PAUL KIPARSKY AND CAROL KIPARSKY

FACT*

The object of this paper is to explore the interrelationship of syntax and semantics in the English complement system. Our thesis is that the choice of complement type is in large measure predictable from a number of basic semantic factors. Among these we single out for special attention PRESUPPOSITION by the speaker that the complement of the sentence expresses a true proposition. It will be shown that whether the speaker presupposes the truth of a complement contributes in several important ways to determining the syntactic form in which the complement can appear in the surface structure. A possible explanation for these observations will be suggested.

1. TWO SYNTACTIC PARADIGMS

The following two lists both contain predicates which take sentences as their subjects. For reasons that will become apparent in a moment, we term them FACTIVE and NON-FACTIVE.

FACTIVE	NON-FACTIVE
significant	likely
odd	sure
tragic	possible
exciting	true
relevant	false
matters	seems
counts	appears
makes sense	happens
suffices	chances
amuses	turns out
bothers	

* This work was supported in part by the U.S. Air Force (ESD Contract AF19(628)-2487) and the National Institutes of Health (Grant MH-13390-01).

This paper developed through several revisions out of a paper read in 1967 at Bucharest. These revisions were largely prompted by helpful discussions with many colleagues, among whom we would especially like to thank John Kimball, George Lakoff, Robin Lakoff, Haj Ross, and Timothy Shopen.

We shall be concerned with the differences in structure between sentences constructed with factive and non-factive predicates, *e.g.*:

Factive: *It is significant that he has been found guilty*
Non-factive: *It is likely that he has been found guilty*

On the surface, the two seem to be identically constructed. But as soon as we replace the *that*-clauses by other kinds of expressions, a series of systematic differences between the factive and non-factive predicates begins to appear.

(1) Only factive predicates allow the noun *fact* with a sentential complement consisting of a *that*-clause or a gerund to replace the simple *that*-clause. For example,

The fact that the dog barked during the night
The fact of the dog's barking during the night

can be continued by the factive predicates *is significant, bothers me*, but not by the non-factive predicates *is likely, seems to me.*

(2) Only factive predicates allow the full range of gerundial constructions, and adjectival nominalizations in *-ness*, to stand in place of the *that*-clause. For example, the expressions

His being found guilty
John's having died of cancer last week
Their suddenly insisting on very detailed reports
The whiteness of the whale

can be subjects of factive predicates such as *is tragic, makes sense, suffices*, but not of non-factive predicates such as is *sure, seems, turns out.*

(3) On the other hand, there are constructions which are permissible only with non-factive predicates. One such construction is obtained by turning the initial noun phrase of the subordinate clause into the subject of the main clause, and converting the remainder of the subordinate clause into an infinitive phrase. This operation converts structures of the form

It is likely that he will accomplish even more
It seems that there has been a snowstorm

into structures of the form

He is likely to accomplish even more
There seems to have been a snowstorm

We can do this with many non-factive predicates, although some, like *possible*, are exceptions:

It is possible that he will accomplish even more
**He is possible to accomplish even more*

However, none of the factive predicates can ever be used so:

**He is relevant to accomplish even more*
**There is tragic to have been a snowstorm*

(4) For the verbs in the factive group, extraposition[1] is optional, whereas it is obligatory for the verbs in the non-factive group. For example, the following two sentences are optional variants:

That there are porcupines in our basement makes sense to me
It makes sense to me that there are porcupines in our basement

But in the corresponding non-factive case the sentence with the initial *that*-clause is ungrammatical:

**That there are porcupines in our basement seems to me*
It seems to me that there are porcupines in our basement

In the much more complex domain of object clauses, these syntactic criteria, and many additional ones, effect a similar division into factive and non-factive predicates. The following lists contain predicates of these two types.

FACTIVE	NON-FACTIVE
regret	suppose
be aware (of)	assert
grasp	allege
comprehend	assume
take into consideration	claim
take into account	charge
bear in mind	maintain
ignore	believe
make clear	conclude
mind	conjecture
forget (about)	intimate
deplore	deem
resent	fancy
care (about)	figure

(1) Only factive predicates can have as their objects the noun *fact* with a gerund or *that*-clause:

Factive: *I want to make clear the fact that I don't intend to participate*
You have to keep in mind the fact of his having proposed several alternatives

[1] Extraposition is a term introduced by Jespersen for the placement of a complement at the end of a sentence. For recent transformational discussion of the complexities of this rule, see Ross (1967).

Non-factive: **I assert the fact that I don't intend to participate*
**We may conclude the fact of his having proposed several alternatives*

(2) Gerunds can be objects of factive predicates, but not freely of non-factive predicates:

Factive: *Everyone ignored Joan's being completely drunk*
I regret having agreed to the proposal
I don't mind your saying so

Non-factive: **Everyone supposed Joan's being completely drunk*
**I believe having agreed to the proposal*
**I maintain your saying so*

The gerunds relevant here are what Lees (1960) has termed 'factive nominals'. They occur freely both in the present tense and in the past tense (*having -En*). They take direct accusative objects, and all kinds of adverbs and they occur without any identity restriction on their subject.[2] Other, non-factive, types of gerunds are subject to one or more of these restrictions. One type refers to actions or events:

He avoided getting caught
**He avoided having got caught*
**He avoided John's getting caught*

Gerunds also serve as substitutes for infinitives after prepositions:

I plan to enter the primary
I plan on entering the primary
**I plan on having entered the primary last week*

Such gerunds are not at all restricted to factive predicates.

(3) Only non-factive predicates allow the accusative and infinitive construction.

Non-factive: *I believe Mary to have been the one who did it*
He fancies himself to be an expert in pottery
I supposed there to have been a mistake somewhere

Factive: **I resent Mary to have been the one who did it*
**He comprehends himself to be an expert in pottery*
**I took into consideration there to have been a mistake somewhere*

As we earlier found in the case of subject complements, the infinitive construction is

[2] There is, however, one limitation on subjects of factive gerunds:

**It's surprising me that he succeeded dismayed John*
**There's being a nut loose disguntles me*

The restriction is that clauses cannot be subjects of gerunds, and that the gerund formation rule precedes extraposition and *there*-insertion.

excluded, for no apparent reason, even with some non-factive predicates, *e.g.*, *charge*. There is, furthermore, considerable variation from one speaker to another as to which predicates permit the accusative and infinitive construction, a fact which may be connected with its fairly bookish flavor. What is significant, however, is that the accusative and infinitive is not used with factive predicates.

2. PRESUPPOSITION

These syntactic differences are correlated with a semantic difference. The force of the *that*-clause is not the same in the two sentences

It is odd that it is raining (factive)
It is likely that it is raining (non-factive)

or in the two sentences

I regret that it is raining (factive)
I suppose that it is raining (non-factive)

The first sentence in each pair (the factive sentence) carries with it the presupposition 'it is raining'. The speaker presupposes that the embedded clause expresses a true proposition, and makes some assertion about that proposition. All predicates which behave syntactically as factives have this semantic property, and almost none of those which behave syntactically as non-factives have it.[3] This, we propose, is the basic difference between the two types of predicates. It is important that the following things should be clearly distinguished:

(1) Propositions the speaker asserts, directly or indirectly, to be true
(2) Propositions the speaker presupposes to be true

Factivity depends on presupposition and not on assertion. For instance, when someone says

It is true that John is ill
John turns out to be ill

he is ASSERTING that the proposition 'John is ill' is a true proposition, but he is not

[3] There are some exceptions to this second half of our generalization. Verbs like *know*, *realize*, though semantically factive, are syntactically non-factive, so that we cannot say **I know the fact that John is here*, **I know John's being here*, whereas the propositional constructions are acceptable: *I know him to be here*. There are speakers for whom many of the syntactic and semantic distinctions we bring up do not exist at all. Professor Archibald Hill has kindly informed us that for him factive and non-factive predicates behave in most respects alike and that even the word *fact* in his speech has lost its literal meaning and can head clauses for which no presupposition of truth is made. We have chosen to describe a rather restrictive type of speech (that of C.K.) because it yields more insight into the syntactic-semantic problems with which we are concerned.

