech and understanding" or unless it "enters into the processing mechanisms".

In §4.5.1 it was shown how these two ontological conditions are based on the views of Chomsky (and Katz). Instead of repeating this demonstration here, we turn to two further possible ontological conditions.

As formulated above, The Physical Basis Condition and The Performance Condition apply to the mental entities postulated by grammars. Ontological conditions of this kind, however, may also be formulated for general-linguistic theories. A first example involves the genetic basis of the entities postulated by these theories.

- (6) The Genetic Condition: A mental entity postulated by a general-linguistic theory cannot be granted existence, unless it corresponds to some component of the genetic programme of human beings.

The Genetic Condition may be derived from Chomsky's characterization of the object about which a general-linguistic theory theorizes. This object he (1976:2) identifies as "... the genetic program that enables the child to interpret certain events as linguistic experience and to construct a system of rules and principles on the basis of this experience".⁽¹³⁾ In a similar vein Chomsky (1978b:7) asserted recently that there is "a fixed biological endowment and that one part of it is a system of principles or conditions on structures, that we may think of as constituting the initial state of language, i.e. the language faculty of each individual. We take universal grammar (UG) to be a description of this initial state".

In §3.3 we considered the nature of the "nativist" claims made by neurophysiologists. It was shown that these claims can be viewed, under certain circumstances, as claims about properties which particular neurons must or must not exhibit before they have been exposed to experience. This is suggestive of the outlines of a second ontological condition for general-linguistic theories.

~~(7)~~ The Neurological Condition: A mental entity postulated by a general-linguistic theory cannot be granted existence, unless certain neurons exhibit particular properties before they have been exposed to linguistic experience.

This condition is based on the natural assumption that the biologically endowed or genetically determined aspects of natural language are realized physically as properties of neurons. Of course, as formulated above, The Neurological Condition is not nearly precise enough. And this holds equally for the other three ontological conditions presented above. The question as to how such ontological conditions may be made more precise and how they may be justified will be considered in §5.4.7 below.

As they have been formulated above, these conditions are merely illustrative of a certain approach that may be adopted in an endeavour to increase the determinacy of ontological linguistic claims. In terms of this approach, it is possible to increase the determinacy of mentalistic claims by associating with their content some "external" component. In the conditions (4), (5), (6) and (7) above, this "external" component is successively physical, behavioral, genetic and neurological. In positive terms, these ontological conditions state that a theoretically postulated mental entity exists in the following respective senses: it is realized physically/neurophysiologically in a particular way; it is used in linguistic performance in a certain manner; it is present in a certain form in the genetic make-up of an individual; and certain neurons underlying it have specific properties. Note that the relevant four ontological conditions by no means represent the entire variety of the stock of such conditions. It appears possible, in principle, to formulate ontological conditions relating to the manifestation of ideal mental entities in still other linguistic phenomena or processes, such as actual language acquisition, speech errors, language pathology, linguistic change, sociolinguistic variation, pidginization and creolization, etc. We return in §5.4.7 to the question of the relative weight and interrelatedness of the various ontological conditions that may be proposed.

Let us, finally, consider ontological conditions of the kind in question from a more general metascientific perspective. The general tenet of such conditions is the following: the existence or nonexistence of a mental entity is reflected by the manner in which it does or does not interact

with other kinds of entities or processes which may be assumed to exist. The philosophical basis of such ontological conditions is simple. Shapere (1969:155) formulates it as follows: "To say that 'A exists' implies (among other things, surely): ... A can interact with other things that exist". This point is illustrated by Shapere (1969:155) with reference to physics: "Particles that exist can interact with other particles that exist, and derivatively can have effects on macroscopic objects and be affected by them. 'Convenient fictions' or 'constructs' or 'abstractions' or 'idealizations' cannot do this, at least not in any ordinary sense". For example, to "... talk of electrons as existing enables us to consider assertions of linkages between electrons and, for example, scintillations or clicks (i.e., the particles involved cause the scintillations or clicks that we 'observe')". Perhaps it is not superfluous to point out that it is not here argued by means of analogy that mentalistic linguistics may, should or even must use ontological conditions of the kind in question because they are used in physics. Rather, the general philosophical principle on which these conditions are based is available to any form of empirical inquiry that needs such devices.

5.3.3 The applicability of ontological conditions

The Reality Condition and The Determinacy Condition are the two fundamental conditions on the ontological import of a progressive mentalism. These two conditions must, however, be supplemented by a meta-condition relating to their applicability.

- (8) The Nonarbitrariness Condition: The Reality Condition and The Determinacy Condition apply to all ontological claims of a progressive mentalism; if there are certain claims to which these conditions must not apply, a principled explanation has to be given for the non-applicability of the conditions to these claims.

The motivation for adopting The Nonarbitrariness Condition may be given with reference to recent criticisms by Katz (1977) of a certain requirement on the psychological reality of semantic representations. In terms of this requirement --- proposed by Fodor, Fodor and Garrett (1975) --- semantic representations are psychologically real in the sense that, given appro-

priate idealizations, understanding a sentence requires the recovery of its semantic representation. Katz (1977:560-561) criticizes this requirement on account of the fact that it exhibits two omissions. The first omission --- in which we are not primarily interested --- is the failure of this requirement to mention sentence production.

It is the second omission which motivates The Nonarbitrariness Condition. Katz (1977:560-561) explicates it as follows: "The other omission is the absence of a psychological reality requirement on the operations of a grammar that generate structural descriptions. This omission, which seems to be a matter of principle, raises the further question of just what the point of performance oriented constraints on grammars can be if the imposition of such constraints is arbitrarily restricted to structural descriptions. One might guess, however, that FFG (i.e., Fodor, Fodor and Garrett --- R.P.B.) make no mention of operations because, on the one hand, the evidence now seems to go against the derivational theory of complexity, and on the other, proposals for transformation-reduced grammars, though available, are not yet firmly entrenched. Thus, performance oriented constraints the (sic) cover operations run the risk of ruling out too much of standard syntactic theory. But if this risk is not taken, FFG leave us wondering why they make a distinction between what in the grammar requires credentials of psychological reality and what does not when there seems to be no relevant difference between them".⁽¹⁴⁾ These criticisms by Katz appear to be eminently sound. There is no point in adhering to a form of mentalism if some of its claims can be protected from refutation with the aid of arbitrary distinctions. The Nonarbitrariness Condition represents a first step towards eliminating such objectionable protection.

In sum: a progressive mentalism must be clearly distinct, in regard to ontological import, from an acceptable form of nonmentalism. Specifically, a progressive mentalism has to meet The Reality Condition and The Determinacy Condition --- conditions which simply do not apply to an acceptable form of nonmentalism.

5.4 Responsibility to evidence

A form of mentalism and a form of nonmentalism which are distinct in regard to ontological import have to be distinct in a second respect as well. They have to differ significantly in regard to their responsibility to evidence.

This second respect in which a progressive mentalism has to be distinct from an acceptable form of nonmentalism may be captured in terms of a number of evidential conditions. Ontological conditions such as The Reality Condition and The Determinacy Condition are proposed primarily to ensure that the ontological claims of a progressive mentalism will be more than mere verbalisms. That is, their primary function is to ensure that these claims will have substantive content. Evidential conditions, however, are formulated primarily to ensure that the substantive content of these claims will be nonmetaphysical. That is, their primary function is to ensure that this content will be empirical. Recall, in this connection, that Chomsky has repeatedly stressed the point that mentalism should be an empirical enterprise. What Chomsky has failed to do is to articulate the evidential conditions which will ensure the empirical status of mentalistic claims.

5.4.1 The testability of mentalistic claims

Let us start with the most fundamental of the evidential conditions for a progressive mentalism.

- (9) The Testability Condition: In order for any form of mentalism to be progressive, its ontological claims must be testable in principle.

The Testability Condition assigns to "empirical" the content "testable in principle". Consequently, as is clear from chapters 3 and 4, this condition is not in line with the methodology practised by Chomsky when he makes mentalistic claims in his capacity of a working linguist. For, testability is neutral between refutability or falsifiability, on the one hand, and confirmability or justifiability, on the other hand; whereas both the epistemological aim and logic of validation adopted by Chomsky as a working linguist are oriented towards justification or confirmation.⁽¹⁵⁾ The Testability Condition is, however, compatible with the epistemology which Chomsky professes to adopt when he reflects, at a meta-level, on the methodological bases of his mentalism. This compatibility is clear from the following remarks by Chomsky (1978b:9): "An implication of this is that it is difficult to make falsifiable or scientific assertions, i.e. it is possible to construct a test, but one is unable to carry out the experi-

~~ment.~~ This does not, however, affect the empirical content of the theory because it is falsifiable in principle, and furthermore very often testable in practice".

But to say that "empirical" means "testable in principle" is not to make a highly informative statement. In order to give sufficient content to this statement, it would be necessary to make clear the conditions under which claims or hypotheses would be testable in principle. The conditions, however, have been at the center of a network of highly technical philosophical controversies which cannot be surveyed here.⁽¹⁶⁾ For their illustrative value, let us take up three minimal conditions on testability in principle --- conditions which in some form or other appear to have been accepted by many scholars and which, moreover, appear not to be in violent disaccord with the philosophy of science to which Chomsky seems to subscribe at a level of metascientific reflection.⁽¹⁷⁾

Our first specimen condition on testability in principle may be formulated as follows:

- (10) The Test Implication Condition: For (sets of) claims to be empirical, they must be so clear in content that they have precise test implications.

