Skeptical Linguistic Essays

Chapter 12 If It Doesn't Follow *Automatically*, then Its Pretty Much Got to at Least *Virtually* Follow, and If Not, Don't Worry, It Is Still Unquestionably *Natural*

Section 1 Automatic Logical Connections

A locution found in the writings of linguists is highlighted in (1):

(1)a. It *follows automatically* from assumptions A_1...A_n that B.

b. B *follows automatically* from assumptions A_1...A_n

c. B falls out *automatically* from assumptions A_1...A_n.

d. B is an *automatic* consequence/result of assumptions A_1....A_n.

e. A_1....A_n predict B automatically.

f. B *automatically* satisfies A_1....A_n

There follow a few entirely random quoted examples of the usages in (1).

(2)a. Chomsky (1955/1975b: 566)

"And it will also automatically give "no improvement was forseen by anyone" as the passive of case (h), thus eliminating one discrepancy in what appears to be a simple and intuitively correct manner."

b. Chomsky (1965: 104)

"First of all, it accounts automatically for the restriction of passivization to Verbs that take Manner Adver bials freely."

c. Postal (1972a: 221)

" This could be an automatic consequence of a higher trigger cyclic formulation..."

d. Bresnan and Grimshaw (1978: 372)

" But in examples (167a-c), the P is deleted as an automatic consequence of Controlled Pro Deletion, which deletes the terminal string of PP [Pro] and coindexes the trace PP with the controller PP in head position."

e. Gazdar (1982: 174) ''The major advantage of the present analysis over that proposed by Bresnan and Grimshaw, apart from its basis in a more constrained linguistic metatheory, is that it automatically predicts the badness of examples like (9.17):"

f. Aissen and Perlmutter (1983: 366)

"A grammar that accounts for the phenomenon by means of a rule of Clause Reduction, however, cannot generate *(16-17) and thereby automatically predicts that these senences will be ungrammatical."

g. Baker (1988: 119)

"The result of this discussion is that Incorporation automatically satisfies the case theory requirements of the head whose NP is incorporated."

h. Hukari and Levine (1991: 203)

"From such a definition, the 'double hole constraint' discussed by Maling and Zaenen (1982) falls out automatically."

i. Culicover and Jackendoff (1995: 258)

"Rather, we will argue, the proper analysis of X else falls in naturally with that of reflexives and pronouns; the apparent differences between them are an automatic consequence of our analysis."

j. Ladusaw (1996a: 212) :

"Under the assumptions made here, this fact follows automatically from the treatment of the NPI as an indefinite, because on this construal, the If condition for the NPI is not met: though the NPI indefinite is in the scope of a licensing operator, it is not roofed by it."

k. Newmeyer (2000: 234)

"Given her theory that only direct objects can be 'promoted' to subject position in passivization, the ungrammaticality of (19b) follows automatically."

l. Chomsky (2001: 24)

"Proper positioning might be automatic under various assumptions: e.g., if the simultaneous satisfaction of properties of _v_ involves an internal cyclic order, with raising of OB first, then "tucking in" of externally Merged SU." [1]

m. Den Dikken (2001: 15 note 19)

"On Kayne's (1994) analysis of *that*-relative clauses, where the moved constituent is an *NP*, not a DP, this will be an automatic result."

Since the citations in (2) are drawn from works spanning almost five decades from the 1950s to the present, they can by no means be regarded as mere slips of the pen or aberrational. Moreover, they do not seem limited to any particular school of syntactic thought. [2]

At issue specifically is the modifying form automatic(ally), used in the broader culture most often in connection with machinery, devices and technology, e.g. when one speaks of an automatic transmission in a vehicle, that is, one which shifts gears without specific mechanical inputs from a driver, an automatic shut-off valve, that is, one which one does not have to be opened or closed by hand, or a program or automaton

which carries out some task automatically, e.g. debiting a bank account. Various questions arise about the appearance of this locution in linguistic works like those in (2).

The uses of automatic(ally) in (1) appear substantively unrelated to the ordinary technological usage. [3] Rather, the term shows up in contexts where one is talking about *logical consequences*. Anyone writing one of the variants of (1) surely intends to indicate *some* logical connection between a set of premisses $A_1...A_n$ and some proposition B. One would *like* to assume that the implication is that if $A_1...A_n$ are all true, then necessarily B is also. This is consistent with the role of e.g. follows in standard discourse about logical connection. The adjectival/adverbial usage of linguists in (1) is then puzzling. For consultation of works in logic reveals automatic(ally) to be unused there, as indicated inter alia by its absence from logic book indices. Would a logician not rewrite e.g. (1a) simply by striking the word automatically, yielding (3).

(3) It follows from assumptions $A_1...A_n$ that B.

Why then do linguists not systematically do likewise? Does the word automatic(ally) in linguistic uses like those in (2) make some (perhaps subtle) substantive contribution, one affecting truth functionality? If it *does*, one should be able to specify precisely the logical difference between (1a) and (3). If it does *not* make such a contribution, but is *still* not totally redundant, then linguists should be in a position to give some *other*, non-truth functional justification for its discourse complicating inclusion. There is then a minor mystery here, which I briefly address.

Genuine logical entailment admit of no degrees, approximations or manners; either something is a logical consequence of a fixed set of assumptions or not. Given that, the uses of automatic(ally) in (1) could, *if* the forms being modified manifested their wider culture *strictly logical* sense, contribute no truth functional substance. While one can perhaps not fully exclude the possibility of total redundancy, persistent use of terms over a long period by a wide range of linguists in a seemingly systematic way renders such a view implausible. So one suspects that at least most occurrences have a different basis. This could initially be taken to mean that standard linguistic uses of logic-invoking terms like follow combined with automatic(ally) have meanings at least partially distinct from their logical usages.

Assuming that requires seeking some way in which linguists' use of automatic(ally) could be rationalized under an assumption that it is *not* modifying a strict logical use of forms like follow and is

thereby not redundant. This demands some view of how logic-invoking terms like follow are used in linguistics when they occur *without* the modifiers of relevance. Several colleagues have proposed the following possibility. Roughly, a usage like (1a) might differ from one like (3) in that the modifier expresses an *exclusion* of the need for *auxiliary assumptions* beyond $A_1...A_n$ to render B an actual logical consequence, whereas the usage in (3), at least among linguists, leaves open this requirement. This initially plausible hypothesis has several implications.

