Some Aspects of Neg-Raising in English:
Toward an Interpretive Principle

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0. Introduction

The rule of so-called 'Neg-Raising' (henceforth, NR) has been heatedly discussed as to its status as a syntactic rule. In Fillmore (1963) and R. Lakoff (1969),[1] it is semantically and syntactically argued that NR is a transformational rule which moves up the negative (or NEG) out of the complement clause to the matrix clause, maintaining the alleged synonymity relation between sentences before and after the application of NR (Sec. 1. 1). For example, consider the following sentences:

(1) a. I think that John didn't claim the existence of NR.
    b. I don't think that John claimed the existence of NR.

Although NEG is found in the complement of (1a) and in the matrix of (1b), sentences (1a) and (1b) are claimed to be equivalent in meaning and to be NR-related.

Bolinger, Jackendoff (1971) and others,[2] however, cast doubt on the status of NR as a transformational rule by pointing out that the pair (1a) and (1b) are not perfectly synonymous, which contradicts Katz-Postal hypothesis (Sec. 1. 2). Since a more principled study of the questionable status of NR is made in Section 3, we will not dwell upon it here any further.

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1 See Klima (1964) and Carden (1973) for other (syntactic) arguments for NR.

2 See Cattell (1973), Iwakura (1974) and Ota (1980) for other arguments against NR.

Whatever force these arguments for or against NR considered above may have, at least the following statements will be established:

(2) a. NR is proposed as a minor rule which applies only to a small number of verbs like those of thinking, opinion, perception, etc.. (Sec. 2. 1)

　　 b. NR is considered to apply to sentences whose matrix verbs belong, in general, to those of the nonfactive class (Sec. 2. 1; verbs of the mid-scalar class), or modals, which stand for mood in common (Sec. 2. 2).[3]

Here, we assume consistently that 'mood' is a formal manifestation of modal structure or context (modality) expressed in a sentence.

Thus, this paper is concerned with some aspects of the alleged NR phenomena, and attempts to give a unified account of them in the course of the discussion. The section that immediately follows will be devoted to a critical review of previous arguments both for and against the existence of NR, thus centering around its status as a transformational rule. The second section will illustrate a syntactic and semantic characterization of modal verbs that may seem to be subject to NR and their correlation with mood or modality. Lastly in Section 3, I will attempt to demonstrate that the NR rule cannot be a syntactic one of the grammar of English, proposing Negative Penetrability Principle which is descriptively preferable to NR in that the former can account for a wider range of the syntactic and semantic phenomena.

In the ensuing discussion, I will examine some interactions of NR and modal verbs in English in the following fashion:

3　Traugott (1972: P. 98-103) refers to how strongly NEG is associated with a subjunctive mood in nonfactives with respect to Old English: "A negative environment almost always triggers a subjunctive in nonfactives." (P. 101)

(3) NR and Modal Verbs (MV) in English

    a.   NP+MV [X−NEG−Y] comp.

    b.   NP+NEG+MV [X−Y] comp.

    c.   MV: those that take *that*-the complements

1. Previous Studies

This section will critically review some major arguments both for and against the putative rule of NR. In the course of the discussion, both syntactic and semantic arguments about the validity of NR as a transformational rule will be expounded in each subsection (Sec. 1.1 and 1.2).

1.1. Arguments for Neg-Raising

At the very outset, let us make a brief review of what we know so far about the putative rule of NR. This rule was first discussed by Fillmore (1963:P.220) to explain the alleged paraphrase relationship between the pair in sentences like (4) and (5). For instance, observe the following sentences:

(4)   I believe that John won't come

(5)   I don't believe that John will come.

Sentence (5), as it is claimed, is ambiguous in the following two readings:[4]

(5a)   I believe that John won't come.

(5b)   It is not the case that I believe that John will come.

In one reading, (5) is synonymous with (5a): I actively disbelieve the claim that John will come. In the other reading, it means (5b): I make no commitment to the claim that John will come.[5]

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    4 According to Jackendoff (1971 : P.291), many informants do not find (5) ambiguous; their reaction is to interpret (5) in a vaguely non-committal sense.

    5 Jackendoff (1971:P.290) interprets (5a) in a committal sense and (5b) in a non-committal sense.

Now, the rule that presumably derives sentence (5) in the former reading (5a) from a common underlying structure which is similar to sentence (4) is known as the NR rule, which optionally moves up to the matrix clause the NEG particle generated in the complement clause.

Furthermore, as already mentioned in the introductory section, NR is restricted to sentences whose matrix verbs are those of a limited set such as *think* and *suppose* (verbs of belief), *seem* (verbs of perception) and *likely* (verbs of probability).[6] For a detailed discussion of the characterization of such verbs, the reader should refer to Subsection 2.1.

Characteristically, it is also claimed that NR is a cyclic rule. For example,

(6)　I don't think that he wants me to think that he did it.

sentence (6) is claimed to involve cyclicity, in which NEG must originate in the deepest clause "he did it," is assumed to be raised first to the second deepest clause "me to think" (I think) and then to the next higher clause "he wants" and finally to the topmost (matrix) clause, as exemplified below:[7]

(6′)
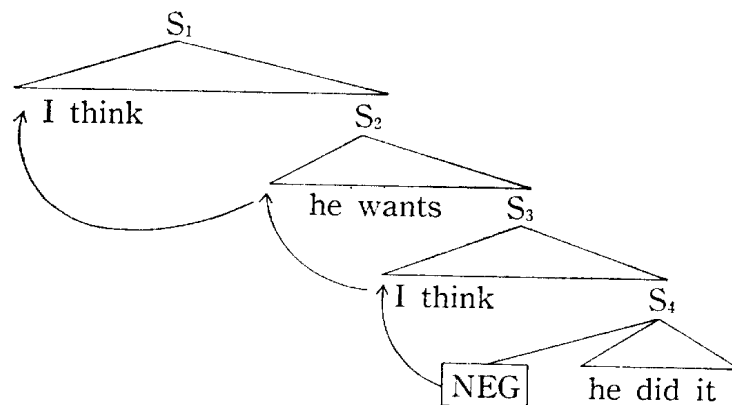
6　See Horn (1978:P. 187) for the classification of verbs that undergo NR.
7　See Fillmore (1963:P. 220) and Horn (1978:P. 130).

The semantically motivated argument mentioned just above appears to be not necessarily satisfactory for positing the existence of NR, which must be therefore justified syntactically as further support to the semantic grounds. Note in this regard that the main syntactic arguments for NR are mostly related to its interactions with tag questions and negative polarity items.