This condition on testability in principle is anticipated in The Reality Condition and The Determinacy Condition on the ontological import of mentalistic claims. No mentalistic claim could meet The Test Implication Condition if it failed to satisfy the previously mentioned ontological conditions. This, of course, is not to say that The Test Implication Condition is a mere paraphrase of these ontological conditions. Clarity of content or ontological import is only one of the factors that are involved in the derivation of precise test implications from a set of claims. And, The Test Implication Condition of course applies also to claims which are not existence claims and, consequently, which do not have to meet the ontological conditions under consideration.

Our second specimen condition on testability concerns the data involved in the testing of (sets of) claims.

- (11) The Data Condition: For (sets of) claims to be empirical, it must be possible in principle to confront their test implications with the appropriate type(s) of data.

The obvious question concerns the content of the expression "appropriate" in the formulation of this condition. This question will be answered below in terms of further evidential conditions for a progressive mentalism.

Our third specimen condition on testability in principle involves the matter of protection.

- (12) The Protection Condition: For (sets of) claims to be empirical, they must not be protected from refutation in objectionable ways.

This protection can be effected by a variety of conceptual devices.⁽¹⁸⁾ One of these devices has already been forbidden by The Nonarbitrariness Condition. Since the highly intricate question of what constitutes an objectionable protective device bears on all scientific claims --- and is not needed solely for the articulation of a progressive mentalism --- it will not be considered further in this study.

5.4.2 The novelty of the evidence

Let us now return to the question of the content of "appropriate" in the context of The Data Condition. That is, what types of data are appropriate and what are not appropriate for the testing of mentalistic claims? Part of the answer to this question is provided by the following evidential condition:

- (13) The Novelty Condition: The original data for the explanation of which a mentalistic claim has been proposed cannot be used to test this claim: for such a test, new evidence is required.

This condition is required to rule out as illegitimate one of the ways in which Chomsky would deal with a challenge to a mentalistic hypothesis.

This line of action was sketched by Chomsky as part of his astrophysical analogy which was analyzed in §3.2 above. Recall that Chomsky (1976:4) provides for two ways in which an astronomer could deal with a challenge to the "physical reality" of his "theoretical constructions": one indirect, the other direct. The indirect way entails that "the astronomer could only respond by repeating what he had already presented: Here is the evidence available and here is the theory that I offer to explain it". This indirect way of responding is also available to the linguist whose mentalistic claims are being challenged. Thus, Chomsky (1976:5) states, "Challenged to show that the constructions postulated in that theory have 'psychological reality', we can do no more than repeat the evidence and the proposed explanations that involve these constructions".

As pointed out in §3.2.4, the indirect way of responding to a challenge is nonrational. First, if the existing evidence for a theory is so weak that it leaves the theory open to serious challenge, what point could there be in repeating this evidence in response to a challenge? The non-rational nature of such an indirect response is clearly illustrated by Bahcall and Davis's attempt to obtain new evidence for testing the theory of nuclear energy generation in stars like the sun --- a point misconstrued in Chomsky's astrophysical analogy. Second, the test implications of a theory take on the form of predictions. Predictions, by their very nature, embody new claims, where "new" indicates that these claims are distinct from those based on the original data. Clearly, testing such new claims requires new evidence. The function of The Novelty Condition, then, is to disallow the futile exercise of repeating existing, unconvincing evidence in the testing of mentalistic claims.

5.4.3 The necessity of external evidence

A further evidential condition for a progressive mentalism relates to the nature of the new evidence required for the testing of mentalistic claims:

- (14) The External Evidence Condition: The new evidence used for testing (a set of) mentalistic claims must be external evidence.

This condition is based on Chomsky's assumption that intuitive evidence has the status of primary linguistic data and that linguistic hypotheses are

initially postulated to account for such data. The External Evidence Condition, then, states that unless (a set of) mentalistic claims can be tested on the basis of nonintuitive evidence, they are nonempirical. This condition, thus, asserts the opposite of Chomsky's Nonnecessity Thesis discussed in §4.4 above. Recall that Chomsky's thesis asserts that it is not necessary, for the validation of mentalistic hypotheses, to use, in addition to intuitive (= internal) evidence, other, nonintuitive (= external) evidence. It was shown that Chomsky's thesis must be rejected. By implication, then, in §4.4 a case was argued for The External Evidence Condition. Here, we shall consider only the gist of this argument.

In §5.3 it was shown that a progressive mentalism differs in regard to ontological import from an acceptable nonmentalism such as Platonism. That is, a progressive mentalism makes ontological claims which cannot be derived from an acceptable nonmentalism. If its ontological claims are to be empirical, then clearly a progressive mentalism has to be responsible to a kind of evidence which is irrelevant to the validation of the claims of a nonmentalism. That is, a progressive mentalism cannot make empirical ontological claims if its evidential basis is identical to that of an acceptable nonmentalism. If these two evidential bases were identical, then the ontological claims of the mentalism would represent either mere verbalisms or metaphysical speculations.

In §5.2 above it was made clear that an acceptable nonmentalism such as Platonism is required to respond to data provided by linguistic intuition. That is, the evidence pertinent to the testing of nonmentalistic claims takes on the form of intuitive evidence. It follows then that if intuitive evidence were the only kind of evidence to which the ontological claims of a mentalism had to be responsible, these claims would not differ in empirical content from the claims of an acceptable nonmentalism. That is, the evidential basis of a progressive mentalism necessarily has to be broader than that of an acceptable nonmentalism. Recall now that Katz (1977:566) has argued plausibly that nonintuitive or external evidence --- derived, for example, from data about performance --- is irrelevant to the validation of the claims made by Platonistic grammars. Here, then, we have a type of evidence with reference to which a significant distinction can be drawn between the evidential basis of a progressive mentalism and that of an

acceptable nonmentalism. This distinction, in fact, is drawn in The External Evidence Condition.

We have arrived at The External Evidence Condition by critically analyzing an aspect of Chomskyan mentalism — reconstructed as The Nonnecessity Thesis in §4.4 above — and by attempting to develop methodological bases for a progressive mentalism. It is interesting, therefore, that other scholars should recently have arrived independently, and via different routes, at positions closely related to the former condition. Two notable examples are Bresnan (1977, 1978) and Lightfoot (in press). Though there are important differences between Bresnan's and Lightfoot's approaches to the study of language, both of these approaches have an aspect which may be reconstructed as a kind of External Evidence Condition.

As regards Bresnan's approach, she (1978:3) argues that "A realistic grammar must be not only psychologically real in this broad sense, but also realizable. That is, we should be able to define for it explicit realization mappings to psychological models of language use. These realizations should map distinct grammatical rules and units into distinct processing operations and informational units in such a way that different rule types of the grammar are associated with different processing functions. If distinct grammatical rules were not distinguished in a psychological model under some realization mapping, the grammatical distinctions would not be 'realized' in any form psychologically, and the grammar could not be said to represent the knowledge of the language user in any psychologically interesting sense".⁽¹⁹⁾ It appears to me that, by taking this position on psychological reality, Bresnan is committed to some version of The External Evidence Condition. Thus, a model of grammar cannot be psychologically real for her if there is no evidence indicating that it can be successfully realized in a psychological model of language processing. Obviously, this evidence cannot be intuitive evidence and must, consequently, be derived from an external source. As such external evidence, Bresnan in fact adduces nonintuitive considerations which indicate that her model of grammar can be successfully realized in a particular processing model.

Lightfoot develops an approach that differs from Bresnan's in important respects. Nevertheless, he too arrives at a kind of External Evidence Condition. He (in press: 19) rejects "unrealistically strong requirements" of psychological reality. For example, he rejects the requirement that the

individual components of a theory of language "should correspond in some way to the psychological processes involved in uttering or comprehending some sentence". However, he rejects "only the strongest version of psychological reality claims ...; one must nonetheless claim that 'the correct grammar' is psychologically real in the weaker sense, if one is to make the usual claims for explanatory adequacy ... That is, the theory of grammar must be interpretable as making some predictions about some 'external', non-distributional domain (such as diachronic change or language acquisition) if it is to achieve explanatory adequacy in the usual sense". The final remark by Lightfoot clearly indicates that he has adopted some version of The External Evidence Condition.