PRESUPPOSING that it is a true proposition. Hence these sentences do not follow the factive paradigm:

**John's being ill is true*
**John's being ill turns out*
**The fact of John's being ill is true*
**The fact of John's being ill turns out*

The following sentences, on the other hand, are true instances of presupposition:

It is odd that the door is closed
I regret that the door is closed

The speaker of these sentences presupposes 'the door is closed' and furthermore asserts something else about that presupposed fact. It is this semantically more complex structure involving presupposition that has the syntactic properties we are dealing with here.

When factive predicates have first person subjects it can happen that the top sentence denies what the complement presupposes. Then the expected semantic anomaly results. Except in special situations where two egos are involved, as in the case of an actor describing his part, the following sentences are anomalous:

**I don't realize that he has gone away*
**I have no inkling that a surprise is in store for me*[4]

Factivity is only one instance of this very basic and consequential distinction. In formulating the semantic structure of sentences, or, what concerns us more directly here, the lexical entries for predicates, we must posit a special status for presuppositions, as opposed to what we are calling assertions. The speaker is said to 'assert' a sentence plus all those propositions which follow from it by virtue of its meaning,

[4] In some cases what at first sight looks like a strange meaning shift accompanies negation with first person subjects. The following sentences can be given a non-factive interpretation which prevents the above kind of anomaly in them:

I'm not aware that he has gone away
I don't know that this isn't our car

It will not do to view these non-factive *that*-clauses as indirect questions:

**I don't know that he has gone away or not*

We advance the hypothesis that they are deliberative clauses, representing the same construction as clauses introduced *but that*:

I don't know but that this is our car

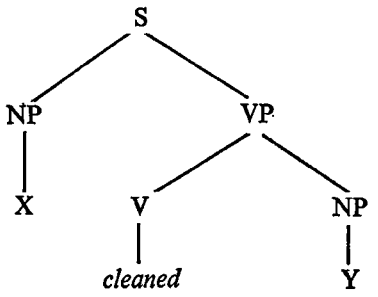
This accords well with their meaning, and especially with the fact that deliberative *but that*-clauses (in the dialects that permit them at all) are similarly restricted to negative sentences with first person subjects:

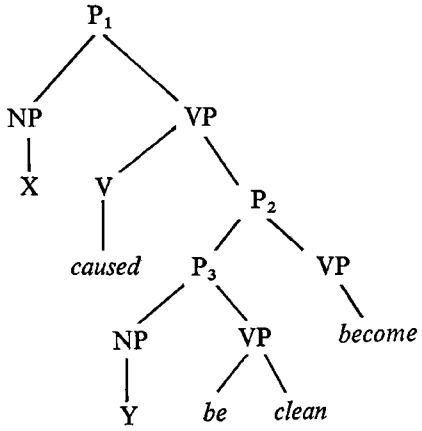
**I know but that this is our car*
**John doesn't know but that this is our car*

not, *e.g.*, through laws of mathematics or physics.[5] Presumably in a semantic theory assertions will be represented as the central or 'core' meaning of a sentence — typically a complex proposition involving semantic components like 'S_1 *cause* S_2', 'S *become*', 'N *want* S' — plus the propositions that follow from it by redundancy rules involving those components. The formulation of a simple example should help clarify the concepts of assertion and presupposition.

Mary cleaned the room

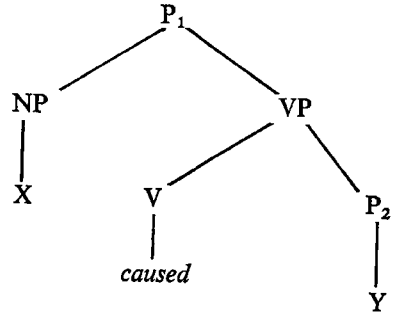
The dictionary contains a mapping between the following structures:



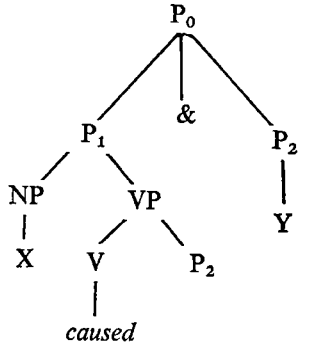


where S refers to the syntactic object 'Sentence' and P to the semantic object 'Proposition'.

A redundancy rule states that the object of *cause* is itself asserted:



ASSERTS



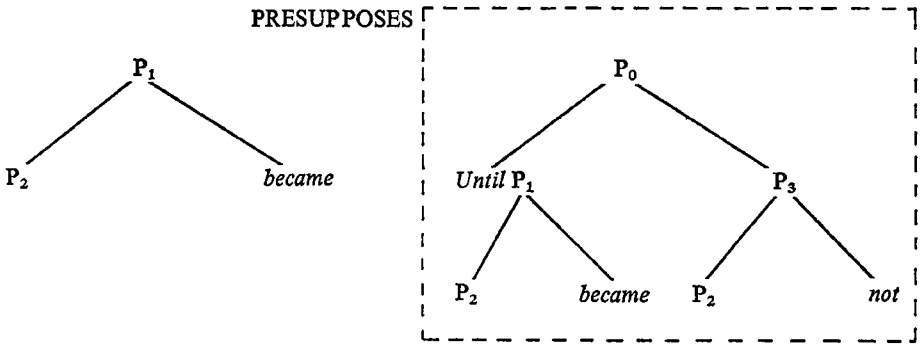
[5] We prefer 'assert' to 'imply' because the latter suggests consequences beyond those based on knowledge of the language. This is not at all to say that linguistic knowledge is disjoint from other knowledge. We are trying to draw a distinction between two statuses a defining proposition can be said to have in the definition of a predicate, or meaning of a sentence, and to describe some consequences of this distinction. This is a question of the semantic structure of words and can be discussed independently of the question of the relationship between the encyclopedia and the dictionary.

This rule yields the following set of assertions:

X caused[6] *Y to become clean*
Y became clean

[Why the conjunction of P_1 and P_2 is subordinated to P_0 will become clear below, especially in (3) and (5)]

Furthermore, there is a presupposition to the effect that the room was dirty before the event described in the sentence. This follows from *become*, which presupposes that its complement has, up to the time of the change referred to by *become*, not been true. This may be expressed as a redundancy rule:



(Presuppositions will be enclosed in dotted lines. Within the context of a tree diagram representing the semantic structure of a sentence, presuppositions which follow from a specific semantic component will be connected to it by a dotted line).

That this, like the factive component in *regret* or *admit*, is a presupposition rather than an assertion can be seen by applying the criteria in the following paragraphs.

(1) Presuppositions are constant under negation. That is, when you negate a sentence you don't negate its presuppositions; rather, what is negated is what the positive sentence asserts. For example:

Mary didn't clean the room

unlike its positive counterpart does not assert either that the room became clean or, if it did, that it was through Mary's agency. On the other hand, negation does not affect the presupposition that it was or has been dirty. Similarly, these sentences with factive predicates

It is not odd that the door is closed
John doesn't regret that the door is closed

presuppose, exactly as do their positive counterparts, that the door is closed.