First, unexpectedly and a bit paradoxically, (1a) would then just translate as the logical equivalent of (3) on its strict logical sense, seemingly leading again to a view of the modifier as logically redundant. Second, invocation of the idea that claims like (3) must, or at least can, be interpreted against a background posit of inexplicit auxiliary assumptions means that when linguists write something like (3), they are *not* committed in general to the existence of any actual logical connection per se between $A_1...A_n$ and B. What then exactly would be implied by claims like (3) under this interpretation? A first approximation might be something like (4):

(4) (In linguistics), 'B follows from $A_1...A_n$' (can be used to) mean(s) only that there is *some* set of premisses $C_1...C_m$ such that B is a logical consequence of the *union* of $A_1...A_n$ and $C_1...C_m$.

Here $C_1...C_m$ would be the auxiliary assumptions required to yield a genuine logical consequence.

But, evidently, a usage characterized *merely* as in (4) would be inappropriate to any intellectual pursuit. Ignoring the trivial case where some C_i = B, given that every proposition is a logical consequence *of a contradiction*, (4) alone would sanction assertion of 'X follows from Y' for any arbitrary X and Y. Any of the infinitely many extant contradictions would union with Y to entail X. Thus minimally, to rationalize usages like (3) via a schema like (4), relevance constraints would have to be imposed on $C_1...C_m$. A further suggestion I have received is that an reconstruction like (4) of e.g. (3) is to be interpreted such that $C_1...C_m$ represent (part of) *some commonly understood theory*, presumably a contradiction-free part.

This helps a little but only subject to important reservations. Schema (4) so clarified might in principle describe a reasonable usage in a field at a state of development where the $C_1...C_m$ are uniquely identified, well-known, well-established principles. E.g. internal to the elementary number theory part of mathematics,

C_1...C_m could be Peano's Axioms (see Chapter 11). Then it would be quite clear that something like (3) was in effect shorthand for (5):

(5) The union of A_1...A_n and Peano's Axioms entails B.

For fixed A_1...A_n, this makes a checkable claim just because elementary number theory has a fixed set of precise, accepted axioms. However, one need not stress that contemporary linguistics is nothing like that; there is not even a hint in current work on syntax, for example, of an analog of Peano's Axioms? What would fill the role of well-known, well-established precise principles whose truth is accepted even by *most* syntacticians?. The closest one could come is probably the Coordinate Structure Constraint. But even today, thirty five years after Ross (1967) proposed it, it remains most often entirely informal, obscure what its actual formulation should be and there are those who have denied the validity of the informal generalization. [4]

Minimally then, in linguistics, interpreting arbitrary uses of the form (3) against a schema like (4) means that as often as not it will be unclear what the background C_1...C_m .are supposed to be.

So, consider the quotations in (2) of actual uses of the logic-invoking forms (irrelevantly for this point, occurring with the modifier at issue here). One finds *first*, that in certain cases, it is unclear whether it is relevant to invoke *any* set of auxiliary assumptions at all. So (2d) states that the deletion of a particular form is an automatic consequence of a *specific deletion rule*. *Second*, and more generally, there is no single common set of auxiliary assumptions which could be taken to underly this range of uses. That of Chomsky (1955/1975b) would involve the earliest notions of transformational generative grammar, that of Chomsky (1965) would have to involve the transformational assumptions of that work, but those were very sketchy and incomplete. That of Postal (1972: 221) would have to involve some set of assumptions relevant to an early but somewhat latter stage of transformational grammar; but which set? That of Bresnan and Grimshaw (1978 : 372) would invoke a later (but still e.g. pre GB stage) stage and again it is unclear what the precise set of axioms would be. The claim of Gazdar (1982: 174) would have to involve assumptions of the beginning stage of GPSG, that of Aissen and Perlmutter (1983: 366) the never formalized assumptions of early RG, those of Baker (1988: 119) of an idiosyncratic variant of GB, those of Hukari and Levine (1991 : 203) those of some variant of HPSG, those of Culicover and Jackendoff (1995) some unique mixture of Principles and Parameters work (e.g. probably as described in Culicover, 1997), and of

Jackendoff's (1983, 1990) quite different and specific views. The assumptions of Ladusaw (1996a: 212) would have to involve his own interpretation of a Montague semantics approach, those of Chomsky (2001: 24) some variant of the Minimalist Program, and finally those of Den Dikken (2001) some unspecified variant of the Principles and Parameters framework. No three of these could involve common assumptions and it is unclear even that any two of them do.

Given such states of affairs and the rapidity of conceptual turnover in linguistics, a reader can have no reliable method for determining for any fixed linguistic usage of follows, etc. how to interpret it against a background view like (4). That is, it is quite doubtful that there is an effective way to *actually find some unique, appropriate set of principles* $C_1...C_m$. Without that, assertions of the form (3) are always in danger of being unverifiable and hence significantly contentless on that ground alone.

Worse, many linguistic views which might be invoked as sources for $C_1...C_m$ are hardly clearly or precisely developed; they can not be seriously compared to sets of precise formulae like Peano's Axioms; some linguistic theoreticians have even downplayed the importance of precise formulations. [5] So, even if one knows, for example, that a logical consequence claim is to be interpreted against *some* set of background $C_1...C_m$ drawn from some view V it is unclear that one would be able to determine the specific *parts* of V which could justify actual talk of logical consequence *even under unioning as in (4).* Skepticism here seems requisite.

Moreover, assume one can determine the view V that underlies a claim P of the form (3) and can isolate a subset of V which can be taken as $C_1...C_m$ in (4). It will still in general be unclear whether P's advocate has ever constructed a demonstration of B from the union of $A_1...A_n$ and $C_1...C_m$, whose mere display could satisfy a skeptic. So ask yourself how many instances one finds in the linguistic literature of such demonstrations. One can be assured that in many cases at least, none has actually been constructed. [6] Rather, linguists have most often *at best* only intuited that one is possible. But even sincere intuitions of this form should not be relied on. Anyone who has ever faced the task of proving some proposition from a fixed set of axioms of a nontrivial character will recognize that it is anything but straightforward. Therefore, it should arguably be mandatory to demand a demonstration of any merely claimed consequence whose status can reasonably be doubted.