Lightfoot's (in press: 74ff.) approach to the study of language in fact contains a second component which obliges him to adopt some kind of External Evidence Condition. This component is a theory of markedness in terms of which grammars may be more or less highly valued, depending on the extent to which the rules incorporated in these grammars instantiate linguistic universals. Thus, a grammar incorporating a rule which violated The Specified Subject Constraint (= SSC) would be "marked", "costly", or "less highly valued". Claiming that a grammar is marked in a given respect gives rise, however, to a serious problem concerning the refutability of the general-linguistic theory incorporating the violated universal constraint.⁽²⁰⁾ Lightfoot (in press: 74) fully appreciates this problem, as is clear from the following question: "If the existence of a rule designed to violate, say, the SSC simply renders the grammar more marked or less highly valued, but not impossible, how could one ever falsify such a theory?" Lightfoot's (in press: 76) solution to this problem is that claims to the effect that a grammar is marked in certain respects should be considered to be empirical in their own right. These markedness claims, moreover, are empirical to the extent that they can be tested on the basis of external evidence. Thus, Lightfoot states that "For specific proposals concerning marked values to entail testable claims, these claims will have to hold for an 'external' domain, a domain other than that of the distribution of morphemes or grammatical well-formedness. Claims to explanatory adequacy will have to be grounded in such domains. Natural candidates for such a domain wherein markedness proposals make empirically testable claims are language change and acquisition". Lightfoot's position obviously entails acceptance of some kind of External Evidence Condition.⁽²¹⁾

Interestingly enough, a markedness theory also plays a prominent part in Chomsky's recent work in syntax.⁽²²⁾ This theory is not particularly clearly articulated: a host of questions arise in regard both to its substance and to its methodological bases. For example, Chomsky has not dealt explicitly with the question of how a claim to the effect that a given language is marked in a certain respect can be tested. Note particularly that he has not attempted to show that such markedness claims can be validated --- that is, justified or refuted --- without recourse to external evidence. This omission on Chomsky's part seems to be doubly unfortunate. First, it has all the appearances of an inconsistency. That is, one would have thought it merely consistent for him to extend his "internal evidence only" position from mentalism to markedness. Or, alternatively, one would have expected him to furnish reasons for a non-extension of this position. Second, since he has taken neither of the steps just alluded to, it seems essentially arbitrary that he (1978b:13) should allude (albeit vaguely) to external evidence in support of one of his speculations about the options in the underlying order of constituents permitted by the \bar{X} -theory: "It is possible that the options of core grammar too, e.g. ordering options, may be layered in accordance with some theory of markedness. There is some work in child language and creole languages, that is suggestive in this regard". Significantly, Chomsky refrains in this context from attempting to apply his "internal evidence only" position on the validation of mentalistic claims to that of markedness claims.

5.4.4 The relevance of external evidence

5.4.4.1 Resolving the Mentalist-Rationalist Paradox

A further evidential condition for a progressive mentalism relates to our acceptance of The External Evidence Condition. Recall that this condition states that mentalistic claims are nonempirical, unless they can be tested on the basis of nonintuitive evidence. Without The External Evidence Condition clearly there can be no progressive, empirical mentalism. The External Evidence Condition (14) is rather problematic, however, within the broader framework of Chomsky's approach to the study of language. As we have seen in chapter 4, this framework has an aspect, known as "rationalism", which underlies the abstractions and resulting idealizations employed by Chomsky in his delimitation of the aims of mentalistic theories. These

abstractions and idealizations have the function of reducing the complexity of the domain of problematic objects and phenomena to be accounted for by mentalistic linguistic theories. By means of these abstractions and idealizations, this domain is limited to the linguistic competence of an ideal speaker-listener (in other words, the final state of the language faculty) and the language acquisition capacity of an ideal language learner (that is, the initial state of the language faculty). As a result, a large variety of objects, phenomena and processes which may be problematic is excluded from the domain of mentalistic theories. Among these excluded objects, phenomena and processes are the following, to mention only a few: the physical basis of both states of the language faculty; the interaction of "nonlinguistic" capacities with the initial state of the language faculty in language acquisition; the interaction of "nonlinguistic" capacities with the final state of the language faculty/linguistic competence in linguistic performance; "on-line" processing operations in linguistic performance; idiolectal, dialectal and sociolinguistic variation; linguistic change; pidginization and creolization; and speech errors and language pathology.

This brings us to a significant consequence of these abstractions and idealizations: mentalistic linguistic theories cannot be expected to give explanations for the problematic features of phenomena, objects and processes outside their domain. This consequence implies, in turn, that it is impossible in principle to test mentalistic claims by confronting them with data about such external linguistic phenomena, objects and processes. Strictly speaking, then, external linguistic evidence is irrelevant, in principle, to the validation of mentalistic claims. Ultimately, this irrelevance is due to the rationalist position which underlies the abstractions and idealizations already referred to. It has been argued by various scholars --- among them Katz (1977:563) --- that in terms of the rationalist position there is only one kind of evidence relevant to the validation of mentalistic (*grammatical*) claims: intuitive evidence. This on the one hand. On the other hand, our analysis shows that a progressive mentalism has to include The External Evidence Condition. For, we have argued, if mentalistic claims cannot be confronted with external evidence, then they are simply nonempirical. In sum: we appear to have a paradox, namely the Mentalist-Rationalist Paradox of chapter 4. The question is whether this apparent paradox can be satisfactorily resolved.

There are two obvious ways, at least, of resolving the apparent paradox. One of them is to give up The External Evidence Condition. But to abandon this condition is to reduce mentalism to metaphysics (or verbalism). The other way is to give up the rationalist idealizations in question, retaining The External Evidence Condition. As a consequence, mentalistic theories would have to account for problematic data about external linguistic phenomena, objects and processes as well. And these data would be relevant in principle to the validation of mentalistic theories. However, this way of resolving the apparent paradox has two unacceptable consequences.

First, to give up the above-mentioned idealizations would be to reduce linguistic inquiry to a taxonomic enterprise. Thus, such scholars as Katz and Bever have repeatedly and convincingly argued that it is impossible for linguistic theories to have any real explanatory power if they are to account, within a single conceptual framework, not only for all problematic features of (the two states of) the language faculty but also for all problematic features of external linguistic phenomena, objects and processes such as those listed above.⁽²³⁾ The essence of this point was recently stated by Chomsky (1978b:10) in the following terms: "We come to have faith in the relevance of certain experiments and observations insofar as they appear to relate to explanatory theory and permit the deepening of such theory. There is only one alternative to this approach and that is a kind of butterfly collecting or elaborate taxonomics of sensations and observations".

Second, providing a comprehensive account --- even a non-illuminating one --- of the problematic properties of the internal and external linguistic phenomena, objects and processes mentioned above must remain beyond the reach of general-linguistic theories, unless these theories are given considerably more formal power than they have within the Chomskyan framework. And the formal power of the theories within this framework is already considered to be too great. That is, even in their current restricted versions, these theories fail to give a proper characterization of the notion "possible human language". Clearly, theories with increased power --- such as those whose domain is not restricted by the rationalist idealizations under consideration --- will be even less successful in giving such a characterization. Thus, giving up these idealizations --- and, by implication, giving up rationalism --- leaves the mentalist with either of two unacceptable consequences: theories which are mere taxonomies or theories which have excessive formal power.

Two negative conclusions may thus be drawn. First, the Mentalist-Rationalist Paradox cannot be resolved by giving up The External Evidence Condition and, by implication, also giving up the idea of an empirical mentalism. Second, this paradox cannot be resolved by giving up rationalism and, by implication, also giving up the aim of explanatory adequacy. The question which arises, then, is the following: is there no way at all out of this paradox? That is, is there no way of being both a progressive mentalist and a rationalist? Or, is there no way of both adopting The External Evidence Condition and retaining the idealizations under consideration (though under the restrictions specified by The Reality Condition and The Determinacy Condition)? In other words, is there no way in which nonintuitive, external evidence can be made properly relevant to the validation of mentalistic claims about (the initial and final state of) an idealized language faculty. Fortunately, there is such a way. Let us consider it in outline.

5.4.4.2 The role of bridge theories

External evidence can be made properly relevant to the validation of mentalistic claims by constructing conceptual devices that may be called bridge theories. As I have shown elsewhere, ⁽²⁴⁾ the function of such bridge theories is to describe the ways in which the two states of the language faculty are related to or involved in external linguistic phenomena, objects and processes outside the narrow, immediate linguistic reality of the rationalist linguist. For example, one such bridge theory will describe the possible interaction between linguistic competence and perceptual strategies in performance; a second will give an account of the relatedness of mental linguistic "computations" and "representations" to neurological or neurophysiological mechanisms; a third will establish the possible ways in which the language faculty may be involved in linguistic change; a fourth will specify how linguistic competence may be involved in idiolectal, dialectal and sociolinguistic variation; a fifth will specify the possible ways in which components of the language faculty may be affected by language pathology; etc. That is, the function of a bridge theory is to reveal systematic correspondences or interactions between, on the one hand, properties of (one of the states of) the language faculty and, on the other hand, properties of some or other external linguistic phenomenon, object, or process. Viewed against the background of

~~an adequate bridge theory~~, mentalistic claims about the properties of an ideal language faculty by implication express statements about the properties of a specified external linguistic phenomenon, object or process as well. Consequently, viewed against the background of an adequate bridge theory, data about the properties of the latter external linguistic phenomenon, object or process are properly relevant to the validation of the former mentalistic claims. In this way, then, the construction of adequate bridge theories may resolve the Mentalist-Rationalist Paradox.

Before considering an example of such a bridge theory proposed in recent literature, we may formulate a further evidential condition for a progressive mentalism.