One of the most influential syntactic arguments for NR is given by R. Lakoff (1969). Her argument revolves around the formation of tag questions based on the "performative" hypothesis. Consider the following examples which she uses:[8]

(7) a. I don' suppose the Yankees will win, will they?

    b. *I don't suppose the Yankees will win, won't they?

    c. *I don't suppose the Yankees will win, do they?

Note first of all that the tag-question formation is generally defined on a top-most sentence in the surface structure.[9] However, as shown by the grammaticality of (7a), as opposed to (7b) and (7c), the fact that the positive tag is formed on the complement clause leads us to posit its underlying structure containing NEG in the complement, at which stage the opposite-polarity positive tag is formed. And after the application of the tag-question formation, NEG is raised into the top-most (or matrix) clause by virtue of NR. R. Lakoff further claims that not only the seemingly paradoxical fact in (7) but also the following examples are explicable naturally by assuming the performative interpretation of the matrix verb *suppose*, as in (8):

(8) a. *He doesn't suppose the Yankees will win,

$$\left\{ \begin{matrix} \text{will} \\ \text{won't} \end{matrix} \right\} \text{they?}$$

b. *I didn't suppose the Yankees will win,

$$\left\{ \begin{array}{l} \text{would} \\ \text{wouldn't} \end{array} \right\} \text{they?}[10]$$

c. John doesn't think the Yankees will win, does he?

The ungrammaticality of (8a) and (8b) correctly predicts that they are no longer interpreted as "performative," because (8a) is assigned the third person subject and (8b) the past tense.[11] By the same token, the grammaticality of (8c) can be easily accounted for by assuming the following underlying structure:

(9)
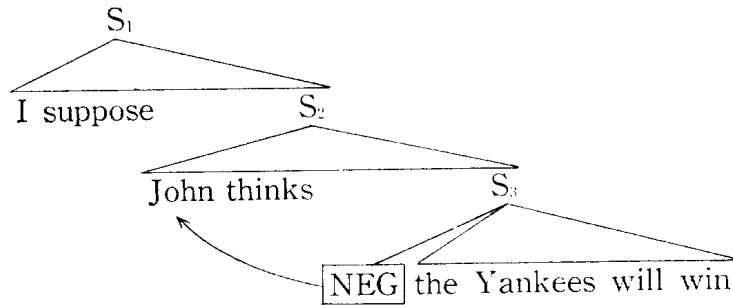
As is clear in (9), sentence (8c), which the performative abstract verb *suppose* underlies, is derived first by raising NEG from the lowest clause S_3 into the next highest clause S_2 by NR, and then tag-question formation applies on the S_2 cycle.[12] On the S_1 cycle, NR, then, does not apply, because *suppose* is not a real verb but a performative abstract verb.

In the next subsection, I will show that R. Lakoff's syntactic argument and analysis based on the formation of tag questions cannot prove the validity of NR and the performative hypothesis.

Another syntactic evidence to argue for NR is concerned with the question of "negative polarity items." Consider the following sentences:

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10 Sentences (8a) and (8b) are taken from Horn (1978:P.154).

11 According to Austin (1962), performative verbs are so called when used in the first person and nonpast tense.

12 R. Lakoff (1969:P.145) : Tag-question formation precedes NR in a cycle.

(10) a. *John will leave until tomorrow.

     b. John won't leave until tomorrow.

This evidence involves the possibility of using *until*-phrase with punctual verbs such as *leave* and *realize*: that is, the ungrammaticality of (10a) is ascribable to the fact that the nondurative *until* is restricted to clauses containing NEG. Let us examine how the following sentences behave with respect to the above feature of the *until*-phrase, as shown by (11) and (12).[13]

(11) a. I believed that John wouldn't leave until tomorrow.

     b. I didn't believe that John would leave until tomorrow.

(12) a. I claimed that John wouldn't leave until tomorrow.

     b. *I didn't claim that John would leave until tomorrow.

Some transformational grammarians such as Klima (1964) and G. Lakoff (1970), in their attempts to account for the alleged paraphrase relationship that holds between the (a)-(b) pair in sentences like (11) and (12), claim in this respect that (11b) is to be derived from its underlying sentence (11a) by moving up NEG, which originates in the complement, to the matrix, since (10a) is ungrammatical. The ungrammaticality of (12b), on the other hand, is illustrative of the fact that since sentences (12) involve matrix verbs that do not undergo NR, NEG in (12a) cannot move to the matrix clause by NR.

Hence, if we do not admit the existence of NR, we would have to impose some complicated constraints on *until*-phrase otherwise. I will show that the aforementioned argument cannot cope with some possible problems in Section 1.2.

1.2. Arguments against Neg-Raising

13   Examples (11) and (12) are from G. Lakoff (1970:P.148-149).

I turn now to an examination of the semantic argument based on the alleged 'synonymity' in the foregoing subsection. Let us refer back to the previous sentences (4) and (5) and consider them :

(13) a.　I believe that John won't come. (=4)

　　 b.　I don't believe that John will come. (=5)

Remember that the main semantic argument for NR mentioned above rested mostly on the observation that pairs of sentences like (13) are synonymous.

At first glance, this argument seems to be persuasive. However, it is pointed out by Bolinger that the status of NR as a transformational rule is dubious in that the pair (13a) and (13b) are not perfectly synonymous, which contradicts Katz-Postal hypothesis to the effect that transformations cannot change meaning. By the 'non-synonymity,' Bolinger means that when the negative occurs in the higher (i. e. matrix) clause,[14]

there is greater uncertainty in the speaker's mind about the negation in the lower sentence.

(Bolinger, quoted in R. Lakoff (1969))

In this connection, Bolinger (1977:P. 38) gives the contrasting pair in corroboration of his aforementioned claim, as shown by (14):

(14) a.　*I think he doesn't like it, maybe he does, but I think not.

　　 b.　I don't think he likes it, maybe he does, but I don't think so.

According to Bolinger, the *maybe* attached to *likes* in (14b) vis-

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14　Poutsma (1928: P. 105), in fact, anticipated Bolinger's remark, stating that "the shifting of *not* often has the effect of softening down the negativing of a sentence."

a-vis (14a) produces no contradiction, just because NEG is not attached to *likes* in the complement, but to *think* in the matrix.