[6] Though we cannot go into the question here, it is clear that the tense of a sentence conveys information about the time of its presuppositions as well as of its assertions, direct and indirect. Thus tense (and likewise mood, cf. footnote 8) is not an 'operator' in the sense that negation and other topics discussed in this section are.

In fact, if you want to deny a presupposition, you must do it explicitly:

Mary didn't clean the room; it wasn't dirty
Legree didn't force them to work; they were willing to
Abe didn't regret that he had forgotten; he had remembered

The second clause casts the negative of the first into a different level; it's not the straightforward denial of an event or situation, but rather the denial of the appropriateness of the word in question (spaced out above). Such negations sound best with the inappropriate word stressed.

(2) Questioning, considered as an operation on a proposition P indicates 'I do not know whether P'. When I ask

Are you dismayed that our money is gone?

I do not convey that I don't know whether it is gone but rather take that for granted and ask about your reaction.

(Note that to see the relation between factivity and questioning only yes-no questions are revealing. A question like:

Who is aware that Ram eats meat

already by virtue of questioning an argument of *aware*, rather than the proposition itself, presupposes a corresponding statement:

Someone is aware that Ram eats meat

Thus, since the presupposition is transitive, the *who*-question presupposes all that the *someone*-statement does.)

Other presuppositions are likewise constantly under questioning. For instance, a verb might convey someone's evaluation of its complement as a presupposition. To say *they deprived him of a visit to his parents* presupposes that he wanted the visit (*vs. spare him a visit...*). The presupposition remains in *Have they deprived him of a...?* What the question indicates is 'I don't know whether they have kept him from...'

(3) It must be emphasized that it is the SET of assertions that is operated on by question and negation. To see this, compare —

Mary didn't kiss John
Mary didn't clean the house

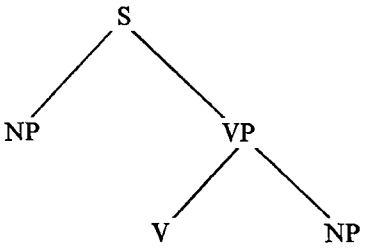
They have certain ambiguities which, as has often been noted, are systematic under negation. The first may be equivalent to any of the following more precise sentences:

Someone may have kissed John, but not Mary
Mary may have kissed someone, but not John
Mary may have done something, but not kiss John
Mary may have done something to John, but not kiss him

And the second:

Someone may have cleaned the house, but not Mary
Mary may have cleaned something, but not the house
Mary may have done something, but not clean the house
Mary may have done something to the house, but not clean it

All of these readings can be predicted on the basis of the constituent structure:



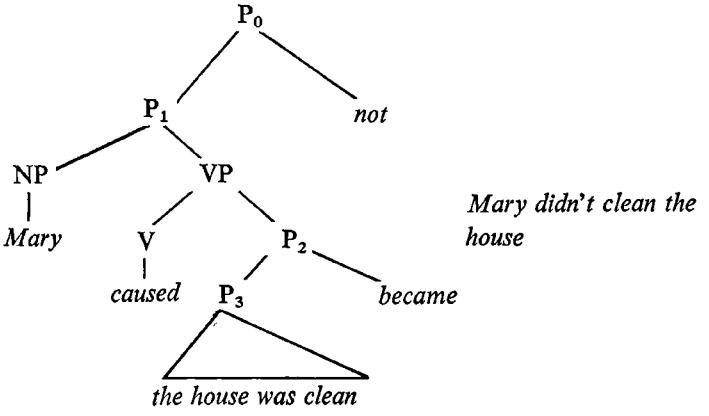
Roughly, each major constituent may be negated.

But the second sentence has still another reading:

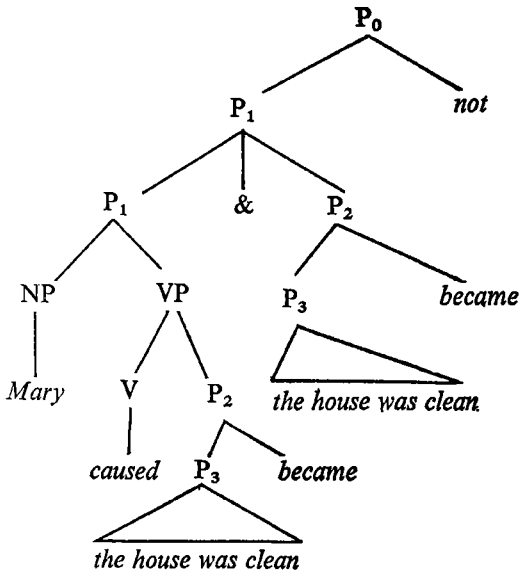
Mary may have been cleaning the house, but it didn't get clean

That extra reading has no counterpart in the other sentence. *Clean* is semantically more complex than *kiss* in that whereas *kiss* has only one assertion (press the lips against), *clean* has two, as we have seen above. How this affects the meaning of the negative sentence can be seen through a derivation:

(i)

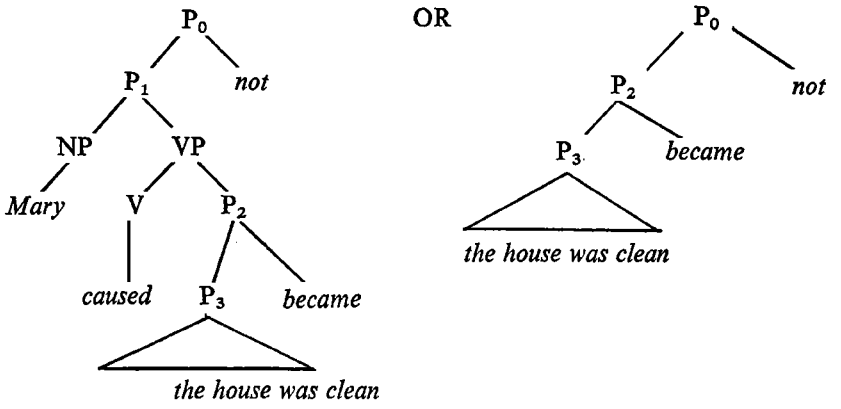


(ii) Application of redundancy rule on 'cause':



It's not the case that both Mary cleaned the house and the house is clean.

(iii) DeMorgan's Law yields



Either 'Mary didn't clean the house' or 'the house didn't get clean'.

Thus to say *Mary didn't clean the house* is to make either of the two negative assertions in (iii). The remaining readings arise from distribution of *not* over the constituents of the lexicalized sentence.

Presumably the same factors account for the corresponding ambiguity of *Did Mary clean the house?*

(4) If we take an imperative sentence like:

(You) chase that thief!

to indicate something like:

I want (you chase that thief)

then what 'I want' doesn't include the presuppositions of S. For example, S presupposes that

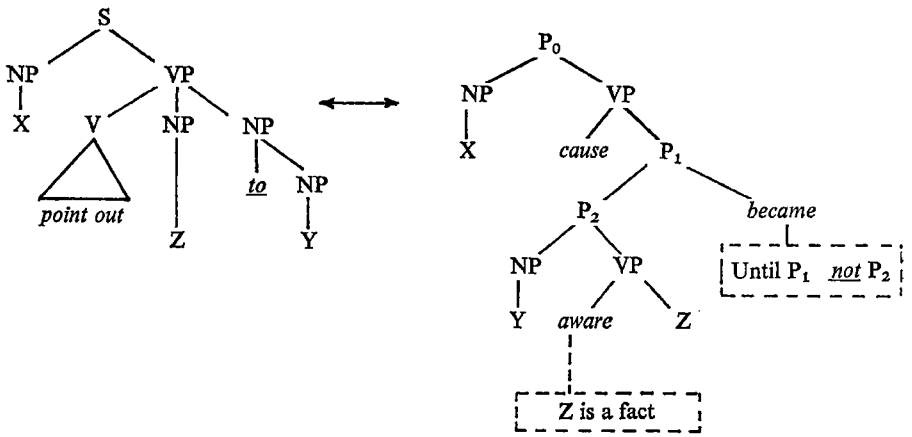
That thief is evading you

but that situation is hardly part of what 'I want'.