- (15) The Relevance Condition: No given type of external evidence is properly relevant to the validation of mentalistic claims in the absence of an adequate bridge theory about the relationship between (the relevant state of) the language faculty and the external linguistic phenomenon, object or process from the properties of which this type of evidence is derived.

The adequacy of a bridge theory depends on a variety of factors central to which are its degree of articulation, the preciseness of its claims, and the extent to which these claims have been validated. Obviously, some bridge theories will be more adequate than others. The consequences of this point will be explored below. Let us first, however, consider a sample of a recently proposed bridge theory. Since the construction of adequate bridge theories is clearly fundamental to a progressive mentalism, it is necessary to show that interesting attempts to develop such theories have been made by working linguists. In this regard, it is sufficient to refer once more to recent work by Bresnan (1978) and Lightfoot (in press). We shall concentrate here on Lightfoot's work and turn to Bresnan's in §5.4.5 below.

Recall that Lightfoot adopts the position that "the correct grammar has to claim psychological reality". These claims, moreover, are empirical to the extent that they make predictions about "some 'external', non-distributional domain (such as diachronic change or language acquisition)". Lightfoot (in press:18) is aware of the problem of the relevance of the evidence derived from external domains. His solution to this problem takes

on the form of the construction of "interpretive mechanisms": "Data from acquisition, say, will simply constitute one more argument for or against the theory (for which psychological reality has to be claimed --- R.P.B.), one more area where the theory makes predictions. There will be interpretive mechanisms which will mediate between the theory of grammar and data from acquisition or historical change. These interpretive mechanisms will be theories of acquisition and change and will constitute the evidence for or against theories of grammar, favouring the theory of grammar which permits the simplest interpretive mechanisms". But, Lightfoot's "interpretive mechanisms" have essentially the function of the bridge theories without which no progressive mentalism can be developed. Lightfoot's study (in press) represents an attempt to develop a particular "interpretive mechanism" or bridge theory: a theory of syntactic change. Let us take a closer look at the function and content of this theory.

The function of Lightfoot's bridge theory is to legitimate the use of historical data in the justification of general-linguistic principles. The general-linguistic principle at stake is the so-called Transparency Principle. This principle "... requires derivations to be minimally complex and initial, underlying structures to be close to their respective surface structures" (p.123). Since this principle helps to define what constitutes a possible grammar, Lightfoot considers it as part of the theory of grammar rather than a component of a theory of (syntactic) change. In justification of the Transparency Principle, Lightfoot adduces historical data about radical re-analyses such as the one involving English modals. These data show how the opaque and complex verbal system of ME changed into the transparent, less complex system of NE. The former system was complex in the sense that it incorporated various exception markers. This complexity was eliminated by a change involving new phrase structure rules: AUX was introduced as an initial structure node, tense was treated as a constituent for the first time, and a new modal category was introduced (p.142). According to Lightfoot, the Transparency Principle predicted that a radical re-analysis would take place. Consequently, the historical data bearing on the change outlined above support the Transparency Principle.

What, then, is the content of Lightfoot's bridge theory (of linguistic change) in terms of which the former data become properly relevant to the

validation of the latter principle as a principle of the theory of grammar? Central among the assumptions of this theory are the following:

- (16) (a) Clusters of simultaneous changes should be related where possible as being surface manifestations of a single basic change at some point in the abstract grammar (p. 137).
- (b) The point at which such re-analyses occur should be predictable by the theory of grammar. (p. 137)
- (c) Communicability must be preserved between generations (p. 151).
- (d) Grammars practise therapy rather than prophylaxis (p. 151).
- (e) Less highly valued grammars are liable to re-analysis (p. 151).
- (f) Certain therapeutic changes are more likely than others (p. 151).

For a detailed discussion of these assumptions chapter 3 of Lightfoot's study should be consulted. It is sufficient to note here that Lightfoot (p. 151) considers only the assumptions (16)(c)-(f) as constituting his "impoverished theory of change". Without making the (meta-)assumptions (16)(a) and (b), however, historical data cannot be relevant to the validation of principles of the theory of grammar. Therefore, Lightfoot's bridge theory has to include the latter assumptions as well.

The individual assumptions of Lightfoot's bridge theory may turn out to be incorrect in minor or even major respects.⁽²⁵⁾ No such error would, however, obscure Lightfoot's recognition of the role which bridge theories or "interpretive mechanisms" have to play in a progressive mentalism. Moreover, he has shown that it is possible to construct such theories or "mechanisms" that may be used to "mediate" between a mentalistic theory of grammar and data about historical change. In short, Lightfoot has shown that it is possible to practise a form of progressive mentalism.⁽²⁶⁾ Bresnan (1978), of course, has independently also done this, a point to which we will return below in §5.4.5.

5.4.4.3 Bridge theories and ontological conditions

Against the background of the conception of bridge theories outlined above it is now possible to clarify a number of points in regard to ontological conditions such as those formulated in §§4.5.1 and 5.3.2. Recall that ontological conditions such as The Physical Basis Condition, The Performance Condition, The Genetic Condition and The Neurological Condition have the function of enhancing the ontological determinacy and the testability of mentalistic claims. The content of these sample conditions has been kept quite nonspecific; the justification for each condition has merely been hinted at; the question of the relative importance of these conditions has not been considered at all. These points may now be clarified with reference to the function of bridge theories and in the light of the consideration that not all bridge theories will be of equal merit.

Ontological conditions such as the four mentioned above clearly relate to bridge theories. Specifically, an ontological condition such as The Performance Condition depends for its content and justification on a bridge theory about the manner in which an idealized linguistic competence is "put to use in speech and understanding" or "enters into processing mechanisms". Should it be impossible to relate such a condition to such a bridge theory, then the condition would be devoid of content and wholly arbitrary. Viewed from a positive angle, the more adequate the bridge theory to which an ontological condition can be related, the clearer and more well-founded the condition.

We have now developed a framework within which the question of the inter-relatedness of the various ontological conditions may be dealt with. The importance or relative weight which any one ontological condition has relative to the others is a function of the adequacy of the respective bridge theories on which these conditions are based. For instance, suppose that The Performance Condition was based on a bridge theory which was more adequate than the bridge theory on which, say, The Physical Basis Condition was based. Then the former condition would contribute more to the determinacy of mentalistic claims than would the latter condition. Let us therefore formulate a meta-condition for ontological conditions:

- (17) The Meta-Condition for Ontological Conditions: Any ontological condition must have as its basis some adequate bridge theory, this bridge theory determining the following properties of the ontological condition:
- (i) the preciseness of its content,
 - (ii) the extent of its justification, and
 - (iii) its relative weight or importance.

Thus, in a progressive mentalism the choice of ontological conditions is clearly a nonarbitrary affair. Thereby we have explored a first consequence of the consideration that not all bridge theories are of equal merit. Let us next turn to a second, related, consequence.

5.4.4.4 The relative weight of a type of external evidence

Consider once more The External Evidence Condition. This evidential condition states that the new evidence used for testing (a set of) mentalistic claims must be external evidence. What this condition omits, however, is to differentiate among the various types of external evidence by assigning to each of them a distinct relative weight. For instance, this condition fails to state, say, that evidence from linguistic performance has more weight than, say, neurophysiological evidence. Having noted that not all bridge theories are of equal merit, it is now possible to do something about this methodologically underdeveloped aspect of a progressive mentalism. We formulate a further evidential condition to supplement The External Evidence Condition.

- (18) The Relative Weight Condition: The relative weight of a given type of external evidence in the testing of mentalistic hypotheses is directly proportional to the relative adequacy of the bridge theory from which this type of evidence derives its relevance.

A consequence of The Relative Weight Condition is that there is no absolute sense in which a given type of external evidence can carry more weight than other types of external evidence. Moreover, the weight of a given type of external evidence is not invariable: this weight depends on the degree of merit accorded to the relevant bridge theory.

The Relative Weight Condition is nonarbitrary in a dual sense. On the one hand, to adopt "(nonconclusive) evidence" as a fundamental concept entails adopting the derivative notion "weight of evidence" as well. On the other hand, the condition under consideration represents an inescapable consequence of the fact that not all bridge theories are of equal merit. That is, since the various bridge theories are not equally well articulated and validated, the respective types of external evidence whose use is sanctioned by these theories must necessarily differ in regard to weight. Note, finally, that The Relative Weight Condition is a more sophisticated methodological device than the Privileged Status Thesis alluded to in §4.5. Whereas the latter thesis indiscriminately assigned to all types of external evidence the status of "privileged evidence", the former condition discriminates between "more" and "less privileged" types of external evidence with differential weight constituting the basis for this discrimination.