The conclusion then is that interpreting linguists' use of the expressions in (1) without the modifier automatic(ally) against a schema like (4) leaves great potential unclarity as to the nature of any truth claim. As in the case of any inference, a reader must minimally determine what precise propositions B and each of $A_1...A_n$ represent. But far beyond that, one would then in addition be obliged to somehow figure out what set of auxiliary assumptions $C_1...C_m$ are required and what precise proposition each of those represents. Only then is there any real hope of verifying the existence of an actual logical consequence. Possibly, all this would be doable in certain cases, but the chances do not in general seem very high.

So a usage characterizable essentially as in a refined version of (4), while not inherently incapable of having a place in genuine inquiry, contains great latitude for *potential* abuse. Under the lure of achieving the sort of prestigious results associated with the rigor of formal fields like logic and mathematics, (some) linguists could end up using the range of logic-invoking terms like 'B follows from A', and synonyms illustrated in (1) in ways which not only fail to represent their strict logical usage but which also fail to represent any *genuine* instantiation of even the enormously weaker schema (4). The latter requires that there exist some actual set of extant auxiliary assumptions $C_1...C_m$ whose union with $A_1...A_n$ yield a real logical entailment. But since the actual 'location' of the auxiliary assumptions, their identity, the rigor with which they are formulated are all left maximally vague, the way is open to literary sanctioning of declarations that 'B follows from $A_1...A_n$' under circumstances broad enough to shade off into sheer wishful thinking.

There is good reason to think that the cited danger is real. It is one where follow, etc. have a use, call it the *dream interpretation*, which involves no more content than that their author *hopes* to show some logical relation and *promises* that it can be done. Although such a use is obviously never made explicit, it is, for instance, reasonable to see the instances of follow in (6) as instantiating a dream interpretation:

(6)a. Chomsky (1980a: 9)

"Assuming that the notion "reciprocal" falls into its natural place within universal grammar, it will follow from (16) that *each other* must have an antecedent, in fact, a plural antecedent.." (Here the author's (16) is : Each other is a reciprocal phrase. PMP)

b. Chomsky (1980a: 9)

"If we assume the NP-trace relation to be simply a case of bound anaphora, then the general properties of movement rules also follow."

c. Chomsky (1980a: 12)

"Since Opacity governs trace, the familiar properties of movement rules also follow."

d. Chomsky (1999: 9)

"The computational burden is further reduced if the phonological component can 'forget' earlier stages of derivation. That follows from the Phase Impenetrability Condition (PIC) (MI (21))."

e. Chomsky (2000b: 120)

"The raised element typically c-commands its trace in the original position, but where true, that follows from independent properties of C_{HL}."

Although the overall contexts (6a-e) are suggestive of logical connection, it would be impossible to provide genuine demonstrations from the putative premisses ithemselves to the alleged conclusions. [7] One could then appeal to a schema like (4). The difference between e.g. taking some cited principle to be backed up by a precise axiom system like Peano's Axioms and something very different then emerges clearly. One has no real idea of e.g. what in (6a) 'the natural place' of a reciprocal in universal grammar is. And for (6b, c), it is not even specified what the 'familiar properties' are, so the whole question of a logical demonstration that their presence follows from something cannot arise. For (6d) what is supposed to follow is a property denoted by a word in quotes, indicating that it is not a technical term and has not been defined. Moreover, it is obscure what <u>that</u> denotes...is it 'that the computational burden is reduced' or 'that the phonological component can forget'. So again questions of genuine demonstration could hardly arise, even if one could tell what the appropriate auxiliary assumptions were. It would be simply utopian to assume that the author of such remarks has actually constructed (but nonetheless failed to make public) a demonstration of the purported consequence from some fixed set of assumptions including the cited one. For (6e), something is claimed to follow from 'independent principles', the latter unspecified. Once more, questions of demonstration can hardly be posed.

The correctness of recognizing a dream usage for <u>follow</u> and a range of its synonyms is supported by the occurrence of these forms where the lack of denotation of actual logical consequence along with 'yearned for' connections is made contextually palpable, when, for instance, propositions embodying putative logical connections are under the scope of modals like <u>would</u>/<u>should</u>. And such usages are not difficult to find (all emphases mine: PMP)

(7)a. Chomsky (2000b: 108)

"The Phase-Impenatrability Conditions yields a strong form of Subjacency. For A-movement, it *should* follow from the theories of Case/agreement and locality."

b. Chomsky (2000b: 109)

"The remaining properties of (5) *should* follow from the theories of Case/agreement and locality, to which we will turn shortly"

c. Chomsky (2000b: 115)

"Basic properties of chains *should* then follow from elementary derivational principles."

d. Chomsky (2000b: 121)

"'To the extent that such ideas can be given substance, it *would* follow that the dislocation property is required;"

e. Chomsky (2001: 5)

"However PIC is formulated exactly, it *should* have as a consequence that at the phase ZP containing phase HP:

(6) The domain of H is not accessible to operations, but only the edge of HP."