The factive complement in the following example is likewise presupposed independently of the demand:

Point it out to 006 that the transmitter will function poorly in a cave

Assume the dictionary contains this mapping:



From the causative redundancy rule, which adds the assertion P_1, the definition of *point out*, and the fact that *want* distributes over subordinate conjuncts, it follows that the above command indicates:

I want 006 to become aware that the transmitter...

However it doesn't in any way convey

I want the transmitter to function poorly in a cave

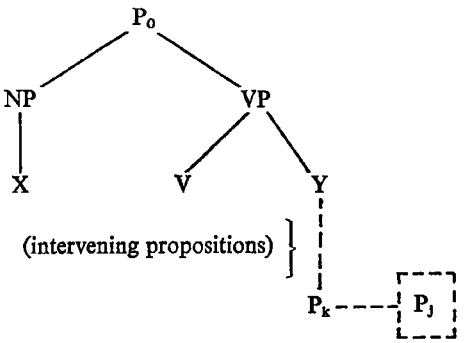
nor, of course, that

I want 006 not to have been aware...

(5) We have been treating negation, questioning, and imperative as operations on

propositions like implicit 'higher sentences'. Not surprisingly explicit 'higher sentences' also tend to leave presuppositions constant while operating on assertions. Our general claim is that the assertions of a proposition (P_k) are made relative to that proposition within its context of dominating propositions. Presuppositions, on the other hand, are relative to the speaker. This is shown in Figures 1 and 2. Fig. 1 shows that the presuppositions of P_k are also presupposed by the whole proposition P_O. In Fig. 2 we see that whatever P_O asserts about P_k it also asserts about the SET (see (3) above) of propositions that P_k asserts.

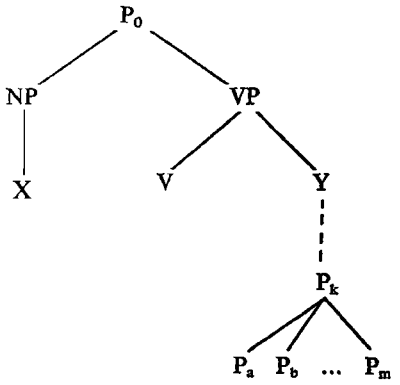
Figure 1:



Redundancy rule:

P_k presupposes P_j

Figure 2:



Redundancy rule:

P_k asserts $\{P_a, P_b, ..., P_m\}$

Let us further exemplify this general claim:

John appears to regret evicting his grandmother

Since *appear* is not factive this sentence neither asserts nor presupposes

John regrets evicting her

However it does presuppose the complement of the embedded factive verb *regret*, as well as the presupposition of *evict* to the effect that he was her landlord.

It does not matter how deeply the factive complement (spaced out) is imbedded:

Abe thinks it is possible that Ben is becoming ready to encourage Carl to acknowledge that he had behaved churlishly

This claim holds for presuppositions other than factivity. We are not obliged to conclude from

John refuses to remain a bachelor all his life

that he plans to undergo demasculating surgery, since *bachelor* asserts *unmarried*, but only presupposes *male* and *adult*. Thus it yields:

John refuses to remain unmarried all his life

but not

John refuses to remain male (adult) all his life

(6) A conjunction of the form S_1 *and* S_2 *too* serves to contrast an item in S_1 with one in S_2 by placing them in contexts which are in some sense not distinct from each other. For instance,

Tigers are ferocious and panthers are (ferocious) too
**Tigers are ferocious and panthers are mildmannered too*

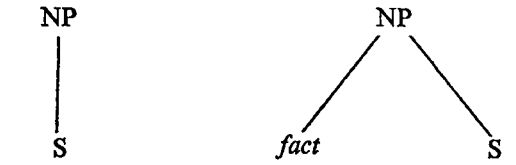
Abstracting away from the contrasting items, S_1 might be said semantically to include S_2. The important thing for us to notice is that the relevant type of inclusion is *assertion*. Essentially, S_2 corresponds to an assertion of S_1. To see that presupposition is not sufficient, consider the following sentences. The second conjunct in each of the starred sentences corresponds to a presupposition of the first conjunct, while in the acceptable sentences there is an assertion relationship.

John deprived the mice of food and the frogs didn't get any either
**John deprived the mice of food and the frogs didn't want any either*
John forced the rat to run a maze and the lizard did it too
**John forced the rat to run a maze and the lizard didn't want to either*
Mary's refusal flabbergasted Ron, and he was surprised at Betty's refusal too
**Mary's refusal flabbergasted Ron and Betty refused too*

3. A HYPOTHESIS

So far, we have presented a set of syntactic-semantic correlations without considering how they might be accounted for. We shall continue by analyzing these facts and others to be pointed out in the course of the discussion, in terms of a tentative explanatory hypothesis, by which the semantic difference between the factive and non-factive complement paradigms can be related to their syntactic differences, and most of the syntactic characteristics of each paradigm can be explained. The hypothesis which we should like to introduce is that presupposition of complements is reflected in their

syntactic deep structure. Specifically, we shall explore the possibility that factive and non-factive complements at a deeper level of representation differ as follows:[7]



Non-factive Factive

[7] It is not quite as simple as this. Consider, for one thing, the sentences:

John's eating them would amaze me
I would like John's doing so

These sentences do not at all presuppose that the proposition in the complement is true. This indicates a further complexity of the FACT postulated in the deep structure of factive complements. Like verbs, or predicates in general, it appears to take various tenses or moods. Note that these correspond to the above sentences:

If he were to eat them it would amaze me
I would like it if John were to do so

These can also be constructed as

If it were a fact that he ate them it would amaze me

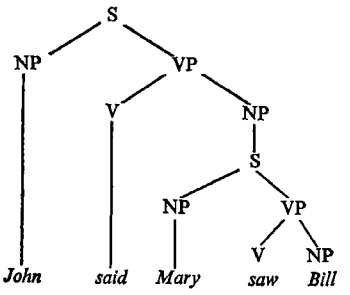
A second over-simplification may be our assumption that sentences are embedded in their deep structure form. A case can be made for rejecting this customary approach in favor of one where different verbs take complements at different levels of representation. Consider direct quotation, which appears not to have been treated in generative grammar. The fundamental fact is that what one quotes are surface structures and not deep structures. That is, if John's words were 'Mary saw Bill', then we can correctly report

John said: 'Mary saw Bill'

but we shall have misquoted him if we say

John said: 'Bill was seen by Mary'

If we set up the deep structure of both sentences simply as



then we have not taken account of this fact. We should be forced to add to this deep structure the

If this interpretation is correct, then closest to the factive deep structure are sentences of the type

I regret the fact that John is ill

The forms in the factive paradigm are derived by two optional transformations: formation of gerunds from *that*-clauses in position after nouns, and deletion of the head noun *fact*. (We do not pause to consider the general rules which take care of the details involving *that* and *of*.) By gerund-formation alone we get

I regret the fact of John's being ill

---

specification that the complement either must or cannot undergo the passive, depending on which of the sentences we are quoting. Since sentences of any complexity can be quoted, to whose deep structures the passive and other optional transformations may be applicable an indefinite number of times, it is not enough simply to mark the embedded deep structure of the quoted sentence as a whole for applicability of transformations. What has to be indicated according to this solution is the whole transformational history of the quoted sentence.