5.4.5 The proper use of external evidence

Let us now return to the issue of the (non)conclusiveness of the external evidence that may be brought to bear on mentalistic claims, an issue first raised in §4.6 above. Recall that Chomsky's Nonconclusiveness Thesis states that the external evidence which can be furnished in support of a mentalistic claim cannot conclusively show this claim to be true. This condition, it may seem, severely restricts the usefulness of external evidence in the validation of mentalistic claims. It was shown, however, that Chomsky's Nonconclusiveness Thesis derives from an untenable approach to the validation of empirical hypotheses and theories. We saw that Chomsky (1976) takes the validation of mentalistic claims to consist almost wholly in providing support for these claims, furnishing justification for them, or demonstrating their truth. Within this justificationist approach, external evidence --- and, for that matter, any other type of evidence --- is necessarily inconclusive. But Chomsky has failed to consider the use of external evidence within the other context of validation, namely the context of falsification or refutation. The forms of argument used in the context of justification are of necessity nondemonstrative, hence inconclusive; however, those pertinent to the context of falsification or refutation are demonstrative, hence less inconclusive. For this reason, the value of external evidence in the validation of mentalistic claims should be judged with reference to the latter, "logically firmer" context.

Against this background, the following evidential condition may be formulated for a progressive mentalism:

- (19) The Falsificationist Condition: The value which external evidence has in the validation of mentalistic claims must be judged primarily with reference to the context of refutation.

The Falsificationist Condition states that external evidence should be valued primarily as a source of counter-evidence to mentalistic claims. It is not in line, therefore, with the way in which Chomsky practises his mentalism. It does, however, tie in with the fact that at a level of metascientific reflection, Chomsky (1978b:9) equates "scientific" or "empirical" to "falsifiable in principle".

The attitude adopted by a mentalist towards The Falsificationist Condition reflects the depth of his commitment to (a progressive) mentalism. If, in appraising linguistic analyses, a mentalist tends to ignore potentially relevant counter-evidence from an external source, his commitment to (a progressive) mentalism is suspect. In §4.6, we have considered in some detail a case in which it would have been natural for Chomsky and Lasnik (1977:478) to question the correctness of a given filter on the basis of external considerations relating to perceptual strategies. We saw, however, that they wholly neglected to raise the question of the possible incorrectness of this filter. This omission on the part of Chomsky and Lasnik contrasts sharply with Bresnan's reaction in a similar situation.

It was shown in §5.4.3 above that Bresnan adopts a condition of realizability for the psychological reality of linguistic hypotheses: in order to be psychologically real, a grammar must be realizable within a model of language use. Significantly, Bresnan is willing to accept the negative consequences of this position as well as the potentially positive ones. Thus, she (1978:2) states: "If a given model of grammar cannot be successfully realized within a model of language use, it may be because it is psychologically unrealistic in significant respects and therefore inadequate in those respects as an empirical theory of the human faculty of language". In accordance with this position, Bresnan (1978:40) attempts to eliminate from the syntactic component all rules that are function-dependent; that is, she (p.14) attempts to factor out of the transformational component all nontransformational relations.⁽²⁷⁾ Consequently, "deep structures more

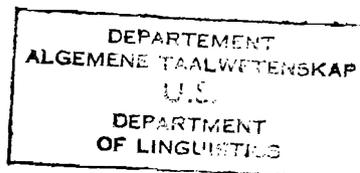
closely resemble surface structures, and the grammar becomes more easily realized within an adequate model of language use".

What Bresnan, then, in essence does is to use external evidence about the realizability of grammars in a given syntactic processing system to falsify mentalistic claims. The syntactic processing system chosen by her is the Augmented Transition Network parsing system.⁽²⁸⁾ To make the former external evidence properly relevant to the validation of the latter mentalistic claims, Bresnan (1978:14) adopts a bridge theory whose central assumptions she informally states as follows:

- (20) (a) "... the syntactic and semantic components of the grammar should correspond psychologically to an active, automatic processing system that makes use of a very limited short-term memory";
- (b) "... the pragmatic procedures for producing and understanding language in context belong to an inferential system that makes use of long-term memory and general knowledge";
- (c) "... it is easier for us to look something up than to compute it".

For further explication and some justification of the individual assumptions of this bridge theory Bresnan's (1978) study and the references cited there may be consulted.

Bresnan may or may not have been right in choosing the Augmented Transition Network parsing system as the syntactic processing system within which the syntactic rules of a grammar are to be realized. Even a wrong choice would not, however, lessen the methodological merit of Bresnan's general position. It is clear that she is aware of the role which external evidence has to play in the falsification of mentalistic hypotheses. Moreover, as a working linguist, she is willing to accept the consequences of The Falsificationist Condition: a clear indication that she is seriously committed to (a progressive) mentalism.



5.5 Heuristic fruitfulness

Recall that The Distinctness Condition requires that, in order to be progressive, a form of mentalism has to be distinct from an acceptable form of nonmentalism in regard to ontological import, responsibility to evidence, and heuristic fruitfulness. We have dealt in some detail with the question of distinctness as regards ontological import and responsibility to evidence. This leaves us with the question of how a progressive mentalism has to differ from an acceptable form of nonmentalism in order to be properly distinct from it in regard to heuristic fruitfulness.

The heuristic fruitfulness of a scientific approach reflects its ability to lead the scientist to new discoveries. That is, this approach must generate new research problems and, very important, must lead the scientist to solutions to these problems. Against this background, the following condition for a progressive mentalism may be formulated:

- (21) The Fruitfulness Condition: In order to be progressive, a form of mentalism must be superior to an acceptable form of nonmentalism in its power to generate new research problems and its power to lead to potential solutions to these problems.

If a given form of mentalism and a given form of nonmentalism generated and solved the same set of research problems, the difference between them would be entirely terminological in nature.

The point, now, is that if a form of mentalism satisfies the conditions on ontological import of §5.3 and the fundamental evidential conditions of §5.4, then it automatically meets The Fruitfulness Condition as well. These ontological and evidential conditions force the mentalist to ask and answer new questions about external phenomena, objects and processes such as the following: the physical basis of the language faculty; the use of linguistic competence in performance and the ways in which this competence interacts with other capacities and mechanisms involved in performance; the genetic aspect of the language faculty; the manner in which the language faculty is involved in linguistic change; the ways in which this faculty is affected by language pathology; the variability --- idiolectal, dialectal, sociolinguistic --- of linguistic competence,

etc. In order to find answers to such new questions, the mentalist is obliged to construct new theories, namely bridge theories. That is, a progressive mentalism forces the mentalist to come up with testable new ideas. In other words, this form of mentalism carries within it the seeds of scientific progress. It is for this reason that calling it a "progressive mentalism" amounts to more than the use of a catching phrase.

5.6 Retrospect

In the preceding sections the methodological bases of a progressive form of mentalism were articulated in terms of a number of explicit conditions. The essence of these conditions may be characterized as follows:

1. Jointly the conditions have to ensure that a progressive form of mentalism is distinct from an acceptable form of nonmentalism in regard to ontological import, responsibility to evidence and heuristic fruitfulness.
2. The conditions on ontological import have to ensure that a progressive mentalism makes sufficiently determinate ontological claims, in a nonarbitrary manner, about real and uniquely identifiable entities.
3. The evidential conditions have to ensure the empirical status of the ontological claims of a progressive mentalism by making these claims in principle falsifiable by negative evidence of various external kinds, the relevance of such evidence being guaranteed by appropriate bridge theories.
4. The condition of heuristic fruitfulness has to ensure that a progressive mentalism generates new problems and their solutions: problems which must be neither raised nor solved within the framework of an acceptable form of nonmentalism.
5. The above-mentioned conditions are so formulated that a progressive mentalism avoids the conflict of methodological bases known as The Mentalist-Rationalist Paradox: external evidence can be brought to bear on mentalistic claims without it being necessary to abandon the crucial field-defining rationalist idealizations.

Chapter 6

CONCLUSION

Let us, in conclusion, briefly consider what, in general terms, could be claimed to be the major weaknesses and the potential contributions of the present study. Starting with the former, it could be argued that a first major weakness of the study is that it gives an incorrect representation of Chomskyan mentalism. Specifically, it could be argued that Chomskyan mentalism in fact exhibits all the defining properties of a progressive mentalism. This argument could be based on the contention that Chomsky has all along implicitly accepted the thesis that, for the validation of mentalistic claims, external evidence is absolutely indispensable.⁽¹⁾ That is, the contention would be that Chomsky has all along implicitly adopted some kind of external evidence condition. This contention, of course, would have to be properly justified, especially since it conflicts with Chomsky's (1976) recent position on the use of external evidence as this position was outlined in §4.4 above.

Now, in support of the contention in question remarks such as the following by Chomsky (1977c:41) could be quoted:

- (1) "The pure study of language, based solely on evidence of the sort reviewed here, can carry us only to the understanding of abstract conditions on grammatical systems. No particular realization of these conditions has any privileged status. From a more abstract point of view, if it can be attained, we may see in retrospect that we moved toward the understanding of the abstract general conditions on linguistic structures by the detailed investigation of one or another "concrete" realization: for example, transformational grammar, a particular instance of a system with these general properties. The abstract conditions may relate to transformational grammar rather in the way that modern algebra relates to the number system.

"We should be concerned to abstract from successful grammars and successful theories those more general properties that account for their success, and to develop UG as a theory of these abstract properties, which might be realized in a variety of different ways. To choose among such realizations, it will be necessary to move to a much broader domain of evidence. What linguistics should try to provide is an abstract characterization of particular and universal grammar that will serve as a guide and framework for this more general inquiry."