In what follows, I will next examine the syntactic arguments for NR based on the formation of tag questions in R. Lakoff (1969) and on the interaction with negative polarity items in Klima (1964) and G. Lakoff (1970).

To begin with, let us consider R. Lakoff's syntactic argument which was based on the two approaches: tag-question formation and performative hypothesis. In her crucial sentences,

(15)　a.　I suppose the Yankees won't win, will they?

　　　b.　I don't suppose the Yankees will win, will they?
　　　　(=7a)

R. Lakoff calls *suppose* a performative in (15), but it seems quite questionable whether verbs like *suppose* and *think* are performatives in the same sense as *name* and *pronounce*. Compare (15) with (16) involving true performative verbs:

(16)　a.　I (hereby) *name* this ship 'Hercules.'

　　　b.　I (hereby) *pronounce* you man and wife.

In accordance with Austin's (1962:P.6) definition, such verbs as *name* and *pronounce* in (16) are correctly regarded as performatives in the sense that the performance is achieved through the act of naming and pronouncing. In the case of *think* and *suppose* in (15), however, Cattell (1973:P.621) questions their status as a performative by saying that nothing is performed by the act of thinking and supposing.[15]

15　Notice that the placement of 'hereby' is a useful device that helps to distinguish between a performative and a nonperformative utterances. (cf. Cattell (1973:P.621) and Horn (1978:P.154))

　　(i)　a.　*I hereby think that the Yankees will win.

　　　　b.　*I hereby suppose that John will come back soon.

Even if NR-triggering verbs such as *think* and *suppose* are in fact performatives, as Cattell argues, the status of a verb as an NR-trigger is neither a necessary nor a sufficient condition for its complement to be taggable.[16] Observe the apparently NR-related pairs, which are not paraphrases, in sentences like (17) and (18) below:

(17) a.　I'm sure that's not right, is it?
　　　b.　I'm not sure that's right, is it?
(18) a.　I know that it's not very important, is it?
　　　b.　I don't know that it's very important, is it?

Here, much heed must be paid to the fact that despite the involvement of verbs (insensitive to NR) such as *be sure* and *know*, the positive tag is formed on the complement of sentences (17) and (18). (Note that the distinction between verbs sensitive and insensitive to NR will be made clear in Section 2.1.)

Jackendoff (1971) objects that R. Lakoff's solution to such complement tags should create some possible difficulties as follows:

(19) a.　I $\left\{\begin{array}{l} *\text{think} \\ ?*\text{believe} \end{array}\right\}$ they won't win, will they?

　　　b.　I don't $\left\{\begin{array}{l} \text{think} \\ ?\text{believe} \end{array}\right\}$ they'll win, will they?[17]

As shown by (19), such verbs as *think* and *believe* are successfully substituted for *suppose* in (15), which gives rise to the considerably less acceptable underlying sentence (19a), as contrasted with (19b). As a matter of fact, these substitutes are among verbs that may undergo NR. Jackendoff thus contends that for R. Lakoff's analysis to be correct, (19b) is to be derived from the virtually unacceptable sentence (19a) by the optional rule of NR, and

16　See Cattell (1973:P.623).
17　See Jackendoff (1971:P.294-295).

that to say that *think* and *believe* trigger the obligatory NR only in this context leads to a loss of generality.

Moreover, the optional NR rule seems to be unable to handle the following sentence after the application of NR.

(20) John doesn't think that Bill didn't go. [18]

Suppose what must be an underlying sentence that derives (20), which would have to be:

(21) [John think [NEG Bill didn't go]].

But since NR is defined as an optional rule, if (21) does not undergo NR, an ungrammatical surface form would be generated as in (22).

(22) *John thinks that Bill didn't not go.

The observations that Cattell and Jackendoff have made can lead us to assume that R. Lakoff's argument and analysis are untenable with respect to the status of NR as a transformational rule.

Last of all, I will move on to argue that the negative polarity argument for NR based on an *until*-phrase is also considerably weakened when the acceptability of the following sentences is taken into consideration:[19]

(23) a. I didn't realize that I had to do it until tomorrow.
     b. I realized that I didn't have to do it until tomorrow.
(24) a. I didn't claim that I'd finish the paper until Friday.
     b. I claimed that I wouldn't finish the paper until Friday.
(25) a. I can't believe that he'd take the exam until he's ready.
     b. I can believe that he wouldn't take the exam until he's ready.

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18 According to Jackendoff (1971:P. 290), sentence (18) means that John thinks that Bill went (committal sense).

19 Examples (23), (24) and (25) are from Lindholm (1969:P. 153).

Recall that this polarity argument is contingent upon the acceptability of (25a) involving such NR-triggering verbs as *think* and *believe,* but on the unacceptability of (23a) and (24a) involving such non-NR-triggering verbs as *claim* and *realize.* However, the fact is that *until* is successfully triggered by NEG on the matrix even in (23) and (24). This really means that, as Lindholm (1969:P. 153) and Horn (1975:P.282) pointed out, many native speakers can force a grammatical reading for at least (23a) and (24a) in which a negative implication (or negativity strength) is strongly conveyed.[20] (cf. Sec. 3.1)

Consequently, there seems no reason to postulate that sentences (23a) and (24a) can hardly be derived from (23b) and (24b), respectively, by NR, since the nonclausemate negation can trigger an *until*-phrase; the pairs in sentences like (23) and (24) are not clearly paraphrases, though.

2. A Characterization of Neg-Raising

In this section, I will be concerned primarily with a syntactic and semantic characterization of NR verbs and their correlation with mood under the assumption that there is a rule of NR. Throughout the following discussion, I wish to point out in a rather revealing fashion that there is a strong relationship between NR and mood (or modality).

2.1. Neg-Raising and Mid-Scalar Hypothesis

Let us begin by considering what is semantically characteristic of verbs that may seem to be sensitive to NR. The semantic characterization of modal elements and their relation to NR is discussed in some detail by Horn (1975, 1978), in which he incorporates what he refers to as "mid-scalar hypothesis" into his arguments about NR, as illustrated in (26):

20　See Horn (1978:P. 143-150).

(26)

		Mid-Scalar Preds.	
possible	believe, suppose	know, realize
able	likely, probable	sure, certain
←-WEAK--	seem, appear	necessary
--STRONG-→	should, ought to	must, have to
may, might	be supposed to	obligatory
can, could	be desirable	need
allow, let	be advisable	make, cause
permit	want, choose	demand, insist

(Horn (1975:P. 288, 1978:P. 194))

This scale table indicates the relationship between modal elements relevant and those irrelevant to NR on a strength scale in which epistemic (belief- and knowledge-based) and deontic (obligation - and permission-based) predicates are mutually superimposed. Here, by Mid-Scalar hypothesis, he means that it is modal elements in the mid-scalar position of (26) that are qualified for membership in the NR club. In other words, modal elements in the weaker and stronger positions, that is, those on either end of the scale, are forced to exclude NR. Note in this respect that modal elements, he thinks, contain modal verbs (or predicates) as well as modal auxiliaries.