Usages like (7a, b, c, d, e) are clearly consistent with a dream- use of the logical terms. So e.g. (7d) makes it pretty clear that 'such ideas' have yet to be given substance. Nonetheless, in the discourse type under discussion one putatively knows what *would* follow from such unworked out ideas *before* this is done, knows that in the dreamed of (lets grant possible) world where they are worked out, certain things will follow from them. [8, 9] Similarly, in (7e) it is explicit that PIC has not been formulated, so that only in fantasy can questions of its consequences arise. Further evidence of the reality of a dream usage would appear superfluous. [10]

I have been exploring a rationalization of the use of the modifier automatic(ally) in linguistics as in (1) via appeal to a schema like (4). This is taken as a reconstruction of at least allowable usages of those forms without the modifier. It has been suggested that such a reconstruction is fraught with problems; so the usage 'B follows from A' under an interpretation like even a refined version of (4) is open to such vagueness and obscurity that the actual truth conditions of the claim are difficult if not impossible to determine. A collapse into the self-indulgent form of discourse seen in (6) and (7) is in no way excluded. This utilizes words with the prestigious connotations of real logical connection to represent at best mere yearning for connections that have never been established. The result is a systematic shift to a dream oriented discourse in which the mere wish for an established consequence suffices for submission for publication. [11, 12]

To sum up so far, I hope to have shown the following:

(8)a. Linguists use logic-invoking terms like follows in ways which do not represent their strict logical usage;

b. It may be correct that many of these usages are (intended) to be interpreted against an elaborated schema like (4).

c. Such a schema is quite weak and, without considerable specification in particular cases, it is impossible to make an actual assessment of what the wider set of assumptions ($C_1...C_m$) are, still less whether they guarantee the truth of the claimed consequent, that is, yield an actual logical entailment.

d. Given the enormous slack between the assertion 'B follows from $A_1...A_n$ ' under the view (4), such a usage is open to a variety of abuses, one of which amounts to nothing more than the dream interpetation.

e. The dream interpetation can be attested.

Conclusions (8a-e) do not argue that (4) is not a reconstruction of the actual way linguists use the logic-oriented expressions of (1) but only that this usage is one open to obscurities, problems and abuse. But in the present context, whose core goal is to try to understand the appearance of the modifier automatic(ally), the very intellectual inadequacy of the uses which (4) sanctions may offer a requisite *insight*. For it suggests a function for the modifier of interest.

Namely, perhaps due to cognizance at some level of the weakness (or even emptiness) of claims in linguistics like 'B follows from $A_1...A_n$ tout court, the modifier usage unknown in logic has developed to permit signalling a claim of a stronger connection than the minimum sanctioned by something like (4), open even to the dream interpretation. It may be that having been exposed to many discourses where the logic-invoking terms of (1) are used in ways which leave obscure what if any logical connections exist and between what, and even having been exposed to discourses like (6) and (7), linguists are at least subconsciously aware that simply writing something like 'B follows from A' allows, and possibly even favors, a vastly weaker interpretation than they feel they want to communicate. Thus one can consider a partly vague, informal assumption, call it *the Seriousness Hypothesis*, that the modifier usage has arisen to perrmit specification of a degree of seriousness about claimed logical connections higher than the low level otherwise fairly current. That is, possibly the modifier automatic(ally) is used because of an implicit recognition that occurrences in linguistic writings of the logic-invoking terms not so modified often represent a level of seriousness appropriate only for junk linguistics.

The thesis that in general the forms modified by automatic(ally) in (1) are used with questionable seriousness has a number of potentially testable implications. A first expectation would involve the most

obvious instantiations of *non-serious* use of the logic-invoking forms, represented by the dream usage, e.g. in (7d). The Seriousness Hypothesis suggests that the more a context indicates that occurrence of follow etc., have a dream usage, the more preposterous should addition of the modifier automatic(ally) seem. Adding it to e.g. (7c) yields:

(9) Basic properties of chains *should* then follow automatically from elementary derivational principles.

This does perhaps sound even sillier than the original.

Second, if it is true that the usages in (1) flourish only against a background intuition of non-serious use of the unmodified terms, it should seem wrong to use the modifiers in contexts where claimed language abuse in linguistics is irrelevant. So, for instance, presence of the modifier in (10) should seem ridiculous, which to me it does.

(10)a. If today is Sunday, then it follows (automatically) that tomorrow is Monday.

b. Since he is in Paris, and Paris is in France, it is a(n) (automatic) consequence that he is in France.

Third, if in specific other fields of inquiry F words having genuine logical uses like follow are *not* used as weakly as (4) allows, one would expect that the discourse of F would not instantiate the use of automatic(ally) illustrated in (1). I have not made the (evidently inherently enormous commitment) required to even begin to evaluate this claim. [13]

Fourth, suppose that even in linguistics *certain* logic-invoking terms lack a nonserious use of the sort that follow has. The Seriousness Hypothesis leads to the expectation that such forms would *not* occur in linguistics with the modifiers of (1). I suspect that the entail, entailment paradigm exemplifies this situation. That is, whatever impulse one might have to interpret (11a) via a schema like (4) seems to me absent for (11b, c):

(11)a. B follows from A

b. A entails B

c. B is an entailment of A.

The latter two really do seem to assert the existence of a genuine relation of logical connection between B and A. If correct that a schema parallel to (4) is always irrelevant for entail, entailment, then it is no

accident that dream proposal (6a) is expressed with follow and not with a sentence containing a corresponding usage of entail, as in (12):

(12). "Assuming that the notion "reciprocal" falls into its natural place within universal grammar, (16) will entail that *each other* must have an antecedent, in fact, a plural antecedent."

If entail and entailment lack the nonserious uses richly illustrated for follows, etc., addition of the modifier of (1) with such forms would, according to the Seriousness Hypothesis, never be motivated. This would ground the apparent fact that one does not seem to encounter the usages in (13), which, moreover strike me as simply ungrammatical:

(13)a. Assumptions A_1...A_n automatically entail B.

b. Assumptions A_1...A_n are an automatic entailment of B.

A fifth type of support for the Seriousness Hypothesis is that it provides a reason why the follows automatically usage is impossible in a context which really *forces* a strict logical interpretation of follow. There are at least three distinct subcases. The first involves a context with the form of *an actual proof*.

(14)a. Axiom 1

b. ....

c. Axiom n

d. Therefore, it follows (automatically) that Q.

Even for linguists, use of automatic(ally) in a context like (14d) should, it seems to me, appear preposterous; I thus guess that it cannot be attested. The Seriousness Hypothesis grounds this since the very structure of (14), enforces a strict usage of the logic-invoking term, rendering any signal of greater than usual seriousness entirely redundant.

A second , related, instance where automatic(ally) seems equally out of the question in a context forcing a strict logical interpretation is one actually *citing a rule of inference* justifying a conclusion:

(15) It follows (automatically) *via Modus Ponens* that B.

Here also, the Seriousness Hypothesis finds no ground justifying the modifier.