A close reading of this passage, however, yields no evidence in support of the contention that Chomsky has implicitly adopted a thesis or condition which asserts that mentalistic claims cannot be validated without recourse to external evidence. First, notice that the "realization" of the abstract conditions with which the passage (1) deals is clearly not a psychological realization in the sense of the present study or of Bresnan (1978). In this passage the expression realization appears to mean no more than "(more) concrete, less abstract instantiation" --- for example, the abstract conditions in question instantiated by, say, a system of transformational rules as opposed to a system of some kind of nontransformational rules. Thus, there is no evidence that the cited passage deals with the question of psychological reality. Second, Chomsky gives no indication in this passage or in the context within which it occurs that his "broader domain of evidence" would be a domain of external evidence. This is a second reason for concluding that the quoted passage has nothing to say about the relevance of external linguistic evidence to the validation of psychological reality or mentalistic claims.

This conclusion applies also to a second passage which could be quoted from Chomsky's (1977b:20-21) work in support of the contention that he has adopted a kind of external evidence condition or thesis:

- (2) "Note also that on this approach, it is possible for a grammar to contain rules that go beyond the general conditions, by explicit stipulation. Such rules will be 'highly marked', under the theory, and can be expected to be unstable, variable across dialects and styles, and late learned."

It appears to me that these remarks by Chomsky do nothing more than raise the possibility that the "marked" nature of certain grammatical rules may be reflected by the manner in which they figure in linguistic change, dialectal and stylistic variation, and language acquisition. As regards its content, this tentative speculation by Chomsky, obviously is distinct from the categorical assertion expressed by the thesis that mentalistic claims cannot be validated without recourse to external evidence. Whereas the present study is concerned with the evidence that must be used for the validation of mentalistic claims, Chomsky's remarks (2) may or may not relate to the evidence which could bear on markedness claims. And I know of no explicit claims by Chomsky to the effect that markedness claims must be equated to mentalistic claims.

There are two reasons why the quoted remarks (1) and (2) by Chomsky were analyzed in some detail above. First, this analysis shows that these remarks cannot be quoted in support of the claim that the present study misrepresents Chomskyan mentalism in crucial respects. Second, and even more important, the analyses illustrate the futility of quoting inexplicit, ambiguous or marginally relevant passages from Chomsky's work in support of the contention that he has all along operated with an external evidence condition such as (14) of §5.4.3. The claim of this study is that, to date, Chomsky has nowhere committed himself explicitly in print to the position that mentalistic claims are nonempirical, unless external linguistic evidence can be brought to bear on them. Moreover, as we saw in §§4.4 and 4.5, it is possible to quote passages from recent work by Chomsky in which he explicitly rejects this position. Consequently, it cannot be argued that the present study is flawed in that it misrepresents this central aspect of Chomskyan mentalism.

A second major weakness of this study, it could be argued, springs from the fact that it deals almost exclusively with Chomskyan mentalism. The point of this argument would be that there are non-Chomskyan forms of mentalism which exhibit the following two properties: they are, in a clear sense, progressive and, in addition, they are methodologically more well-founded than the progressive mentalism of the present study. If correct, this, of course, would be a telling criticism of this study.

The obvious question is: which forms of mentalism exhibit the two properties specified above? The recent literature has produced only one candidate that readily comes to mind, namely Katz's (1977) competencism of which some of the outlines were presented in §§4.2 and 5.2 above. It is difficult to subject this form of mentalism to "final" analysis since not all of its principles are equally clear and since Katz has promised a fuller account of it.⁽²⁾ It is possible though to point out a feature of Katz's approach on the basis of which it should be disallowed the status of a form of progressive mentalism. Recall that, according to Katz (1977:563), "Competencism claims that idealizations in grammar proceed only from intuitions of grammatical properties and relations. Data pertaining to the nature of events in tasks involving high speed operations, such as errors and reaction times, do not enter into the evidential constraints in grammar construction. Such events are different in kind from mental acts of inner apprehension". Since all external

linguistic phenomena, objects, processes and events are by their very nature different in kind from mental acts of inner apprehension, Katz's position entails that external evidence is in principle irrelevant to the validation of mentalistic theories. But this also is a consequence of the Platonist position. For, as spelled out by Katz (1977:566) "... Platonists would argue that data about on-line operations in sentence processing cannot constitute evidence to confirm or disconfirm theories of semantic structure... Information about errors and reaction times for performance tasks like sentence comprehension thus has the wrong import. It is not about language". Like *competencism*, Platonism takes linguistic intuition to constitute the only source of facts to which linguistic theories are required to respond (p. 565).

It appears, then, as if *competencism* and Platonism have the same evidential or data basis: one which excludes external evidence and which includes intuitive evidence alone. If this is so, Katz's *competencism* fails to satisfy The Distinctness Condition (1) formulated in §5.2 above. Since the mentalistic claims of *competencism* and the nonmentalistic claims of Platonism are made responsible to the same evidence, the former and the latter claims are evidentially nondistinct. But this entails that, if mentalistic claims have more content than nonmentalistic claims --- which they must have --- the additional content of the former claims must be nonempirical in nature.

There is a complication, however, which should be noted. Katz (1977:565) claims that there is a difference in the way in which *competencists* and Platonists interpret intuitive evidence. *Competencists* take both the source and the import of intuitive evidence to be psychological. Platonists, by contrast, consider the source but not the import of such evidence to be psychological. That is, Platonists, unlike *competencists*, do not take intuitive evidence to be about something psychological. The crucial question now is whether or not this difference in interpretation of the status of intuitive evidence constitutes sufficient grounds for claiming *competencism* to be evidentially distinct from Platonism. Specifically, does this difference have consequences which render *competencism* empirically distinct from Platonism? Katz does not address himself to this question. In particular, he does not show that, in virtue of the relevant difference in interpretation of intuitive evidence, *competencism* generates and solves linguistic problems which can be neither posed nor solved

within the framework of Platonism. Therefore, it does not appear at present that Katz's competencism --- which, incidentally, he (1977:561) calls "the classical Chomskyan position" --- qualifies as a form of progressive mentalism in terms of this study.

This brings us to what could be argued to be a third major weakness of the present study. This weakness would be that the study has adopted a seriously defect philosophy of science or theory of scientific rationality as the philosophical framework for its progressive mentalism. It could be pointed out that this falsificationist philosophy of science as represented, for example, in the work of Popper is deficient in at least two important respects. On the one hand; some of its most fundamental concepts --- e.g. "empirical" or "falsifiable in principle" --- have unclear and philosophically questionable aspects.⁽³⁾ On the other hand, because it overemphasizes the importance of falsifiability in principle, this philosophy of science lacks the ability to characterize as rational some of the clearest instances of the growth of scientific knowledge.⁽⁴⁾ Thus, the argument could conclude, any attempt to explicitly articulate the methodological bases of a progressive mentalism should proceed within the framework of a less deficient, non-falsificationist philosophy of science.

Although the above-mentioned two defects of Popperian falsificationism appear to be real, they do not directly bear on the merits of the present study. In the Preamble it was clearly stated that this study represents an attempt to improve the cognitive standing of the mentalistic approach by eliminating incompatibilities between Chomskyan mentalism and the methodology subscribed to by Chomskyans at a level of metascientific reflection. In subsequent chapters we found this methodology to be essentially falsificationist. Thus, the above-mentioned defects of falsificationism would in the first place bear on the merits of the methodological theory adopted by Chomskyans. It would of course be a big step forward if this methodological theory could be replaced by a less deficient one. It should be noted however, that in philosophy of science, as in linguistics, it is much easier to identify defects in a given theory than to develop a more adequate alternative. Thus, it would be no simple undertaking to attempt to reconstruct the methodological bases of a form of mentalism within the framework of a new, more adequate philosophy of science.

Let us next turn to what appear to be the more important potential contributions of this study. If its argumentation is sound, the most important potential contribution of the study is that it has shown how apparently fatal incompatibilities between Chomskyan mentalism and the relevant methodology can be eliminated. That is, it illustrates how the cognitive standing of the mentalist approach to the study of language can be improved by spelling out the methodological bases of a progressive mentalism which clearly is superior to Chomsky's nonempirical (or verbalistic) form of mentalism.

A second potential contribution of the study --- related to the first --- is that it has shown that the fact that Chomskyan mentalism is unacceptable does not force the linguist to adopt some form of nonmentalism. Though certain forms of nonmentalism may be methodologically respectable, they are, from a substantive point of view, quite sterile when compared to our progressive mentalism. That is, in regard to its potential contribution to the growth of the scientific knowledge of natural language(s), this progressive mentalism is clearly superior to a form of nonmentalism such as Platonism. Thus, the former approach necessarily has to raise and solve a significant class of linguistic problems --- the one concerning external linguistic phenomena, processes, events, etc. --- which, for essential reasons, lie beyond the scope of the latter approach. The fact that a progressive mentalism must use external linguistic evidence in the validation of mentalistic claims has a further positive consequence: it no longer relies exclusively on intuitive evidence of questionable reliability.