Horn (1978) maintains further that modal elements in the mid-scalar position can be divided into a variety of semantic classes as follows:[21]

(27) a. [BELIEF/OPINION]: think, believe, suppose, expect, etc.

a'. [PERCEPTION]: seem, appear, look like, etc.

b. [PROBABILITY]: be likely, be probable, etc.

c. [INTENTION/VOLITION]: want, intend, choose, etc.

c'. [JUDGMENT/(WEAK)OBLIGATION]: be supposed, should, etc.

21 See Horn (1978:P. 187).

Note in this connection that since the present study is arbitrarily limited to modal verbs taking *that*-complements and their interaction with NR, the account of modals taking infinitive complements and modal auxiliaries as in (27c) and (27c') is beyond the scope of our study and shall be precluded from the ensuing discussion.

A closer examination of these semantic classes reveals that what is common to most of the alleged NR verbs in (27a), (27a') and (27b) is that they belong to the class of "nonfactive" as opposed to that of "factive." It is well known that the distinction between nonfactives and factives was originally made clear by Carol and Paul Kiparskys (1971), who claimed that the former differ from the latter in the presupposition involved; that is, only factive verbs presuppose the complement. For instance, compare the following examples involving nonfactive verbs in the mid-scalar position with those involving factive verbs such as *know* and *regret*:[22]

(28) *Nonfactive*

a. I *think* that Santa Claus came last night.
(Belief Verbs)

b. It *seems* that my father came home drunk yesterday. (Verbs of Perception)

c. It *is likely* that the Prime Minister carried out a reshuffling of his cabinet.
(Verbs of Probability)

(29) *Factive*

a. I *know* that Santa Claus came last night.

b. Bill *regrets* that the Prime Minister carried out a reshuffling of his cabinet.

(30) a. Santa Claus came last night.

b. The Prime Minister carried out a reshuffling of his

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22 As pointed out by Hooper and Thompson (1973) and Hooper (1975), factive verbs can be divided into two types; semifactive (eg. *know*) and true factive (eg. *regret*), which will be touched upon in some detail in the next subsection.

cabinet.

Following the line of the Kiparskys, Hooper and Thompson (1973) and Hooper (1975) further elaborate upon such 'factive'/'nonfactive' dichotomy, stating that verbs of the factive class in sentences like (29) can be used with the presupposition of the truth of their *that*-complements, i.e. (30a) and (30b),[23] whereas in sentences (28a), (28b) and (28c), those of the nonfactive class cannot be accompanied by such a presupposition. The observation that the 'factive'/'nonfactive' distinction depends upon the presupposition is syntactically justified by the fact that negation in the matrix clause, for example, does not affect the presupposition expressed in the complement clause.[24] Observe the following examples:

(31) *Nonfactive*

   a. I *think* that Santa Claus came last night, but in fact he didn't.

   b. It *seems* that my father came home drunk yesterday, but in fact he didn't.

   c. It *is likely* that the Prime Minister carried out a reshuffling of his cabinet, but in fact he didn't.

(32) *Factive*

   a. *I *know* that Santa Claus came last night,
     but in fact he didn't.

   b. *Bill *regrets* that the Prime Minister carried out a reshuffling of his cabinet, but in fact he didn't.

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23 It is interesting to note that there are two types of presupposition; (a) of the speaker's and (b) of the subject's. For example,

   (i) a. Harry regrets that Janet is going away.
       b. Harry knows that Janet is going away.

In (ia), both the speaker and the subject regard the complement of *regret* as true, but in (ib), the speaker believes that Janet is going away; but there is none of the presupposition that the subject, *Harry*, believes it. (Cattell (1973:P.629))

24 In the Kiparskys (1971:P.362), further evidence is given to show that only nonfactives are pronominalized by *so*.

As is evident from the contradiction in (32), in contrast to (31), we cannot negate the complement clauses in (32) that sentences (29a) and (29b) presuppose to be true.[25] On the other hand, the grammaticality of each of the sentences in (31) actually stems from the speaker's uncertainty about the truth of the proposition expressed by the complement.

On the basis of the facts thus presented, together with Horn's arguments (if assumed to be valid), the following is tentatively established:

(33)　The putative NR rule is triggered by modal verbs of the nonfactive class which are characterized by the speaker's uncertainty about the truth of the complement.

It should be noted in (33) that NR is not necessarily triggered by such modal verbs as *possible* and *certain* in the weaker and stronger positions, respectively, simply because they belong to the nonfactive class.[26] The crucial difference in the applicability of NR between nonfactive verbs in the mid-scalar and those in the weaker and the stronger is related to the possibility of their occurrence or nonoccurrence with "negative polarity items" as follows:

(34)　*Negative Polarity Items*
　　i)　*lift a finger*
　　　　a.　Japan hasn't lifted a finger to help Indochinese refugees.
　　　　b.　*Japan has lifted a finger to help Indochinese refugees.
　　ii)　*until*
　　　　c.　Mary will not leave until after the show.
　　　　d.　*Mary will leave until after the show.

25　The observation as seen in (31) and (32) is made by Morgan (1969) and Yamanashi (1977:Chap. 4).

26　According to Hooper and Thompson (1973) and Hooper (1975), the difference between *possible* and *certain* lies in their assertiveness: the former is marked by "nonassertive," the latter is by "strong assertive."

(35) *Nonfactive in the Mid-Scalar*

A. *Verbs of Belief*

   a. I think that Japan hasn't lifted a finger to help Indochinese refugees.

   b. I don't think that Japan has lifted a finger to help Indochinese refugees.

   c. I think that Mary will not leave until after the show.

   d. I don't think that Mary will leave until after the show.

B. *Verbs of Perception*

   a. It seems that Japan hasn't lifted a finger to help Indochinese refugees.

   b. It doesn't seem that Japan has lifted a finger to help Indochinese refugees.

   c. It seems that Mary will not leave until after the show.

   d. It doesn't seem that Mary will leave until after the show.