A more natural alternative is to let the surface structure itself of the quoted sentence be embedded. This would be the case in general for verbs taking direct quotes. Other classes of verbs would take their complements in different form. We then notice that the initial form of a complement can in general be selected at a linguistically functional level of representation in such a way that the truth value of the whole sentence will not be altered by any rules which are applicable to the complement. Assuming a generative semantics, the complements of verbs of knowing and believing are then semantic representations. From

John thinks that the McCavitys are a quarrelsome bunch of people

it follows that

John thinks that the McCavitys like to pick a fight

That is, one believes propositions and not sentences. Believing a proposition in fact commits one to believing what it implies: if you believe that Mary cleaned the room you must believe that the room was cleaned. (Verbs like *regret*, although their objects are also propositions, differ in this respect. If you regret that Mary cleaned the room you do not necessarily regret that the room was cleaned).

At the other extreme would be cases of phonological complementation, illustrated by the context

John went '.....'

The object here must be some actual noise or a conventional rendering thereof such as *ouch* or *plop*.

A good many verbs can take complements at several levels. A verb like *scream*, which basically takes phonological complements, can be promoted to take direct quotes. *Say* seems to take both of these and propositions as well.

Are there verbs which require their complement sentences to be inserted in deep structure form (in the sense of Chomsky)? Such a verb *X* would have the property that

John Xed that Bill entered the house

would imply that

John Xed that the house was entered by Bill

but would not imply that

John Xed that Bill went into the house.

That is, the truth value of the sentence would be preserved if the object clause underwent a different set of optional transformations, but not if it was replaced by a paraphrase with another deep structure source. It is an interesting question whether such verbs exist. We have not been able to find any. Unless further search turns up verbs of this kind, we shall have to conclude that, if the general idea proposed here is valid, the levels of semantics, surface structure, and phonology, but not the level of deep structure, can function as the initial representation of complements.

Fact-deletion can apply to this derived structure, giving

I regret John's being ill

If *fact*-deletion applies directly to the basic form, then the simple *that*-clause is formed:

I regret that John is ill

Although this last factive sentence has the same superficial form as the non-factive

I believe that John is ill

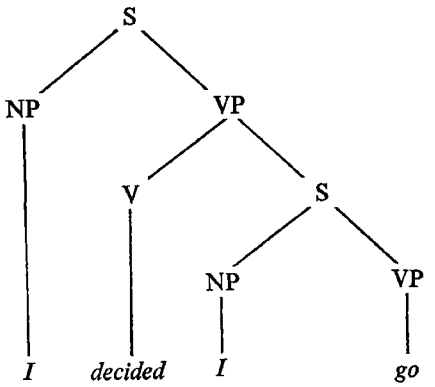
according to our analysis it differs radically from it in syntactic form, and the two sentences have different deep structures as diagrammed above. Simple *that*-clauses are ambiguous and constitute the point of overlap (neutralization) of the factive and non-factive paradigms.

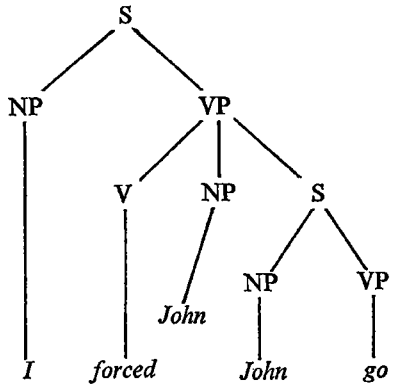
If factive clauses have the deep structures proposed by us, these various surface forms in which factive clauses can appear become very easy to derive. That is one piece of support for our hypothesis. The remaining evidence can be grouped under three general headings:

(1) syntactic insulation of factive clauses (Section 4)
(2) indifferent and ambiguous predicates (Section 5)
(3) pronominalization (Section 6)

4. SYNTACTIC INSULATION OF FACTIVE CLAUSES

Let us first return in somewhat more detail to infinitive constructions, examining first the derivation of infinitives in general and then of the class of infinitive constructions which we mentioned as being characteristic of non-factive predicates. Basic to our treatment of infinitives is the assumption that non-finite verb forms in all languages are the basic, unmarked forms. Finite verbs, then, are always the result of person and number agreement between subject and verb, and non-finite verbs, in particular





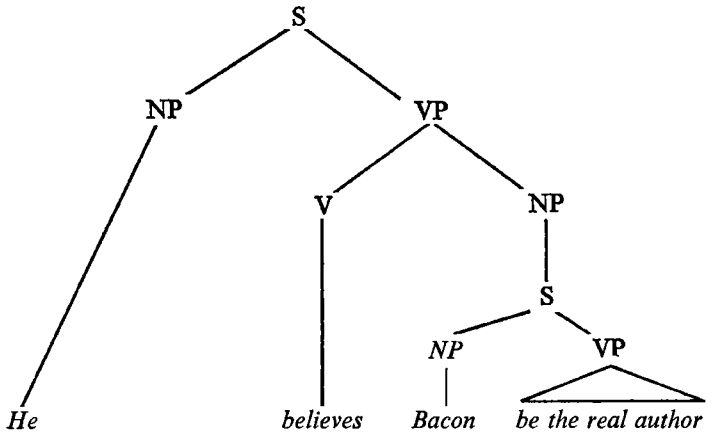
infinitives, come about when agreement does not apply. Infinitives arise regularly when the subject of an embedded sentence is removed by a transformation, or else placed into an oblique case, so that in either case agreement between subject and verb cannot take place. There are several ways in which the subject of an embedded sentence can be removed by a transformation. It can be deleted under identity with a noun phrase in the containing sentence, as in sentences like *I decided to go* and *I forced John to go* (cf., Rosenbaum, 1967).

After prepositions, infinitives are automatically converted to gerunds, *e.g.*, *I decided to go vs. I decided on going*; or *I forced John to do it vs. I forced John into doing it.* These infinitival gerunds should not be confused with the factive gerunds, with which they have in common nothing but their surface form.

A second way in which the subject of an embedded sentence can be removed by a transformation to yield infinitives is through raising of the subject of the embedded sentence into the containing sentence. The remaining verb phrase of the embedded sentence is then automatically left in infinitive form. This subject-raising transformation applies only to non-factive complements, and yields the accusative and infinitive, and nominative and infinitive constructions:

He believes Bacon to be the real author
This seems to be Hoyle's best book

The operation of the subject-raising rule in object clauses can be diagrammed as follows:



The italicized noun phrase is raised into the upper sentence and becomes the surface object of its verb.[8]

[8] This subject-raising rule has figured in recent work under at least three names: pronoun replacement (Rosenbaum 1967); expletive replacement (Langendoen 1966); and *it*-replacement (Ross 1967). Unfortunately we have had to invent still another, for none of the current names fit the rule as we have reformulated it.

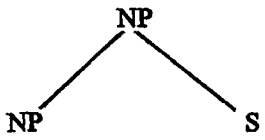
We reject, then, as unsuccessful the traditional efforts to derive the uses of the infinitive from its being 'partly a noun, partly a verb', or, perhaps, from some 'basic meaning' supposedly shared by all occurrences of infinitives. We reject, also, the assumption of recent transformational work (*cf.*, Rosenbaum, 1967) that all infinitives are "*for-to*" constructions, and that they arise from a "complementizer placement" rule which inserts *for* and *to* before clauses on the basis of an arbitrary marking on their verbs. Instead, we claim that what infinitives share is only the single, relatively low-level syntactic property of having no surface subject.