A third potential contribution of this study is that it has shown how the domain of linguistic theories can be extended and how a better integration of apparently disparate research aims can be achieved without a sacrifice of explanatory power. The conceptual means to achieve this have been called "bridge theories". It is the construction of these theories which makes it possible for a progressive mentalism to do what it necessarily has to do: to raise and answer questions relating to external linguistic phenomena, objects, processes, events, etc. Of course, dealing with such questions has always been an option available to the Chomskyan mentalist. History shows, however, that quite often he has passed the buck, leaving these questions to be answered by colleagues in "other" fields. This ploy is strikingly illustrated by Chomsky's (1975b:91) view

of the task of the linguist vis-à-vis that of the neurologist: "Studying the use and understanding of language, we [linguists --- R.P.B.] reach certain conclusions about the cognitive structure (grammar) that is being put to use, thus setting a certain problem for the neurologist, whose task it is to discover the mechanisms involved in linguistic competence and performance". The progressive mentalist cannot afford this luxury: he cannot live under the illusion that neurologists will make the effort to study linguistics in such depth that they will come to know what it is that the Chomskyan linguist would like them to find out. The progressive mentalist must himself attempt to interpret the findings of neurological inquiry in relation to mentalistic claims. The conceptual means by which he must attempt to do this is that of a suitable bridge theory. Thus, the progressive mentalist --- while retaining his rationalist philosophy of science --- will consider the boundary between linguistics and neurology to be arbitrary in a specific sense. And this holds equally for the boundary between linguistics and certain other disciplines --- those traditionally taken to be concerned with so-called external linguistic phenomena, etc. But to adopt this position is merely to give substance to a principle which, interestingly enough, Chomsky seems to hold himself at a level of metascientific reflection. This is the principle which he (1976:13) alludes to in the following terms: "To me this distinction [between linguistics and psychology --- R.P.B.] has always seemed quite senseless. Delineation of disciplines may be useful for administering universities or organizing professional societies, but apart from that, is an undertaking of limited merit".

NOTES TO CHAPTER 1

1. Cf., e.g., Botha 1971:ch.4; 1973:ch.4; Cooper 1975; Derwing 1975: ch.8; Derwing and Harris 1975; Hiž 1966; Sampson 1975:ch.4; Schwartz 1969; Steinberg 1975; Stich 1972; 1975.

2. Thus consider the following remarks by Katz (1977:564): "The competencist might thus introduce principle R as the counterpart to A.

(R) A *grammar* of a language must be psychologically real in the sense that it represents an idealization of the knowledge that speakers of a language have about its grammatical structure, that is, it represents an ideal of their knowledge in the sense of M.

This, however, is not the only possibility. The competencist might not wish to impose such a constraint, but only to claim that an optimal grammar in the above sense is (as a matter of fact) psychologically real in the sense of being an idealization of actual speaker-hearer's grammatical knowledge. It is, I think, not clear which of these possibilities Chomsky takes ... In this quote A denotes the following condition: "Semantic representations are psychologically real in the sense that, given appropriate idealizations, understanding a sentence requires the recovery of its semantic representation" (Katz 1977:560). M, by contrast, refers to the following methodological principle: "As real conditions more closely approximate to ideal ones, the predictions of the laws formulated over ideal objects must approximate to actual observations more and more closely" (Katz 1977:563).

3. This is their 1974 paper "What the linguist is talking about".

4. This study has evolved from four earlier papers --- Botha 1978a; 1978b; 1978c; 1979 --- on the method of mentalism.

5. Two other major sources of conceptual problems, according to Laudan (1977:55), are (a) cases where two scientific theories from different domains are in tension; and (b) cases where a scientific theory is in conflict with any component of the prevalent world view.

NOTES TO CHAPTER 2

1. Chomsky (1976:8) clarifies certain aspects of this representation in the following note: "Take t to be the 'trace' left by movement of which from the position where t appears in (12) [= our (4) --- R.P.B.], in accordance with the trace theory of movement rules ... Take PRO to be an abstract 'pronominal' form, which can in fact be regarded as an 'uncontrolled trace'"
2. In a later paper, Chomsky (1978b:16ff.) attempts to reduce the wh-island constraint to a more general principle, the principle of sub-jacency. This, however, is irrelevant to the present discussion. Only one additional point should be noted: Chomsky's wh-explanation also depends on his Superiority Condition (1973:246) and the fact that COMP can accommodate only one element in English.
3. In §4.2 it will be shown that the ontological status of a non-mentalistic, formal grammar may be characterized, pace Katz (1977: 565-566), as "Platonistic".
4. It will become clear in §4.3 that the idealizations in question are in fact more powerful: they abstract from the effects of non-cognitive systems as well.
5. In later papers Chomsky (1978a; 1978b) repeats the essentials of the account given in this paragraph of the objects, aims, idealizations and abstractions of mentalistic linguistic theories.
6. For some discussion of these conditions cf. Bartley 1968.
7. Thus, consider the following remarks by Chomsky (1978b:9): "An implication of this is that it is difficult to make falsifiable or scientific assertions, i.e. it is possible to construct a test, but one is unable to carry out the experiment. This does not, however, affect the empirical content of the theory, because it is falsifiable in principle, and furthermore very often testable in practice".

NOTES TO CHAPTER 3

1. For the fundamental claims of this theory cf. (2) (a) and (b) below.
2. Notice, incidentally, that Bahcall and Davis judged their experiment to be important for a second reason as well, a reason not mentioned by Chomsky at all. This reason relates to the heuristic potential which Bahcall and Davis (1976:264) originally saw in the observing technique used in their experiment: "We also hoped originally that the application of a new observing technique would provide added insight and detailed information".
3. Cf. Botha 1973:§2.3 for a discussion of the nature of nondemonstrative arguments.
4. Cf. e.g., Botha 1973:ch.5; Itkonen 1976; Labov 1972; Ringen to appear a; to appear b; Sampson 1975 --- to mention only a few studies in which this issue is discussed.
5. Cf. Botha 1973:§5.4.
6. Cf. Botha 1973:§5.4.3.1.
7. The principles --- and measures or strategies based on them --- dealt with in this manner in Botha 1973 include the strategy based on the notion "systematic and general theory" (§5.4.3.2), the "majority vote" strategy (§5.4.3.3), the strategy of using operational and behavioural tests (§5.4.3.4), the strategy of grammatical argumentation (§5.4.3.5), the "my idiolect-your idiolect" gambit (§5.4.4.2), and the explanatory approach (§5.4.4.3).
8. Dougherty (1975) is another orthodox Chomskyan who has, unsuccessfully, attempted to disparage the findings of Botha 1973. For a detailed rebuttal of Dougherty's criticisms of the latter study, cf. Botha 1977.

9. These philosophers of science include Feyerabend, Kuhn, Lakatos and Laudan. We return to this point in §5.2 and §6 below.
10. For some discussion of this point cf. Botha 1968:95-96.
11. Cf. Harré 1961:85-87.
12. Cf. Koningsveld 1977:107.
13. Cf. Botha 1973:32ff. and the references cited there.
14. In a later paper Chomsky (1976a:46) mentions "the method of concomitant variation" as "a natural way" to study the language faculty directly. However, he does not elaborate on this rather cryptic remark of his.
15. The essence of Chomsky's position on the ethical barriers to "direct investigation" is repeated in Chomsky 1978b:9.
16. This point is developed more fully in §4.3.
17. These two possible lines of counter-argumentation --- though not their limitations --- were pointed out to me by David Lightfoot.
18. For some discussion of the nature, function, and objectionable aspects of such protective devices cf. Botha 1978d; to appear: §11.3.1.4 ; Sinclair 1977.
19. Notice that in a specific sense Chomsky's reference to Grobstein and Chow's 1975 paper is rather curious. Chomsky's purpose in referring to this paper is to clarify and justify his "nativism". Yet the general argument of Grobstein and Chow's paper is against an overly strong "nativist" view of the development of the "visual pathways" in the rabbit, cat and monkey. That is, over the years Chomsky has endeavoured to deemphasize --- though not eliminate --- the role of linguistic experience in language "development" or acquisition. In contrast to Chomsky, however, Grobstein and Chow argue that visual experience is essential to the development of "the visual pathways" mentioned above. They (1975:352) "suggest that a new perspective

may be warranted, one which recognizes receptive field development as continuing well into the time of, and being, significantly influenced by, visual experience". In keeping with this perspective, they reach such conclusions as the following: "what is special about binocular specificity, it seems to us, is that individual experience is probably indispensable in its development" (p.356); and "... genetic information is probably intrinsically inadequate to assure functionally appropriate connections" (p.356). Compare the latter conclusion with the following assertion by Chomsky (1978b:8): "... the contribution of the innate endowment must be of overwhelming importance, much as in the case of the physical growth of the body". This comparison clearly indicates the marked difference in emphasis which exists between Grobstein and Chow's position and that of Chomsky. In any event, the fragments quoted by Chomsky from Grobstein and Chow's article give an inaccurate impression of the position argued for by these neurophysiologists.

20. As was pointed out in note 2 to chapter 2, Chomsky (1978b:16ff.) has argued in a later paper that the wh-island constraint is a special case of his subjacency principle. This (possible) change in the status of the former constraint in no way affects the discussion below.
21. For this abstraction cf. Chomsky 1975b:91.