C. *Verbs of Probability*

   a. It is likely that Japan hasn't lifted a finger to help Indochinese refugees.

   b. It isn't likely that Japan has lifted a finger to help Indochinese refugees.

   c. It is likely that Mary will not leave until after the show.

   d. It isn't likely that Mary will leave until after the show.

(36) *Nonfactive in the Weaker*

   a. It is possible that Japan hasn't lifted a finger to help Indochinese refugees.

   b. *It isn't possible that Japan has lifted a finger to help Indochinese refugees.

   c. It is possible that Mary will not leave until after the show.

d. *It isn't possible that Mary will leave until after the show.

(37)　*Nonfactive in the Stronger*

a. It is certain that Japan hasn't lifted a finger to help Indochinese refugees.

b. *It isn't certain that Japan has lifted a finger to help Indochinese refugees.

c. It is certain that Mary will not leave until after the show.

d. *It isn't certain that Mary will leave until after the show.

As shown by (34), such lexical items as *lift a finger, until* (in a nondurative sense), etc.[27] appear only in a syntactic environment which is negative. It is of prime importance to notice that although such modal verbs as *possible* and *certain* belong to the nonfactive class just as those in the mid-scalar, the (a) — (b) and (c) — (d) pairs in (36) and (37), as they differ in behavior from those in (35), are no longer related by NR because (36b, d) and (37b, d) are ungrammatical in that the above polarity items never occur in the scope of *not possible* in (36) and *not certain* in (37).

To recapitulate, the above-mentioned statement of (33) will be slightly modified as follows:

(38)　The putative NR rule is triggered by modal verbs of the nonfactive class in the mid-scalar position which are characterized by the speaker's uncertainty about the truth of the complement.[28]

27　There are some other negative polarity items which can be roughly classified into adverbs (eg. *any more, ever, next to, a red cent*) and verbs (eg. *budge, drink a drop, bat an eye*).

28　Strikingly, such verbs as *say*, though not in the nonfactive class, can even trigger NR if they are used in *modal* contexts like "would say." (cf. quoted in Ota (1980:P.526))

(i)　A:　Do you think Sally is pregnant?

B:　I wouldn't say she is.

(=I would say she isn't.)

Admittedly, Horn's mid-scalar hypothesis is far from fully validated; nonetheless, we shall continue to assume in this paper that his hypothesis, alongside the line of (38), is basically adequate except for him to argue for the transformational rule of NR (cf. Sec. 3).

2.2. Neg-Raising and Mood

I will turn to look rather closely at how the aforementioned nonfactive verbs, i. e. those putatively subject to NR, correlate with mood or modality.

A strong correlation between the NR verbs and mood or modality gains support from both semantic and syntactic considerations. Semantically, they are, just as modal auxiliaries such as *may, should,* etc., characterized as reflecting the speaker's judgment or attitude in asserting the proposition in a sentence. As far as modal auxiliaries are concerned, there seems no room for doubt about the fact that they correlate with mood or modality. Traugott's (1972:P. 98) pertinent remark in this regard may bear out such a semantic assumption:

> The "indicative," in contrast to the subjunctive, is a verbal inflection associated with facts that have occurred, are occurring, or are sure to occur. Indicative is therefore typical of factive complements, whereas the subjunctive is typical of many nonfactives.

The important thing to note here is that the "indicative" and the "subjunctive" mood is associated with factive complements marked by factive predicates and nonfactives marked by nonfactive predicates, respectively.

A syntactic criterion that helps to relate the NR verbs to mood or modality has to do with the possibility of whether they behave equally as modal auxiliaries and modal adverbs, since mood is defined as a formal manifestation of modal structure expressed in a sentence. For instance, observe first how modal

auxiliaries interact with negation, as in (39).

(39) a. *Mary [may not] have been scolded by the master yesterday.

b. Mary may [not have been scolded by the master yesterday].

c. It is possible that Mary was not scolded by the master yesterday. (=39b)

The fact that (39a), as such, is ruled out can be accounted for by the assumption that the epistemic modal, *may*, is by no means negated. It should also be pointed out that it is because such modal auxiliaries as *may* are directly followed by the present perfect form in (39a, b) that they can be unambiguously interpreted as "epistemic." As illustrated by (39b), however, the proposition is under the scope of negation, but *may* is outside its scope, which yields the grammaticality of (39b). Note here that (39c) is a paraphrase of (39b).

Likewise, we conjecture that the NR verbs, in their turn, bear a strong resemblance to modal auxiliaries, as shown by the following examples involving verbs of thinking (eg. *think*, *suppose*) and perception (eg. *seem*):

(40) a. I don't {think / suppose} that Ann moved to Piccadilly a month ago.

b. I {think / suppose} that Ann didn't move to Piccadilly a month ago.

c. I {think / suppose} that it is not the case that Ann moved to Piccadilly a month ago.

(41) a. It doesn't seem that Ann moved to Piccadilly a month ago.

b. It seems that Ann didn't move to Piccadilly a month ago.

c. It seems that it is not the case that Ann moved to Piccadilly a month ago.

As might be expected from such NR sentences as (40) and (41), the negation of the matrix clause in (40a) and (41a) does not negate the act of thinking and supposing, but the content or proposition of thinking and supposing, that is, the complement clause in the scope of negation as in (40b) and (40b). This suggests that these verbs are in fact transparent to their negative force, where the same behavior can be seen as modal auxiliaries.

Next, the association of the NR verbs with mood or modality in question can be borne out according to whether adverbs of modality, modal adverbs, such as *probably*, *evidently*, etc. cooccur or not within *that*-complements which these verbs can take.[29] Let us compare sentences (42) with the NR verbs and sentences (43) with such factive verbs as *regret*, *be sorry*, etc. as follows :

(42) *Neg-Raising Verbs*

a. I $\begin{Bmatrix} think \\ suppose \end{Bmatrix}$ that George *probably* lost his mind.

b. It seems that this pregnant woman *probably* called me a thief.

(43) *Factive Verbs*

a. *I *regret* that George *probably* lost his mind.

b. *This pregnant woman *is* *sorry* that she *probably* called me a thief.

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29 See Kajita (1967 : P. 58-79) for a detailed observation on the distribution of sentence adverbials in embedded sentences. He lists five types of sentence adverbials, in which sentence adverbials of modality correspond to the modal adverbs in question; eg. *apparently*, *possibly*, *certainly*, *presumably*, *clearly*, *undeniably*, *likely* and *undoubtedly* (P. 61).