Assuming that the subject-raising rule is the source of one particular type of infinitive complements, we return to the fact, mentioned earlier, that factive complements never yield these infinitive complements. We now press for an explanation. Why can one not say

**He regrets Bacon to be the real author*
**This makes sense to be Hoyle's best book*

although the corresponding *that*-clauses are perfectly acceptable? It is highly unlikely that this could be explained directly by the SEMANTIC fact that these sentences are constructed with factive predicates. However, the deep structure which we have posited for factive complements makes a syntactic explanation possible.

Ross (1967) has found that transformations are subject to a general constraint, termed by him the Complex Noun Phrase Constraint, which blocks them from taking constituents out of a sentence *S* in the configuration



For example, elements in relative clauses are immune to questioning: *Mary* in *The boy who saw Mary came back* cannot be questioned to give **Who did the boy who saw come back?* The complex noun phrase constraint blocks this type of questioning because relative clauses stand in the illustrated configuration with their head noun.

This Complex Noun Phrase Constraint could explain why the subject-raising rule does not apply to factive clauses. This misapplication of the rule is excluded if, as we have assumed, factive clauses are associated with the head noun *fact*. If the optional transformation which drops this head noun applies later than the subject-raising transformation (and nothing seems to contradict that assumption), then the subjects of factive clauses cannot be raised. No special modification of the subject-raising rule is necessary to account for the limitation of infinitive complements to non-factive predicates.

Another movement transformation which is blocked in factive structures in the same way is NEG-raising (Klima, 1964), a rule which optionally moves the element

NEG(ATIVE) from an embedded sentence into the containing sentence, converting for example the sentences

It's likely that he won't lift a finger until it's too late
I believe that he can't help doing things like that

into the synonymous sentences

It's not likely that he will lift a finger until it's too late
I don't believe that he can help doing things like that

Since *lift a finger*, punctual *until*, and *can help* occur only in negative sentences, sentences like these prove that a rule of NEG-raising is necessary.

This rule of NEG-raising never applies in the factive cases. We do not get, for example:

**It doesn't bother me that he will lift a finger until it's too late*

from

It bothers me that he won't lift a finger until it's too late

or

**I don't regret that he can help doing things like that*

from

I regret that he can't help doing things like that

Given the factive deep structure which we have proposed, the absence of such sentences is explained by the complex noun phrase constraint, which exempts structures having the formal properties of these factive deep structures from undergoing movement transformations.[9]

Factivity also erects a barrier against insertions. It has often been noticed that subordinate clauses in German are not in the subjunctive mood if the truth of the clause is presupposed by the speaker, and that sequence of tenses in English and French also depends partly on this condition. The facts are rather complicated, and to formulate them one must distinguish several functions of the present tense and bring in other conditions which interact with sequence of tenses and subjunctive insertion. But it is sufficient for our purposes to look at minimal pairs which show that one of the elements involved in this phenomenon is factivity. Let us assume that Bill takes it for granted that the earth is round. Then Bill might say:

[9] We thought earlier that the oddity of questioning and relativization in some factive clauses was also due to the Complex Noun Phrase Constraint:

**How old is it strange than John is?*
**I climbed the mountain which it is interesting that Goethe tried to climb.*

Leroy Baker (1967) has shown that this idea was wrong, and that the oddity here is not due to the Complex Noun Phrase Constraint. Baker has been able to find a semantic formulation of the restriction on questioning which is fairly general and accurate. It appears now that questioning and relativization are rules which follow *fact*-deletion.

*John claimed that the earth was (*is) flat*

with obligatory sequence of tenses, but

John grasped that the earth is (was) round

with optional sequence of tenses. The rule which changes a certain type of present tense into a past tense in an embedded sentence if the containing sentence is past, is obligatory in non-factives but optional in factives. The German subjunctive rule is one notch weaker; it is optional in non-factives and inapplicable in factives:

Er behauptet, dass die Erde flach sei (ist)
*Er versteht, dass die Erde rund ist (*sei)*

The reason why these changes are in part optional is not clear. The exact way in which they are limited by factivity cannot be determined without a far more detailed investigation of the facts than we have been able to undertake. Nevertheless, it is fairly likely that factivity will play a role in an eventual explanation of these phenomena.[10]

5. INDIFFERENT AND AMBIGUOUS PREDICATES

So far, for clarity of exposition, only predicates which are either factive or non-factive have been examined. For this set of cases, the factive and non-factive complement paradigms are in complementary distribution. But there are numerous predicates that take complements of both types. This is analoguous to the fact that there are not only verbs which take concrete objects and verbs which take abstract objects but also verbs which take either kind. For example, *hit* requires concrete objects (*boy*, *table*), *clarify* requires abstract objects (*ideas*, *fact*), and *like* occurs indifferently with both. Just so we find verbs which occur indifferently with factive and non-factive complements, *e.g.*, *anticipate*, *acknowledge*, *suspect*, *report*, *remember*, *emphasize*, *announce*, *admit*, *deduce*. Such verbs have no specification in the lexicon as to whether their complements are factive. On a deeper level, their semantic representations include no specifications as to whether their complement sentences represent presuppositions by the

[10] This may be related to the fact that (factive) present gerunds can refer to a past state, but (non-factive) present infinitives can not. Thus,

They resented his being away

is ambiguous as to the time reference of the gerund, and on one prong of the ambiguity is synonymous with

They resented his having been away.

But in

They supposed him to be away

the infinitive can only be understood as contemporaneous with the main verb, and the sentence can never be interpreted as synonymous with

They supposed him to have been away.

speaker or not. Syntactically, these predicates participate in both complement paradigms.

It is striking evidence for our analysis that they provide minimal pairs for the subtle meaning difference between factive and non-factive complements. Compare, for example, the two sentences

They reported the enemy to have suffered a decisive defeat
They reported the enemy's having suffered a decisive defeat

The second implies that the report was true in the speaker's opinion, while the first leaves open the possibility that the report was false. This is explained by our derivation of infinitives from non-factives and gerunds from factives. Similarly compare

I remembered him to be bald (so I was surprised to see him with long hair)
I remembered his being bald (so I brought along a wig and disguised him)

Contrast *forget*, which differs from *remember* in that it necessarily presupposes the truth of its object. Although it is logically just as possible to forget a false notion as it is to remember one, language seems to allow for expressing only the latter. We cannot say

**I forgot that he was bald, which was a good thing since it turned out later that he wasn't after all*
**I forgot him to be bald*

There is another kind of case. Just as different meanings may accompany subjects or objects differing by a feature like concreteness, as in

The boy struck$_1$ *me*
The idea struck$_2$ *me*

so verbs may occur with factive and non-factive complements in different meanings. Compare

(a) *I explained Adam's refusing to come to the phone*
(b) *I explained that he was watching his favorite TV show*

In (a), the subordinate clause refers to a proposition regarded as a fact. *Explain*, in this case, means 'give reasons for'. When the object is a *that*-clause, as in (b), it can be read as non-factive, with *explain that S* understood as meaning 'say that S to explain X'. To account for the differences between (a) and (b), we might postulate two lexical entries for *explain* (not denying that they are related). In the entry appropriate to (a) there would be a presupposition that the subordinated proposition is true. This would require a factive complement (recall that the form of the complement has an associated interpretation) in the same way as the two verbs *strike*$_1$ and *strike*$_2$ would receive different kinds of subjects. The entry for (b) would have among its presuppositions that the speaker was not committing himself about the truth of the subordinated

proposition, so that a factive complement would not fit. Thus, the meaning of the complement form is directly involved in explaining its occurrence with particular verbs.