NOTES TO CHAPTER 4

1. The essence of the argument of the present chapter was developed in two earlier papers, viz. Botha 1978b; 1979.
2. Cf., e.g., Chomsky 1965:25ff. for the notion "primary linguistic data".
3. Some of these abstractions and idealizations have been considered in §2.2. We return to them in §4.3 below.

- ~~4. Where (3) and (4) are numbers in §2.1.~~
5. Cf. Chomsky and Katz 1974:359-360.
 6. Cf., e.g., Bever 1974; Katz and Bever 1977; Bever, Katz and Langendoen 1977.
 7. Katz (1977:561) characterizes "competencism" as "... the classical Chomskyan position: it makes a strict competence/performance distinction, separating 'the speaker-hearer's knowledge of the language' from 'the actual use of language in concrete situations', and it takes a grammar 'to be the description of the ideal speaker-hearer's competence, not of the use of language' (Chomsky (1965:4))."
 8. Bever (1974:178) gives the following general characterization of the methodological assumptions central to this philosophy of science:
 - " a) Specific factual phenomena are often the result of interactions among different (physical, psychological, biological) systems.
 - b) The formal theory in each system should be as limited as possible to be as testable as possible.
 - c) When a new fact can be described by two existing systems, but would require elaboration of one of them and not the other, the fact is interpreted as due to the system not requiring elaboration for its description."
 9. This interpretation is borne out by the following remarks by Chomsky (1976:12): "... evidence concerning production, recognition, recall, and language use in general can be expected (in principle) to have a bearing on the investigation of rules of grammar, on what is sometimes called 'linguistic competence' or 'knowledge of language'. But such evidence, where it is forthcoming, has no privileged character and does not bear on psychological reality in some unique way". The content of this quote is analyzed more closely in §4.5 below.
 10. Notice, incidentally, in regard to the quote given above that it is difficult to reconcile Chomsky's "can do no more" formulation in the first statement with the "Or" formulation of the final statement. How can a linguist have the option of doing B (the "Or" formulation) if he "can do no more" than A?

11. We return to this point in §4.6 below.
12. Katz's position on the status that such evidence has in "Platonism" and various forms of mentalism is analyzed in more depth in §5.2 below.
13. In chap. 6 we shall consider the claim, implausible as it may sound, that Chomsky has all along implicitly accepted a Necessity Thesis.
14. For a repetition of the essence of this view consider also the following remarks by Chomsky and Lasnik (1977:434): "A grammar, representing grammatical competence, is embedded in a system of performance. That is, use of language involves knowledge of language".
15. Cf. Botha 1973:§§2.3-2.4 for a discussion of this point.
16. Cf. Botha to appear:§10.2.1.1.2 for an explication of this point.
17. This point is elucidated in Botha to appear:§10.2.1.2.1.
18. Recall that in §§3.2.3-3.2.4 above it was shown that Chomsky even goes so far as to project his justification-oriented conception of the validation of empirical claims onto the falsificationist-oriented methodology of the form of physical inquiry practised by Bahcall and Davis (1976).
19. In his paper "On binding" (1978a:33), Chomsky proposes a second filter not expressing a property of the complementizer system and, consequently, not obviously related to any plausible perceptual strategy. Again Chomsky fails to bring the absence of external evidence for this filter to bear on its correctness.

NOTES TO CHAPTER 5

1. A metaphysical claim has substantive content but cannot be validated on the strength of empirical data. It may, however, be possible to validate such a claim with reference to considerations or arguments

- of a nonempirical sort. A purely verbalistic claim, by contrast, has no substantive content at all. Consequently the question of how it may be validated does not even arise. Consequently, whereas a metaphysical claim may have a certain kind of intellectual respectability, a purely verbalistic claim completely lacks such respectability.
2. This is argued, among others, by Lakatos 1971.
 3. In the light of the distinction drawn in note 1, however, it would obviously be sheer folly to attempt a similar kind of defence of Chomskyan mentalism as an approach which generates claims of a purely verbalistic nature.
 4. For statements by Chomsky to this effect cf., e.g., §2.3 above and Chomsky 1976:3, 10, 20.
 5. This reference as well as those immediately below are to Katz's 1977 paper.
 6. For the defining assumptions of inductivism, falsificationism, "research programmism" (and conventionalism) cf., e.g., Lakatos 1971. "Progressive problematization" represents Laudan's (1977) theory of scientific growth.
 7. Cf., e.g., Bar-Hillel 1964; 1966.
 8. This was shown in §4.6 above. For a more detailed illustration of the point in question cf. Botha 1977.
 9. Cf. §§2.1-2.2 and also Botha to appear:§6.3.2.3.4; and Chomsky and Katz 1974 for Chomsky's realistic view of the ontological status of linguistic theories.
 10. Cf. §2.3 and also Botha 1971:chaps. 4, 5; 1978d(§8) for some discussion of Chomsky's view that theories should be empirical. A third fundamental principle of Chomsky's philosophy of science --- which we considered in §4.3 (n.8) above --- is (phenomenological) rationalism.
 11. For more examples of claims about "mental representations" and/or

"mental computation(s)" cf. also Chomsky 1978a:1; 1978b:13, 16, 22; Chomsky and Lasnik 1977:453.

12. Those scholars who are keen on analogies, comparisons, etc. should note that, in contrast to Chomsky's ideal entities, the classical ideal entities of natural science exist legitimately in terms of The Reality Condition. That is, entities such as ideal fluids, perfect levers, perfectly elastic bodies, etc., represent abstractions from non-ideal fluids, bars, bodies, etc., respectively.
13. For a nearly identical formulation cf. Chomsky 1976:13.
14. The central thesis of the derivational theory of complexity, according to Fodor, Bever and Garrett (1974:320), is "... that the complexity of a sentence is measured by the number of grammatical rules employed in its derivation".
15. Cf. §§3.2.3, 3.2.4, and 4.6 for Chomsky's justificationist approach.
16. For some discussion of these conditions cf. Bartley 1968.
17. These three conditions embody the essence of Popper's (1974) position on the testability or refutability of scientific hypotheses.
18. For a discussion of a variety of these devices cf. Botha 1978d; Botha to appear:§11.3.1.4; and Sinclair 1977.
19. Bresnan (1976:3) takes over Levelt's (1974, Vol. 3:70) characterization of the "broad sense" in which a linguistic concept must be psychologically real: "A linguistic concept is psychologically real to the extent that it contributes to the explanation of behavior relative to linguistic judgments, and nothing more is necessary for this. Although the term [psychological reality of linguistic concepts] is misleading, it does indeed have content in that it refers to the question as to whether constructions which are suited to the description of one form of verbal behavior (intuitive judgments) are equally suited to the description of other verbal processes (the comprehension and retention of sentences, etc.)."

- ~~20.~~ This problem is discussed in regard to Chomsky's (1975a) and Emonds's (1976) theories of syntax in Botha 1978d. Cf. also Botha to appear: §§10.4.3.3, 11.3.1.4 for a discussion of this problem within the more general context of the refutability of linguistic hypotheses.
21. It should be pointed out that Lightfoot is not the first generative grammarian to adopt this position on the empirical nature of markedness claims. Specifically, Postal (1968:169ff.) has dealt in some detail with the manner in which external evidence from statistical, diachronic, dialectal, physiological, and perceptual domains as well as evidence about language acquisition and pathology may be used for validating claims about the marked or unmarked status of underlying phonological segments.
22. Cf., e.g., Chomsky 1978b.
23. For a general discussion of this point cf., e.g., Bever 1974; Bever, Katz and Langendoen 1977; and Katz and Bever 1977.
24. Cf. Botha to appear:§9.3.2.4.3.
25. In a later paper Lightfoot (to appear) himself considers the possibility that his theory of change could be given up in favour of --- what in essence constitutes --- a theory of language acquisition. If this contention should turn out to be correct, Lightfoot would simply have replaced one bridge theory by another.
26. Kiparsky (1968a; 1968b) did some work on phonological change which may be reconstructed as a similar attempt. For the reasons why Kiparsky's attempt was unsuccessful cf. Botha 1973:§4.2. The crucial difference between Kiparsky's approach and that of Lightfoot is that Lightfoot, but not Kiparsky, has a clear understanding of the methodological problems concerning the need for, function of and nature of bridge theories. Skousen (1975) is another linguist who recently attempted to use external evidence for the validation of claims involving psychological reality. This attempt fails for essentially the same reasons as those for which Kiparsky's use of diachronic evidence has to be disallowed, as is pointed out by Flege (1977:19-20) as well.

27. The active-passive relation (cf. Bresnan 1978:14ff.) is a case in point.
28. For some discussion of the properties of this system cf. Bresnan 1978:50ff.; and Wanner and Maratsos 1978.

NOTES TO CHAPTER 6

1. I am indebted to David Lightfoot for pointing out this line of argument as well as the two passages (1) and (2) from Chomsky's work to me.
2. Thus Katz (1977:561, n.2) refers the reader to his study "What a grammar is a theory of" which is still in preparation.
3. Cf., e.g., Grünbaum 1976 a; b; c; d; and Hempel 1966:30.
4. Cf., e.g., Grünbaum 1976d; Lakatos 1971:111ff.; and Laudan 1977:4.

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