In view of the difference in grammaticality between (42) and (43), it is clear that while modal adverbs like *probably* are allowed to occur freely in the *that*-complements which these NR verbs take, in the case of factive verbs in (43), however, no modal adverbs can occur in their factive complements. This suggests that the NR verbs at issue are far more likely to function as those of mood or modality.

What is to be noticed in this regard is that not all the factive verbs actually behave in the same manner as we have just mentioned above. Such factive verbs as *know* and *realize*, for example, are the case in point as in (44):

> (44) a.　I *know* that George *probably* lost his mind. [30]
>
> b.　I *realize* that this pregnant woman *probably* called me a thief.

In order to clarify this issue, we think it is necessary to subdivide the factive verbs in question. It seems that Karttunen's (1971) observation for that matter, lends itself to the differentiation between them; that is, true factive verbs (eg. *regret, be sorry*, etc.) and semifactive verbs (eg. *know, realize*, etc.). According to Karttunen, the latter (semifactives), unlike true factives, can lose their factivity in modal contexts such as Conditionals as shown below:

> (45)　*Semifactive*
>
> If I {know / realize} later that I had not told the truth, I will
>
> confess it to everyone; but I'm sure about it right now.

> (46)　*True Factive*

---

*If I $\begin{Bmatrix} \text{regret} \\ \text{am sorry} \end{Bmatrix}$ later that I had not told the truth,

I will confess it to everyone; but I'm sure about it right now.[31]

With respect to verbs of the semifactive class, as distinct from those of the true factive class in (46), we can assert sentence (45) without any contradiction.[32] Accordingly, that semifactive verbs lose their factivity in the above modal context leads us to the tentative assumption that, in comparison with true factive verbs, semifactive verbs are more likely to function to some degree as verbs of modality.

To sum up, then, the following classification of the verbs, factive or nonfactive, taking *that*-complements under discussion is captured with respect to the varying degrees of modality as in (47):

(47)　　　Modal Auxs　↑　stronger modality

　NR　Nonfactive
　　　(mid-scalar)

　　　Semifactive　↓　weaker modality
　　　True Factive

3.　An Alternative Approach to Neg-Raising Account

In the preceding section, we have characterized the putative rule of NR in terms of mood or modality, working on the tentative assumption that there is such a rule. In the remaining discussion, I will concentrate on demonstrating that NR cannot be a syntactic and transformational rule of the grammar of English.

Toward this end, our approach rests, at least partially, on

31　This test is due to Hooper and Thompson (1973: P. 137) and Yamanashi (1977: P. 103).

32　For other syntactic tests distinguishing semifactives from true factives (eg. Complement Preposing, Root Transformations, etc.), see Hooper and Thompson (1973) and Hooper (1975).

Bolinger's and Jackendoff's arguments against NR on their semantic and syntactic bases (Sec. 1.2). In addition to their considerations, we will have to seek a more unified alternative account; i.e. Negative Penetrability Principle, which will be primarily investigated in the subsequent sections.

3.1.　Negative Penetrability Principle

As a possible approach to arguing against the existence of NR, we can claim that under a wide range of NR phenomena, the pair of a sentence before and after the application of NR are uniformly related regardless of the varying degrees of 'negativity strength' of a complement clause. For example, if a semifactive verb like *know* is involved in a pair, the pair is in no way related by virtue of NR. On the other hand, if Horn's mid-scalar verbs such as *think, seem, likely*, etc. are involved in the alleged NR pair, the pair become uniformly NR-related without regard to the 'negativity strength' of a complement clause: this is because NR is a transformational rule.

Thus, our claim hinges crucially on the justification for the 'negativity strength' of a complement clause. Namely, I will show that the following two types of negativity are valid, as represented in (48a-b) below:
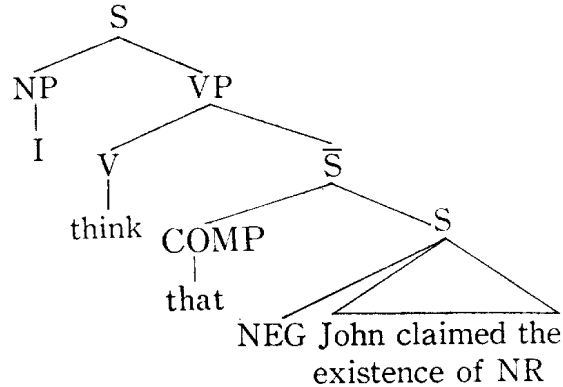
(48)　Unmarked Negativity vs. Marked Negativity
　　a.　Unmarked Negativity: $NP + MV + [X - NEG - Y]$ comp.
　　b.　Marked Negativity: $NP + \underline{NEG} + MV + [X - Y]$ comp.
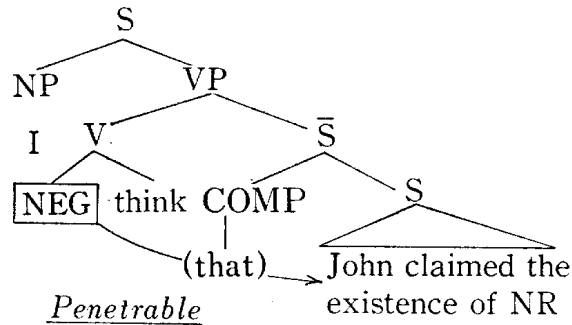　　　　　　　　　　　　　　└─penetrable─┘
　　　　　　　　　　　　　　　(≠ raising)
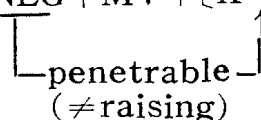
More specifically, I propose to argue empirically that these two types of negativity, if they apply to sentence (1), are respectively ascribed to the distinct underlying structures schematized in (49a) and (49b):

(49)   a.   Unmarked Negativity

b.   Marked Negativity

In sentences like (49a), where NEG stands in the 'neutral' complement position, the complement invariably conveys a greater degree of negativity strength than that of (49b), which is characterized as Unmarked Negativity.[33] On the other hand, the complement in (49b), where NEG stands in the matrix position, is penetrable, to a weaker degree, by NEG on the matrix. More generally, the negativity strength of a complement, or negative penetrability into a complement——the degree to which a complement is penetrable by NEG on a matrix——varies according to types of verbs which can take *that*-complements. That is what we mean by Marked Negativity.[34] Thus, the difference between

33 The negativity strength in (49a), as already noted by Sheintuch and Wise (1978: P. 549), is greater than that in (49b) simply because in (49b), there is a greater degree of uncertainty in the speaker's mind about the negation of the state of affairs in the complement.