For a third case, recall Freidin's usage remarked in note 12:

(16) It follows (automatically) as a theorem (automatically) from $A_1...A_n$ that B.

Here the presence of as a theorem also seems to force a strict logical sense of follow, and again the modifier seems bizarre. The Seriousness Hypothesis justifies that situation too, since the context makes interpretation of follow via schema (4) unavailable.

The last issue I can raise about the usage in (1) and its connection to the Seriousness Hypothesis involves negation.

(17)a. B follows automatically from $A_1...A_n$.

b. B follows from $A_1...A_n$.

c. B does not follow automatically from $A_1...A_n$.

d. B does not follow from $A_1...A_n$.

While nothing in general English rules of syntax or interpretation justifies that (17c) is (any more than 17d) bizarre, I find the usage odd and I know of no instantiations of (17c) in the literature. Regularly, one would expect that in (17c), the scope of negation is restricted to the adverbial. Why then is this negation peculiar? I think that the Seriousness Hypothesis offers some basis for this.

For implicit in the latter is the idea that the modifiers in (17) do not really modify a minimal meaning to give a more complex meaning. Rather, they simply signal that a word is being used in a strict sense, when custom in the field allows very unstrict uses. Under that view, follow in (17a) is *truth functionally* simply the reciprocal of entail. So a commitment to (17a) simply asserts the strict sense of (17b). Therefore, to deny (17a) is just to deny (17b). And a short way to do that is to assert (17d). Moreover, the motivations which, according to the Seriousness Hypothesis, lead to expression of the strict sense of (17b) as (17a) do not likewise motivate expressing the strict sense of (17d) as (17c). For *lack* of a logical consequence relation between a proposition B and an arbitrary set of assumptions $A_1...A_n$ *is the default*. One is thus in general motivated to *deny* such a connection only in the face of an *assertion* of its existence. Therefore, one is motivated to assert the negation of (17a) at best only when someone has asserted (17a). But to reject a claim of the form (17a), it suffices to use (17d). Invocation of the 'seriousness marker' automatic(ally) is untmotivated because merely by using it, any defender of (17a) has already *renounced* appeal to an interpretation of follow via a weak schema like (4). Thus nothing motivates one who denies (17a) to *also* renounce it.

The Seriousness Hypothesis is the best account I have been able to develop of the a priori puzzling linguistic usage sechematized in (1). I certainly have not meant to suggest that this vague, primitive and unformalized propsal is a serious lexical analysis and I invite others to pursue the development of the latter.

Recognition that 'B follows from $A_1...A_n$' even in contexts which seem to involve logical connection does not in linguistics commit an author to a genuine logical connection raises the question of whether appending automatic(ally) does so. To deny this is to allow that e.g. even 'B follows *automatically* from $A_1...A_n$' involves no commitment to established logical consequence. That would seem to open the door to the nihilistic conclusion that nothing linguists say can so commit them. Such a conclusion strikes me as going beyond skepticism to genuine cynicism. However, the following section indicates that linguists utilize other terms in ways which explicitly undermine commitment to real logical consequence. So even mere skeptics might well keep in mind the saying that 'no matter how cynical one is, one can't keep up.'

Section 2 If It's Just about True, It Can't Be False, Can It ?

Another usage having a special connection to forms with logical import in ordinary discourse which seems to have achieved some currency in linguistics is schematized in (18).

(18) X *virtually* holds

Examples include :

(19)a. Chomsky (1981: 136)

"Base rules are virtually eliminated."

b. Chomsky (1982a: 89)

"and the components of transformations in the sense of earlier work can be virtually abandoned;"

c.. Chomsky (1982a: 34)

"An important property of these three types of EC is that they (virtually) partition the distribution of NP."

d. Chomsky (2000a: 120)

"There is reason to believe that the computational system is invariant, virtually."

e. Chomsky (2000a: 122)

"Each language, then, is (virtually) determined by a choice of values for lexical parameters;"

A survey of logic works again provides no grounding for the adverb. In this case though, I believe the use of the adverbial form is less mysterious than that of automatically. It always functions substantively; its suppression to yield (20) clearly changes things truth functionally. [14]

(20) X holds.

For anyone who writes an instance of (18), must admit (21):

(21) X does not hold

This is clear since virtually in contexts like (18) is, like the in part discussed in note 9, a kind of weakening hedge, but one probably even vaguer than in part. No one would claim (18) *if* they were in the position to demonstrate or argue for (20) itself. [15] This is evident for (19a, b), where, if the author had thought it was really supportable that base rules in the first case or transformational components in the second could in his terms just flatly be abandoned, he would not have felt the need for hedging. Even more clearly, for the case of (19c), the author himself appended a footnote (his 29) which makes explicit that the claim without the hedge is false.

Given then that (18) expresses (21), why would linguists write (18)? The only answer I see is that it is a relatively safe way of at least implying more good things about one's proposals than is justified. This is why it is hard to imagine anyone *ever* writing (18) as part of a criticism of someone *else's* analysis whose *rejection* one is defending. If one is criticizing analysis A, which supposedly explains B, and one can really show that A simply doesn't entail B, one would surely simply assert something like (21). One only uses things of the form (18), I believe, to talk about conclusions one *likes* and *supports*. For in saying (18) one gives the, of course illusory, impression of some sort of result. The implication is that the logical connection holds except in some insignificant way; one at least implicitly grants in the background (to cover oneself) that it is not literally true, but vouschafes that in some inchoate sense (one need never specify) this does not matter to serious folk like contemporary linguists. In short, such usages terminologically facilitate the claim of a significant result in the absence of one.

Among the infinite set of natural numbers, some are even and some odd. Just so, some are primes and some are not. Notably, the intersection of the even natural numbers and the prime natural numbers contains only one member, 2. Linguists who are prepared to look with indulgence on the use in linguistics of virtually as in (18), might then consider (22):

(22)a. All primes are odd.

b. The distribution of the properties even and odd among the primes virtually follows from (22a).

What was said before determines that (22b) requires:

(23) The distribution of the properties even and odd among the primes does *not* follow from (22a).