6. PRONOMINALIZATION

The pronoun *it* serves as an optional reduction of *the fact*. It can stand directly before *that*-clauses in sentences with factive verbs:

Bill resents it that people are always comparing him to Mozart
They didn't mind it that a crowd was beginning to gather in the street

Although the difference is a delicate one, and not always clear cut, most speakers find *it* unacceptable in the comparable non-factive cases:

**Bill claims it that people are always comparing him to Mozart*
**They supposed it that a crowd was beginning to gather in the street*

This *it*, a reduced form of *the fact*, should be distinguished from the expletive *it*, a semantically empty prop which is automatically introduced in the place of extraposed complements in sentences like

It seems that both queens are trying to wriggle out of their commitments
It is obvious that Muriel has lost her marbles

Rosenbaum (1967) tried to identify the two and to derive both from an *it* which he postulated in the deep structure of all noun clauses. This was in our opinion a mistake. In the first place, the two *it*'s have different distributions. Expletive *it* comes in regardless of whether a factive or non-factive clause is extra-posed, and does not appear to be related to the lexical noun *fact*, as factive *it* is.

The relationship of factive *it* to the lexical noun *fact*, and its distinction from expletive *it*, is brought out rather clearly by a number of transformational processes. For example, the presence of factive *it* blocks the formation of relative clauses just as the lexical noun *fact* does:

**This is the book which you reported it that John plagiarized*
**This is the book which you reported the fact that John plagiarized*
This is the book which you reported that John plagiarized

But expletive *it* differs in permitting relativization:

That's the one thing which it is obvious that he hadn't expected
**That's the one thing which the fact is obvious that he hadn't expected*

As Ross (1966) has shown, facts like these create seemingly insoluble problems for a system like Rosenbaum's, in which factive and expletive *it* are derived from the same source. We have not proposed an alternative in anything like sufficient detail, but it

is fairly clear that a system of rules constructed along the general lines informally sketched out here, which makes exactly the required syntactic distinction, will not have inherent difficulties in dealing with these facts.

Direct comparison of factive *it* and expletive *it* shows the expected semantic difference. The comparison can be carried out with the verbs which are indifferent as to factivity:

I had expected that there would be a big turnout (but only three people came)
I had expected it that there would be a big turnout (but this is ridiculous — get more chairs)

The second sentence, with *it*, suggests that the expectation was fulfilled, whereas the first is neutral in that respect. On the other hand, expletive *it* adds no factive meaning, and the following sentence is ambiguous as between the factive and non-factive interpretation:

It was expected that there would be a big turnout

This analysis makes the prediction that cases of *it* which cannot be derived from *fact* will present no obstacle to relativization. This is indeed the case:

Goldbach's conjecture, which I take it that you all know ...
The report, which I will personally see to it that you get first thing in the morning ...
This secret, which I would hate it if anyone ever revealed ...

On the other hand, it is not too clear where these *it*'s do come from. Perhaps their source is the "vacuous extraposition" postulated by Rosenbaum (1967).[11]

The deep structures which we have posited for the two types of complements also explain the way in which they get pronominalized. In general, both factive and non-factive clauses take the pro-form *it*:

John supposed that Bill had done it, and Mary supposed it, too
John regretted that Bill had done it, and Mary regretted it, too

But the two differ in that only non-factive clauses are pronominalized by *so*:

John supposed that Bill had done it, and Mary supposed so, too
**John regretted that Bill had done it, and Mary regretted so, too*

These facts can be explained on the basis of the fairly plausible assumptions that *it* is the pro-form of noun phrases, and *so* is the pro-form of sentences. Referring back to the deep structures given in Section 3, we see that the only node which exhaustively dominates factive complements is the node NP. For this reason the only-pro-form for them is the pro-form for noun phrases, namely, *it*. But non-factive complements are exhaustively dominated by two nodes: NP and S. Accordingly, two pro-forms are available: the pro-form for noun phrases, *it*, and the pro-form for sentences, *so*.

[11] Dean (1967) has presented evidence from German and English that extraposition is the general source of expletive pronouns.

7. ADDITIONAL NOTES ON FACTIVITY

We have dealt with the syntactic repercussions of factivity in sentential complementation. This is really an artificially delimited topic (as almost all topics in linguistics necessarily are). Factivity is relevant to much else in syntax besides sentential complementation, and on the other hand, the structure of sentential complementation is naturally governed by different semantic factors which interact with factivity. That is one source of the painful gaps in the above presentation which the reader will surely have noticed. We conclude by listing summarily a couple of possible additional applications of factivity, and some additional semantic factors which determine the form of complements, in order at least to hint at some ways in which the gaps can be filled, and to suggest what seem to us promising extensions of the approach we have taken.

(1) There is a syntactic and semantic correspondence between TRUTH and SPECIFIC REFERENCE. The verbs which presuppose that their sentential object expresses a true proposition also presuppose that their non-sentential object refers to a specific thing. For example, in the sentences

I ignored an ant on my plate
I imagined an ant on my plate

the factive verb *ignore* presupposes that there was an ant on my plate, but the non-factive verb *imagine* does not. Perhaps this indicates that at some sufficiently abstract level of semantics, truth and specific reference are reducible to the same concept. Frege's speculations that the reference of a sentence is its truth value would thereby receive some confirmation.

Another indication that there is a correspondence between truth of propositions and specific reference of noun phrases is the following. We noted in Section 1 that extraposition is obligatory for non-factive subject complements. Compare

That John has come makes sense (factive)
**That John has come seems* (non-factive)

where the second sentence must become

It seems that John has come

unless it undergoes subject-raising. This circumstance appears to reflect a more general tendency for sentence-initial clauses to get understood factively. For example, in saying

The UPI reported that Smith had arrived
It was reported by the UPI that Smith had arrived

the speaker takes no stand on the truth of the report. But

That Smith had arrived was reported by the UPI

normally conveys the meaning that the speaker assumes the report to be true. A non-factive interpretation of this sentence can be teased out in various ways, for example by laying contrastive stress on the agent phrase (*by the UPI, not the AP*). Still, the unforced sense is definitely factive. These examples are interesting because they suggest that the factive *vs.* non-factive senses of the complement do not really correspond to the application of any particular transformation, but rather to the position of the complement in the surface structure. The interpretation can be non-factive if both passive and extraposition have applied, or if neither of them has applied; if only the passive has applied, we get the factive interpretation. This is very hard to state in terms of a condition on transformations. It is much easier to say that the initial position itself of a clause is in such cases associated with a factive sense.

This is which the parallelism between truth and specific reference comes in. The problem with the well-known pairs like

Everyone in this room speaks two languages
Two languages are spoken by everyone in this room

is exactly that indefinite noun phrases such as *two languages* are understood as referring to specific objects when placed initially ('there are two languages such that...'). Again, it is not on the passive itself that the meaning depends. In the sentence

Two languages are familiar to everyone in this room

the passive has not applied, but *two languages* is again understood as specific because of its initial position.

(2) We also expect that factivity will clarify the structure of other types of subordinate clauses. We have in mind the difference between purpose clauses (non-factive) and result clauses (factive), and different types of conditional and concessive clauses.

(3) There are languages which distinguish factive and non-factive moods in declarative sentences. For example, in Hidatsa (Matthews, 1964) there is a factive mood whose use in a sentence implies that the speaker is certain that the sentence is true, and a range of other moods indicating hearsay, doubt, and other judgments of the speaker about the sentence. While this distinction is not overt in English, it seems to us that it may be sensed in an ambiguity of declarative sentences. Consider the statement

He's an idiot

There is an ambiguity here which may be resolved in several ways. For example, the common question

Is that a fact or is that just your opinion?