34 Essentially, ours seems to be compatible with Ota's (1980: P. 516-41) argument in that NR is characterized as a *marked* process.

Marked and Unmarked Negativity concerns the degrees of negativity strength.

What is most essential for our argument is based on the demonstration that if the varying degrees of negativity strength, or the varying negative penetrability does exist in the grammar of English, the status of NR as a transformational rule should be relentlessly rejected. I maintain further that Negative Penetrability Principle may be best handled by an interpretive rule as it is initiated by Jackendoff (1972).

Bearing this principle in mind, let us now proceed to its substantial discussion. Specifically, I believe that the following syntactic or semantic tests will contribute to the creation of the varying negative penetrability in question:

(50)　T_1 : Truth-Value Reversal (cf. Sec. 2.1)
　　　T_2 : Negative Polarity Items
　　　T_3 : Tag-Question Formation

In the rest of this section, I will briefly mention that these three tests lend their support to the characterization of negative penetrability. The first test, T_1, has to do with whether the truth-value of a complement clause is reversed or not by NEG on a matrix clause ; that is, in order to illustrate how penetrable a complement is by NEG on a matrix, its truth-value has to be reversed, i.e. become false. More concretely, the negative penetrability into a complement is measured by the possibility of reversing its truth-value. This test is, in a sense, compatible with Horn's mid-scalar hypothesis in that NR-triggering verbs are also characterized by the speaker's uncertainty about the truth of a complement (cf. Sec. 2.1, (38)).

The other two tests, T_2 and T_3, are utilized to examine whether NEG on a matrix can penetrate the barrier of the complementizer *that*, and to what degree its complement clause is penetrable by NEG as well (cf. Sec. 1 and 2). In the next

subsection, I will endeavor to argue in favor of Negative Penetrability Principle at some length.

3.2. An Argument for Negative Penetrability

Having elucidated the nature of negative penetrability, I will go on to probe the varying negative penetrability by the application of the aforementioned tests to various types of *that*-complement clauses.

To do this, I will non-arbitrarily choose the following five types of verbs (or predicates), factive or non-factive, that can take *that*-complements for discussion:

(51) *Nonfactive*

    a. Type A: *Raising Verbs* (Verbs of Opinion and Perception)[35]

           think, believe, suppose, expect, seem, appear, etc.

    b. Type B: *Full Nonfactive Verbs*

           be likely, be possible, doubt,

           deny, be unlikely, be impossible, etc.

    c. Type C: *Direct Discourse Verbs*[36]

           say, claim, report, tell, ask, explain, etc.

(52) *Factive*

    d. Type D: *Semifactive Verbs*

           know, realize, remember, find out, discover, etc.

    e. Type E: *True Factive Verbs*

           regret, be sorry, resent, forget, be odd, be strange, etc.

These five types of verbs (or predicates) can be well supported by the Kiparskys (1971), Karttunen (1971), Hooper and Thompson (1973) and Hooper (1975): First, it is needless to point out the

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35 See Horn (1975, 1978) and Section 2.1 of this paper.
36 Kuno (1975)

fact that at least two types of factive/nonfactive verbs are distinguishable with respect to the possibility of involving presupposition (cf. Sec. 2.1), and that factive verbs are divided into two types (Type D, Type E) in terms of the presence or absence of factivity in modal contexts (cf. Sec. 2.2). Recall here that Type D (Semifactive) is more likely to function as a kind of modality than Type E (True Factive). Yet, the division of nonfactive verbs into three types (Type A, Type B, Type C) merits a brief inspection.

According to Hooper and Thompson (1973) and Hooper (1975), the nonfactive verbs in question can be divided into two types, depending on the possibility of containing assertion; assertive verbs (Type A, Type C) and nonassertive verbs (Type B).[37] In addition, assertive verbs are divided into 'weak' assertive verbs (Type A) and 'strong' assertive verbs (Type C).[38] In this study, we assume that Type A ('weak' assertive) is characterized by the function of what we call *Raising Verbs*, since they show the same behavior as verbs of opinion and perception (cf. Sec. 2.1), and that Type C ('strong' assertive) and Type B (nonassertive) are respectively characterized by their functions of what we call *Direct Discourse Verbs* (cf. Kuno (1975)) and *Full Nonfactive Verbs*. Note that verbs of Type B are so called because they only lack the total amount of assertion in the nonfactive class. Further motivations for the three types of nonfactive verbs are not directly relevant to the present study, so we will not discuss them any more.

We are now in a position to advance our argument in favor of negative penetrability. As mentioned earlier, the vary-

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37　The evidence for assertive/nonassertive distinction is concerned with the applicability of Root Transformations and Complement Preposing. (cf. Hooper (1975))

38　The 'weak'/'strong' distinction is evidenced by the applicability of Tag-Question Formation from complement clauses.

$$\frac{\text{WA} \mid \text{OK}}{\text{SA} \mid *} \quad \left\{ \begin{array}{l} \text{subject=first—person sg.} \\ \text{tense=simple present} \end{array} \right\} \text{condition}$$

ing negative penetrability is measured by applying the foregoing tests to the *that*-complement clauses which these five types of verbs can take: For example, which type of verbs is characterized as that of more penetrability or that of less penetrability, and so forth.

Let us begin with the T_1 first in such a way as raised in Section 2. 1.

(53) a. Her husband didn't *think* that the door was locked, but in fact it was locked.

b. It wasn't *likely* that the door was locked, but in fact it was locked.

c. Her husband didn't *say* that the door was locked, but in fact it was locked.

d. ?Her husband didn't *know* that the door was locked, but in fact it was locked.

e. *Her husband didn't *regret* that the door was locked, but in fact it was locked.

As shown by (53), all nonfactive clauses (53a-b-c) can be asserted without any contradiction, while (53e) with a true factive clause is totally rejected as contradictory and (53d) involving a semifactive clause is more or less odd. This observation suggests that if a matrix clause predicated by a verb of the nonfactive class is negated, the truth-value of its complement clause is reversed. The opposite case is with verbs of the factive class whose complement clauses are not penetrable by NEG on a matrix clause.

Furthermore, I will give another truth-value dependent test which also applies for confirmation about the truth of a complement. This test is characterized by the possibility of adding a clause that finishes a sentence with a negated matrix verb.[39] Observe the following examples:

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39   This test is taken from Hooper and Thompson (1973).