And (23) is, as already indicated, true. But if one considers some sort of measure of degree of falsehood in terms of cases, then (22a) (and consequently (22b)) is not bad. After all, there are $\aleph_0$ cases which support (22a) and only one which falsifies it. It is doubtful that any linguistic usage of virtually could even aspire to such grounding. And yet clearly (22a) is an absurdity. [16] The imposed conclusion then is that talk like (18) in linguistics is a thinly veiled attempt to imply a result or stronger results than could be justified by any available argument or evidence.

The two usages discussed so far, follows automatically and virtually, are independent and in principle could be combined, and at least once they have been: [17]

(24) Hukari and Levine (1991 : 120)
"Apart from a remarkable structural parallel between these and subject-extraction contexts, there is considerable evidence that AP and A' must ccontain the agreement feature AGR, thus making it locally accessible to the UDC feature associated with the gap, from which connectivity follows virtually automatically."
Happily, previous reasearch aids us in translating any claim of the form (25a) into truth-functionally more transparent assertions.

(25)a It follows virtually automatically that X.
b. It follows automatically that X.

For it has been established that (25a), which hedges (25b), can only be true if (26) holds:

(26) It does not follow automatically that X.
And the prior discussion of such uses of automatically in linguistics indicate that the odd (26) is simply a way of asserting, and in any event entails:

(27) It does not follow that X.

Normally, in inquiry if one has not established any connection between states of affairs, one can save time by simply not claiming one has. As touched on in the previous section, that is the default. Why then is it at least modestly acceptable in current linguistics to formulate the non-result (27) as the better-sounding but obscuring (25a). Why do referees and editors allow such verbiage to be distributed with the imprimata of a scientific journal? It may not be fun to inquire into such matters, especially for those who doubt that our field contains a good dose of what should rightfully be called junk linguistics.

Section 3 My Accounts Are Natural; Don't You Wish Yours Were!

It would be only *natural* in a skeptical essay concerned like the present one with usages in linguistics to focus on the concept natural, e.g. in contexts like the following (all highlighting mine: PMP):

(28)a. Chomsky (1975a: 94-95)

"I have elaborated a version of this position elsewhere, and shown how some fairly complex examples can be handled from this point of view in what seems a rather *natural* way."

b. Chomsky (1975a: 241)

''There is, in fact, a rather *natural* analysis of rules into several categories in terms of their position in the system of linguistic rules and the conditions that apply to them.''

c. Chomsky (1988: 83)

"Given the quite *natural* representation in (22), we can…."

d. Chomsky (1988: 89)

"and it is a fact of some interest that a *natural* logical structure is directly represented in the mental representations that underlie the actual expressions of language"

e. Chomsky (1999: 12)

"A *natural* principle, which has been suggested in various forms, is (14):" (the author's (14) is : Maximize matching effects.)"

f. Chomsky (1999: 31)

"These conclusions too follow *naturally* if overt V-to-T raising, T-to-C raising, and N-to-D raising are phonological properties,…"

g. Chomsky (2000b: 113)

"Relations that enter into C_{HL} either (i) are imposed by legibility conditions or (ii) fall out in some *natural* way from the computational process."

While a detailed investigation of this usage is currently beyond my powers, (29a-d) seem correct.

(29) The term:

a. is undefined and unanalyzed;

b. adds nothing of substance;

c. is subjective and

d. is used by writer W as a totally safe (since contentless) way of being positive about a proposal, almost always one of W's.

It is of course of some note, given earlier remarks, that the empty naturally appears in (28f) as a modifier of follow. Again the combination is unknown in logic for reasons parallel to those mentioned about automatic(ally). One must suspect that the modified usage involves the dream interpretation of follow.

Observe that in (28g) things are said to fall out in *some* (unspecified) natural way, indicating that in the author's view, there are more than one. Are there better and worse *natural* ways in which things fall out? Again one is clearly very remote from the realm of discussion of actual logical consequences, which either hold or fail to, and which need no contentless compliments like natural.

With respect to (29d), the intended claim is that one can be confident that a purveyor of this use of natural would never say anything like (30a, b):

(30)a. So and so's proposal must be rejected because it is natural and gets the facts wrong.

b. This analysis of the sentences at issue is misguided and quite natural.

It is probably accurate then to say that the use of natural in the contexts in question approximates in objective content and in subjective positive attitude the youthful cool; see presumably interchangeable fine-sounding pairs like (31a) and interchangeable but bad sounding ones like (31b) :

(31)a. The analysis I have here provided of these facts is natural/cool.

b. So and so's analysis is completely wrong-headed, lacking in scientific value and quite natural/cool.

Statement (31a) evidently totally lacks truth functional content and in (31b) neither version of the third conjunct adds any substance.

Consider too how (equally) absurd it would be to argue *against* claims like (32a) in the form (32b):

(32)a. Linguist W: It follows in a natural/cool way from $A_1...A_n$ that B.

b. Linguist X: While B may follow from $A_1...A_n$, it is simply not true that it follows in a natural/cool way.

That is, no one but a drunk in a bar is going to quarrel with a claim of naturalness and argue tout court that some proposal is *not* natural.

The characteristic natural of linguistics is then a purely rhetorical device to give a positive-sounding though content-free (but, happily, thereby universally available) boost to any proposal a writer wishes to. Those who doubt the existence of junk linguistics might ask why those who waste time, energy, ink and space with this empty verbiage (think they) need to.

Section 4 Virtually Self-evident Natural Conclusions Which Follow Automatically (Surely) from Something

I have in the previous sections focused on three usages rather prevalent in linguistic writings of the sort falling under the topic of these essays. Evidently, I have only touched the surface of a serious analysis of these forms. I invite others with greater analytic powers, more patience and more insight to do more.

That said, I hope to have said enough to indicate that each of them has unfortunate features incompatible with serious writings concerned with a search for the truth about NL.

The trouble with the automatic(ally) usage is that it can, as far as I see, be rationalized as other than a total waste of words only against a background of more or less debased usages of follows and other terms from logic. If one could by magic exclude the excessively obscure uses of logic-invoking follows, etc. allowed by a schema like (4), uses open even to the dream interpretation, what purpose could automatic(ally) serve? Put differently, the evidently widely felt need for this usage should be taken as a warning sign, like that provided by expired canaries in the coal mines of an earlier era, that something toxic is present. In this case, the toxic material is called junk linguistics.