(presumably unnecessary in Hidatsa) is directed exactly at disambiguating the statement. The corresponding *why*-question

Why is he an idiot?

may be answered in two different ways, *e.g.*,

(a) *Because his brain lacks oxygen*
(b) *Because he failed this simple test for the third time*

There are thus really two kinds of *why*-questions: requests for EXPLANATION, which presuppose the truth of the underlying sentence, and requests for EVIDENCE, which do not. The two may be paraphrased

(a) *Why is it a fact that he is an idiot?*
(b) *Why do you think that he is an idiot?*

8. EMOTIVES

In the above discussion we rejected Rosenbaum's derivation of infinitive complements like

I believe John to have liked Anselm
I forced John to say cheese

from hypothetical underlying forms with *for–to*

**I believe for John to have liked Anselm*
**I forced John for John to say* cheese

This leaves us with the onus of explaining the *for–to* complements which actually occur on the surface:

It bothers me for John to have hallucinations
I regret for you to be in this fix

But once the spurious *for–to*'s are stripped away, it becomes clear that the remaining real cases occur with a semantically natural class of predicates. Across the distinction of factivity there cuts orthogonally another semantic distinction, which we term EMOTIVITY. Emotive complements are those to which the speaker expresses a subjective, emotional, or evaluative reaction. The class of predicates taking emotive complements includes the verbs of emotion of classical grammar, and Klima's affective predicates (Klima, 1964), but is larger than either and includes in general all predicates which express the subjective value of a proposition rather than knowledge about it or its truth value. It is this class of predicates to which *for–to* complements are limited. The following list illustrates the wide range of meanings to be found and shows the cross-classification of emotivity and factivity.

Factive examples	*Emotive*	*Nonemotive*
Subject Clauses	important	well-known
	crazy	clear
	odd	(self-evident)

		Emotive	*Nonemotive*
Subject Clauses		relevant	goes without saying
		instructive	
		sad	
		suffice	
		bother	
		alarm	
		fascinate	
		nauseate	
		exhilarate	
		defy comment	
		surpass belief	
		a tragedy	
		no laughing matter	
Object Clauses		regret	be aware (of)
		resent	bear in mind
		deplore	make clear
			forget
			take into account
Non-factive examples			
Subject Clauses		improbable	probable
		unlikely	likely
		a pipedream	turn out
		nonsense	seem
	future	urgent	imminent
		vital	in the works
Object Clauses		intend	predict
		prefer	anticipate
	future	reluctant	foresee
		anxious	
		willing	
		eager	
			say
			suppose
			conclude

We have proposed that infinitives are derived in complements whose verbs fail to undergo agreement with a subject. In the infinitives mentioned in Section 4, agreement did not take place because the subject was in one or another way eliminated by a transformation. There is a second possible reason for non-agreement. This is

that the subject is marked with an oblique case. There seem to be no instances, at least in the Indo-European languages, of verbs agreeing in person and number with anything else than nominative noun phrases. Good illustrations of this point are the German pairs

Ich werde betrogen (I am cheated)
Mir wird geschmeichelt (I am flattered)
Ich bin leicht zu betrügen (I am easy to cheat)
Mir ist leicht zu schmeicheln (I am easy to flatter)

Presumably the same syntactic processes underlie both sentences in each pair. The accusative object of *betrügen* is changed into a nominative, whereas the dative object of *schmeicheln* stays in the dative. But from the viewpoint of agreement, only the nominative counts as a surface subject.

As the source of *for* with the infinitive we assume a transformation which marks the subjects in complements of emotive predicates with *for*, the non-finite verb form being a consequence of the oblique case of the subject.

We can here only list quickly some of the other syntactic properties which emotivity is connected to, giving an unfortunately oversimplified picture of a series of extremely complex and difficult problems. What follows are only suggestive remarks which we plan to pursue at a later time.

First of all, emotives may optionally contain the subjunctive marker *should*:

It's interesting that you should have said so
**It's well-known that you should have said so*

(We do not of course mean the *should* of obligation or the *should* of future expectation, which are not limited to emotives).

We assume that a future *should* is optionally deleted by a late rule, leaving a bare infinitive:

I'm anxious that he (should) be found
It's urgent that he (should) be found

Emotive complements can be identified by their ability to contain a class of exclamatory degree adverbs such as *at all* or (unstressed) *so*, *such*:

It's interesting that he came at all
**It's well-known that he came at all*

Finally, it seems that one of the conditions which must be placed on relativization by *as* is that the clause be non-emotive although many other factors are certainly involved:

**As is interesting, John is in India*
As is well-known, John is in India

9. CONCLUSIONS

Syntactic-semantic interrelationships of this kind form the basis of a system of deep structures and rules which account for the complement system of English, and other languages as well. The importance of a system successfully worked out along the general lines suggested above would lie in its ability to account not only for the syntactic structure of sentential complementation, but also for its semantic structure, and for the relationship between the two. Our analysis of presupposition in the complement system contributes a substantial instance of the relation between syntax and semantics, and enables us to correct an error which has been made in most past work on transformational syntax. The error is that different types of complements (*that*-clauses, gerunds, infinitives) have all been assumed to have the same deep structure, and hence to be semantically equivalent.[12] We have seen that there is good reason to posit a number of different base structures, each mapped by transformations into a syntactic paradigm of semantically equivalent surface structures. The base structures differ semantically along at least two independent dimensions, which express the judgment of the speaker about the content of the complement sentence.

This approach to a theory of complementation is not only more adequate from a semantic point of view. Its purely syntactic advantages are equally significant. It eliminates the need for marking each verb for compatibility with each surface complement type, that is, for treating complementation as basically irregular and unpredictable. We account for the selection of complement types quite naturally by our proposal that there are several meaningful base structures, whose choice is in large part predictable from the meaning of each predicate. These base structures are subject to various transformations which yield surface structures in which the relation between form and meaning is considerably obscured.

REFERENCES

Baker, Leroy,
1967 "A Class of Semantically Deviant Questions" (unpublished).
Dean, Janet
1967 "Noun Phrase Complementation in English and German" (unpublished).
Klima, Edward S.,
1964 "Negation in English", in: Fodor and Katz, eds., *The Structure of Language* (Englewood Cliffs, N.J., Prentice-Hall).
Langendoen, D.T.,
1966 "The Syntax of the English Expletive 'IT'", *Georgetown University Monograph Series on Languages and Linguistics*, No. 19: 207-216.
Lees, Robert B.,
1960 *The Grammar of English Nominalizations* (The Hague, Mouton).

[12] The studies of Lees (1960) and Vendler (1964), however, contain many interesting semantic observations on sentential complementation and nominalization which still await formal description and explanation.

Matthews, G. H.,
1964 *Hidatsa Syntax* (The Hague, Mouton).
Rosenbaum, P. S.,
1967 *The Grammar of English Predicate Complement Constructions* (Cambridge, Mass., M.I.T.-Press).
Ross, John Robert
1966 "Relativization in Extraposed Clauses (A Problem which Evidence is Presented that Help is Needed to Solve)" (= *Mathematical Linguistics and Automatic Translation*, Report No. NSF-17 to the National Science Foundation, Harvard University, Computation Laboratory).
1967 "Constraints on Variables in Syntax" (Unpublished dissertation, M.I.T.).
Vendler, Zeno,
1964 "Nominalizations" (Mimeographed, University of Pennsylvania).