(54) a. John didn't *think* that his wife was ill, but he thought that his only daughter was ill.

b. ?It wasn't *likely* that his wife was ill, but it was likely that his only daughter was ill.

c. John didn't *say* that his wife was ill, but he said that his only daughter was ill.

d. John didn't *know* that his wife was ill, but he knew that his only daughter was ill.

e. *John didn't *regret* that his wife was ill, but he regretted that his only daughter was ill.

It should be observed in (54e) and (54b) that the negated sentences involving *regret* (Type E) and *likely* (Type B) give us so 'finished' an impression that they refuse to add a clause that finishes them. This means that the complement is not penetrable at all in (54e), and that the degree to which the complement in (54b) is penetrable is not so clear, in view of the result in (53) together. However, this is not the case with (54a), (54c) and (54d), semantically 'unfinished,' where NEG on the matrix casts doubt on the truth of the complement.[40] It is thus found that their complement clauses are more or less penetrable by NEG on the matrix clauses.

The next set of sentences examine the cooccurrence possibility with the T$_2$, Negative Polarity Items.

(55) a. I don't *suppose* that the American elite lifted a finger to speak Japanese during his stay in Japan.

b. It isn't *likely* that the American elite lifted a finger to speak Japanese during his stay in Japan.

c. *?I don't *claim* that the American elite lifted a finger to speak Japanese during his stay in Japan.

d. *I don't *realize* that the American elite lifted a

40　The remark that the negated sentences in (52b-e) are given the impression 'finished' and those in (52a-c-d) the impression 'unfinished' is made by Hooper and Thompson (1973:P. 142).

finger to speak Japanese during his stay in Japan.

  e. *I am not *sorry* that the American elite lifted a
finger to speak Japanese during his stay in Japan.

Recall that such polarity items as *lift a finger* appear only in a syntactic environment which is negative (cf. Sec. 2.1). Thus, the ungrammaticality of (55c) involving *claim* (Type C) as well as (55d-e) involving such factive verbs as *realize* and *be sorry* (Type D and Type E, respectively) can be accounted for most naturally by assuming that the complement clauses are not penetrated by NEG on the matrix.

Finally, we are concerned with the T_3, Tag-Question Formation.

  (56) a.   I don't *believe* that Kate spoke Basque,

$\begin{Bmatrix} \text{*don't I/*do I} \\ \text{*didn't she/}\textit{did she} \end{Bmatrix}$?

     b.   It isn't *likely* that Kate spoke Basque,

$\begin{Bmatrix} \text{*isn't it/is it} \\ \text{?didn't she/*}\textit{did she} \end{Bmatrix}$?

     c.   John didn't claim that Kate spoke Basque,[41]

$\begin{Bmatrix} \text{*didn't he/did he} \\ \text{*didn't she/*}\textit{did she} \end{Bmatrix}$?

     d.   John didn't *find out* that Kate spoke Basque,

$\begin{Bmatrix} \text{*didn't he/did he} \\ \text{*didn't she/*}\textit{did she} \end{Bmatrix}$?

     e.   It isn't *strange* that Kate spoke Basque,

$\begin{Bmatrix} \text{*isn't it/is it} \\ \text{*didn't she/*}\textit{did she} \end{Bmatrix}$?

Note first of all that the italicized tag questions in (56); that is, whether the positive tag is formed on a *that*-complement

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41   Even if verbs of Type C are used in the first person of the present tense, a tag question may be formed from the matrix clause. Observe the following sensences (taken from Hooper and Thompson (1973:P.133)):

  (i) a.   I claim that deep structures are green, $\begin{Bmatrix} \text{*aren't they} \\ \text{don't I} \end{Bmatrix}$?

     b.   I say that Hannah is the best wrestler, $\begin{Bmatrix} \text{*isn't she} \\ \text{don't I} \end{Bmatrix}$?

clause or not, are directly relevant to the present argument. As illustrated above, (56a) differs quite clearly from the other sentences in that although the tag normally mirrors the subject and auxiliary of a top-most (or matrix) clause, in sentence (56a) alone the subject of the tag is taken from its complement clause. More importantly, the absence of NEG from the tag in (56a) can be explained straightforwardly by assuming that the complement is most penetrable by NEG.

The above findings of these tests are recapitulated in (57):

(57)

tests types	T_1		T_2	T_3
Type A	OK	OK	OK	OK
Type B	OK	?	OK	*
Type C	OK	OK	*?	*
Type D	?	OK	*	*
Type E	*	*	*	*

A close examination of (57) shows that the distributions of OK's and stars constitute a rather hierarchical 'squish,'[42] though the actual situation is not so clear-cut.[43] Thus, Type A stands all the tests, while Type E behaves just the other way around. Type B fails to pass only the T_3, which is probably caused by the 'nonassertive' nature inherent in this type of verbs. Finally, Type C indicates the same behavior as Type D in that both types succeed in passing only the T_1. From this observation, it follows that Type A is the most penetrable, whereas Type E is the least penetrable.

We now arrive at the hierarchy of the varying negative

42　Our conclusion as in (57) is related to Ross' (1973) theory of non-discrete grammar.

43　Our attempt to incorporate this fuzzier theory (i. e. non-discrete grammar) into our argument is largely based on Ross (1973) and Kageyama (1976).

penetrability for the five types of verbs (or predicates) as in (58):

(58) *Negative Penetrability Hierarchy*

more◄—————————penetrable—————————————►less

Type A ＞ Type B ＞ Type C ＞ Type D ＞ Type E

We conclude that Negative Penetrability Principle will allow us to capture the varying degrees of negativity strength of complement clauses which cannot be accounted for by the transformational rule of NR.

4. Summary

After critically examining [some major arguments both for and against NR (cf. Sec. 1), we have attempted the characterization of the putatively NR-triggering modal verbs, which proved to be strongly correlated with mood or modality (Sec. 2.2). In so doing, Horn's mid-scalar hypothesis was shown to be basically useful in characterizing modal verbs sensitive to NR; that is, verbs of the nonfactive class in the mid-scalar position (Sec. 2.1).

Finally we have argued against NR as a transformational rule (Sec. 3). It turned out then that Negative Penetrability Principle, an interpretive principle in the sense of Jackendoff (1972), has greater descriptive adequacy in handling a wide range of the syntactic and semantic phenomena involving the varying degrees of negativity strength exhibited by various types of complement clauses.

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