The virtually usage might seem less ominous. It is a wider culture hedge and might seem to be used in linguistics in partially standard ways. The problem though is that it is arguably leaking into contexts where *it simply is not appropriate to hedge*. At certain points, one just has to face the fact that not having established that conclusion C holds, there is not only no postive value but on the contrary considerable negative value in penning the weaker 'C virtually holds'. First, there is a real possibility of fooling readers into thinking more has been established than has been. Second, and possibly even worse, there is a possibility of fooling oneself into not pursuing the search for actual results, those needing no hedging.

As for natural(ally), it too has a bit of the aspect of the warning canaries. The impulse to use this term is an admission that an author wishes to say more positive things about a proposal than there is any substantive basis for saying. Such a wish alone is unworthy but being largely subjective must be dealt with by individuals for themselves. But one who actually indulges the wish by penning natural(ally) carries discourse toward the realm of junk linguistics, whose essential nature is, after all, to advance pretensions to the discovery of some truth(s) about NL in the absence of any such discovery. To the extent that a real linguistics provides actual discoveries, they will impose themselves by their truth and will induce no felt need to gild them with empty compliments.

Overall then, caution about the discourse of linguists is advisable; one must subject instances of logic-invoking terms like follow to strict analysis, one must question why one should care about claims about positively regarded conclusons which are only *virtually* true (that is, are false), and one should strongly suspect that the degree to which a work is infected with the virus of junk linguistics is in part measured by the number of times one is told some proposal is cool, or natural.

Notes

1 It seems correct to take automatic in (2l) as elliptical for an automatic consequence.

2 While I would like to be able to claim I have never utilized follows automatically, etc., (2c) alas already shows I have; and I suspect this is not the only instance. However, hopefully I have not used it in at least several decades.

3 One possible exception, relevant at most to (2d), is that the use of automatic(ally) in linguistics might be linked to the technological meaning via the assumption that grammars are a variety of automata. I disregard this possibility in the present essay, although it bears looking into.

4 Lakoff (1986) rejects the existence of a syntactic constraint properly reconstructed as the Coordinate Structure Constraint. His arguments are analyzed and rejected in Postal (1998: Chapter 3).

5 See Pullum (1989) for documentation and Chomsky (1990) for a not very responsive response.

6 Postal (1982) analyzes in detail a claim of Chomsky and Lasnik (1977) that some substantive generalization follows from something called *trace theory*, which would instantiate the variable V in the text. The results more than justify the skepticism here expressed.

7 These remarks about the claimed consequences in (6) are highly skeptical of course, but that is appropriate in what were announced to be skeptical essays. Moreover, anyone skeptical of *my* claims here could easily show they are false merely by (and only by) providing the demonstrations I have claimed cannot be provided.

8 With respect to the overall implication of this section of the current work that much in linguistics is junk linguistics, it is appropriate to ask how many other fields there are where one could document pages being taken up not with establishing actual logical connections, but with expressions of mere hope about connections holding under some imagined sets of circumstances

9 The debasement of language represented by the dream usage internal to a putative science is hardly the only one of the relevant terms which can be found. Consider:

(i) Chomsky (2000b: 103)

"Property (5a) follows in part from the θ–theoretic principle (6), which is implicit in the conception of θ-roles as a relation between two syntactic objects, a configuration and an expression selected by its head."

Here the critical notion is 'B follows in part from A'. Surely <u>in part</u> is here a hedge, but one so vague and unexplicated that it is impossible to determine whether (iia, b) or something else is intended:

(ii)a. Property (5a) is a logical consequence of a set of princples including principle (6) and a non-null set of others not here mentioned.

b. Some but not all cases where (5a) holds are consequences of principle (6).

Clear under either radically distinct intepretation is that, despite the logic-like usages of <u>follows from</u>, <u>principle</u>, no logical consequence relation (is even claimed to) exist between principle (6) and property (5a). That is, no one would be led to use <u>follows in part</u> as in (i) unless the actual situation were:

(iii) Property (5) has not been shown to be a logical consequence of principle (6).

10 Dream usages in linguistics are not limited to the expressions of (1). Consider:

(i) Chomsky and Lasnik (1995: 65) :

"A strong form of *recoverability of deletion* would presumably prevent the deletion of an element with ϕ–features."

Claim (i) is properly characterized as dreaming because it references consequences of a principle not actually formulated. Notable is that the highlighted *principle name* invoked in (i) figured in my 1988 parody reprinted here as Chapter 9, where it instantiated one of the explicit targets of ridicule. So it was there observed (Chapter 9 page) that the same princple name invoked with no formulation of a principle by Chomsky and Lasnik (1977) to account for a fact was equally invoked by other linguists nine years later, again with no formulation. And I quoted in (ii) their (1977: 446-447).

(ii) "We assume that this possibility is excluded by the recoverability principle for deletion. Exactly how to formulate this principle is a nontrivial question, but there is little doubt that such a principle is required".

And I then noted: "Thus Riemsdijk and Williams (1986, p. 103) appeal to the same phantom recoverability principle as Chomsky and Lasnik (1977)", and quoted the former authors:

(iii) "The principle for recoverability that would allow this deletion remains to be given, but it is plausible to assume . . ." [plausible assumption omitted]

I then concluded: "Nine years have elapsed, and the phantom principle remains unformulated. I see no reason why the situation will be different nine years from now, or ever." (i) justifies the latter conclusion as one sees that seven years later (hence eighteen years after the initial reverie), the dream usage of *recoverability* is yet again unapologetically invoked by these authors.

11 Whatever success this form of discourse achieves depends of course on a highly indulgent audience. Merely submitting dreams to putative scientific outlets in linguistics can only lead to publication with the cooperation of the editorial authorities. The prevalence of such publication and the lack of discernable outcry about it thus suggests that indulgent audiences and cooperative editors are not lacking.

12 Recall the remarks of Freidin (1978: 539) mentioned in the Introduction and already discussed in Chapter 9:

(i) Freidin (1978: 539):

"By taking (54a-e) as axioms of the theory of grammar, we derive the empirical effects of the strict cycle as a theorem."

This 'derive as a theorem' claim, which seems stronger than the dream usage and at least as strong as the intentions of <u>follows automatically</u>, was then followed by an explicit admission that no proof was extant, accompanied by doubts that any was possible. This usage does not fit the dream pattern since the author was seemingly perfectly cognizant of, and up front about, the *lack* of logical consequence. Perhaps involved here was a simple lack of understanding of the equivalence between 'theorem of axioms $A_1...A_n$' and 'conclusion of a valid proof from $A_1...A_n$'. The remaining mystery is what the author thought 'deriving X as a theorem from axioms' *does* mean. About that, I have no clue.

13 But Christopher Potts has made a small start. Surprisingly (to me), he informs me (personal communiation: 4/30/02) that via internet searches, he has found usages of 'follows automatically' outside of linguistics, in other academic disciplines. He offers data like:

(i) From a page titled `The abstract group concept':

"As for permutations the associative law follows automatically for operators."

http://www-groups.dcs.st-and.ac.uk/~history/HistTopics/Abstract_groups.html

(ii) From a page titled `Re: quaternionic C*-algebras':

"This equation follows automatically from the abstract nonsense given above - we don't need to put it in by hand."

(iii) From a page titled `Relation expansion':

"Sometimes the congruence property follows automatically because the relation and (constructor and selector) signatures involved are the default choices."

http://www.cs.ucsd.edu/groups/tatami/handdemos/doc/rexp.htm

(iv) From a tutorial on basic logic:

"A strong (or sound) argument is one in which (1) the premises of that argument are true and (2) the conclusion follows automatically from its premises."

http://www.molloy.edu/academic/philosophy/sophia/reading/evaluation.htm

These occurrences seem to me to have unpleasant implications for the fields in which they occur, but I will have to leave it to those who work in them to worry about it..

14 In this respect, virtually is like almost/practically. So all of (i) seem to determine the negative (ii):

(i) Andre is almost/practically/virtually penniless.

(ii) Andre is not penniless.

In ordinary discourse, these forms have perfectly *reasonable* uses, specifically when the predicate they modify denotes something evaluable on a scale. So consider:

(iii) This (football game) is virtually over.

Such a remark is reasonable and contentfully interpretable if said e.g. with twenty seconds remaining and a score of 56 to 3. The reason is that over said of games (and e.g. elections) has an ambiguity. On one reading, where virtual in (iii) would *not* be appropriate when used as described, a game is over when the rules defining it specify that it has come to completion. In football, this is when and only when the fixed time period (48 minutes in professional games) has elapsed. In this sense, a game cannot sensibly be said to be 'virtually over', since it either is or isn't. But on a second sense, a game is over when the conditions (the score) are such that no matter what the team/player in the inferior position are assumed to do, it/(s)he

cannot alter the relative status. That is, on the second reading, over means something like 'the outcome is determined'. It is reasonable to hedge this because such determinations, unlike those involving the techincal definition of completion, involve scalar inference and judgment. So, as one gradually decreases the gap (here 53) and increases the remaining time, it becomes less and less reasonable to say the game is 'virtually over'.

The reader will note that the reasonableness of utilizing virtual with scalarly evaluated predicates offers no rationalization whatever for uses of this term in linguistics like those in (19).

15 Beyond the remarks of note 14, one can imagine at least one sort of context in which one might reasonably say 'It virtually follows from A that B', namely, one in which one then immediately concludes that one must, to establish a logical connection, also assume C, thereby going on to state 'It follows from A and C that B'. The uses of virtually being quarreled with here do not occur in such contexts.

16 Of course, it would *not* be an absurdity if one could adopt the exceptionally clueless view of mathematical truth of Smith (1999:148) that "mathematical systems have no properties of their own, except those we stipulate." For (22a) is as good a stipulation as any, Smith not even having required e.g. any notion of consistency for his stipulations. One must wonder then whether Smith believes something analogous about logic. Since he holds that e.g. the property that every number is smaller than its successor is at best just a stipulation one could (therefore) suspend, is e.g. logical consistency too for him just an arbitrary stipulation? Is the property of inference embodied in the rule of Modus Ponens also a mere stipulation? In fact, it is hard to see how Smith's view could permit any defense of the idea that truth in logic is more than stipulation. If Smith sees a fundamental break between truth in mathematics (mere stipulation) and truth in logic, how would he account for the extensively successful attempt of Russell and Whitehead to reduce talk of mathematics to talk about logic (so that Quine (1953: 80) could say: "In Whitehead and Russell's *Principia Mathematica* we have good evidence that all mathematics is translatable into logic.").

One cannot help but wonder too how Smith accounts to himself for the fact that mathematicians sometimes devote their whole careers to solving certain problems, acting as if there were some truth there. Why don't they save time, simply stipulate whatever answer they like or whatever answer someone will pay them for and then do something real? And what could be the difference in Smith's terms between a proven mathematical result and an open question, e.g. Goldbach's Conjecture (that every even natural number is the sum of two primes)? Since there is no truth beyond what is stipulated, everyone is free to make it come

out however they want. Smith (1999) expresses other clueless ideas about mathematics, such as (p. 231) that a non-denumerably infinite set is one which can be put in one-to-one correspondence with the collection of real numbers. This claims, contrary to all of modern set theory, that there are only two sizes for infinite sets and, specifically contrary to Cantor's Theorem (see note 3 of Chapter 6), that there are sets S whose power sets are not greater in size than S.

17 I have as yet encountered no usage of the form 'B automatically virtually follows from $A_1...A_n$.' I suppose that, given what has been said, this would have to mean that B is not an actual logical consequence of the premisses. And this not being the sort of thing linguists want to say about their own favored ideas, there is no motivation for its occurrence.

Other logically possible but so far unattested combinations of various hedges and modifiers discussed in preceding text are listed in (i).

(i)a. B automatically follows in part from $A_1...A_n$.

b. B virtually follows in part from $A_1...A_n$.

c. B automatically virtually follows in part from $A_1...A_n$.

d. B follows virtually automatically in part from $A_1...A_n$.

Only someone with stronger masochistic tendencies than mine would want to inquire seriously into their truth conditions.