AN ACCOUNT OF ENGLISH "MAY" BASED ON A POSTULATE OF MODAL LOGIC

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Sentences with the auxiliary "may" have readings of both permission and possibility (Case I, e.g. John may come) or only possibility (Case II, e.g. John may want to come) or only permission (Case III, e.g. May I come?). In some of the Case II sentences, the exclusion of the permission reading seems to parallel the unacceptability of the corresponding sentences with "I permit ...":

1(a) It's possible John may come. (=possibility, ≠permission)
1(b) It's possible John is coming.
1(c)* It's possible I permit John to come.

2(a) John may want to come. (= possibility, ≠permission)
2(b) It's possible John wants to come.
2(c)* I permit John to want to come.

3(a) John may be coming. (= possibility, ≠permission)
3(b) It's possible John is coming.
3(c)* I permit John to be coming.

4(a) John may have come. (= possibility, ≠permission)
4(b) It's possible John has come.
4(c)* I permit John to have come.

From 1(c),2(c),3(c)&4(c) it can be seen that there are restrictions on what can co-occur with "permit", or at least with the predicate underlying "permit". Let PERM be the three-place predicate (PERM(a,b,S) where b occurs in S in certain ways irrelevant here ≡ a permits b to do x, where S = b does x) which figures in the restrictions on possible phrase-markers needed to account for the unacceptability of the (c) sentences above. A natural way to explain the presence or absence of one of the readings is to suppose two homophonous lexical items - may $_{PERM}$, which is inserted for the predicate PERM (as "I permit ..." also can be),

and may $_{POSS}$, which is inserted for the predicate POSS, like "It's possible that ..." can be (cf. the discussion of transitive and intransitive "may" in Ross (1969)). POSS(S) = It is possible that S. Thus the "may" in the (a) sentences above must be may $_{POSS}$, since general restrictions on the distribution of PERM (as evidenced in the (c) sentences but not investigated here) make it impossible for may $_{PERM}$ to be inserted in these sentences.

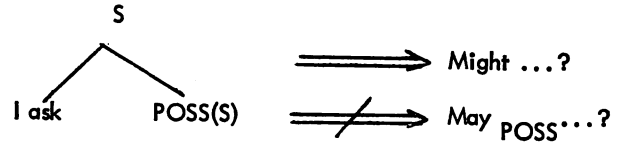
Similarly, there are Case III sentences where the difficulty of the possibility meaning matches the strangeness of the corresponding sentences with "It is possible ...", e.g.

5(a) You may come. (= permission, ?= possibility)
5(b) I permit you to come.
5(c) ? It is possible that you come.

Thus there are sentences in which the reading of possibility or permission is excluded because restrictions on possible phrase-markers limit the distribution of the predicates PERM and POSS. But there are sentences in which the reading of possibility is excluded and yet there are no restrictions on POSS in the corresponding phrase-marker. This is the case in interrogatives and antecedents of conditionals :

6(a) John may come. (=permission, =possibility)
6(b) May John come? (=permission, $\neq$ possibility)
6(c) Might John come?
6(d) Is it possible that John is coming?

Presumably, 6(c) and (d) have as their source a tree like the following :



Similarly, the exclusion of the possibility reading in 7(a) can not be due to an inadmissable underlying structure, as is shown by the possibility of 7(b) :

7(a) If John may come, Harry would be happy. (=permission, $\neq$ possibility)
7(b) If John were to come, Harry would be happy.

The facts about the distribution of the meanings of "may" are elusive but I believe they are explicable if one makes use of a meaning-postulate relating the predicates PERM and POSS.

The meaning-postulate needed has the form

PERM (a,b,S) POSS(S)

The postulate follows immediately from the explication of PERM given in Lakoff (1972)[1]. In ordinary language it means "If a permits b to do x, then it's possible that b will do x". The possibility arising from the implication from PERM must not be equated with the possibility of the pre-supposition to PERM which might be rendered as "It's possible for b to do x" (POSS(B,S)). The POSS(S) of the implication is a one-place predicate which is true when PERM(a,b,S) is true and about which nothing follows when PERM(a,b,S) is false; the POSS(a, S) of the pre-supposition is a two-place predicate which must be true when PERM(a,b,S) is either true or false. To see the difference between POSS(S) and POSS(b,S) compare

If I give permission for John to come, then it follows that John will come. (POSS(S))

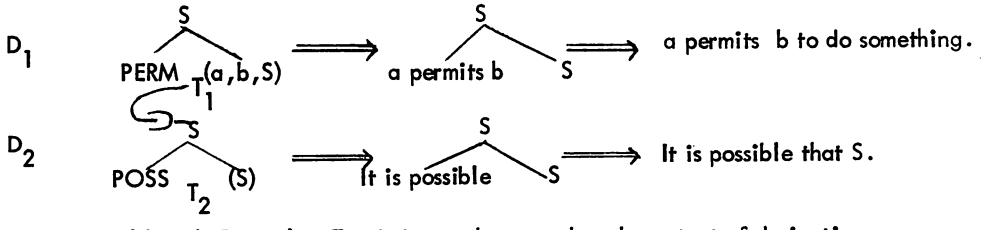
If I do not give my permission for John to come, then nothing can be concluded about POSS(S).

If I give permission for John to come, then it must have been possible for John to come, e.g. he must have transport. (POSS(b,s))

If I do not give my permission for John to come, it must still have been possible for John to come. (POSS(b,S))

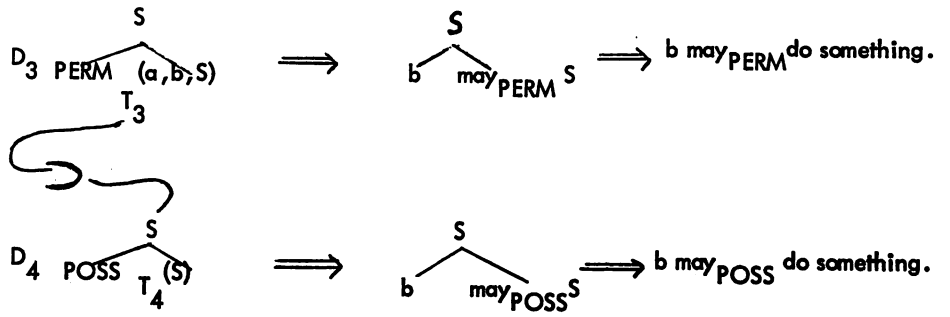
The postulate provides us with a second source for POSS(S). Let us look at assertional, interrogative, and conditional sentences to see if any conditions must be placed on invoking this postulate.

Assertional structures. Given A B. Once A has been asserted, it follows that B is true; in general, A does not also mean B.



Although T_1 implies T_2, it is not the case that the output of derivation D_1 (a permits b to do something) has two meanings, represented by T_1 and T_2. D_1 has only the meaning of T_1, although it implies the truth of the output of D_2.

But now compare the corresponding derivations in which may$_{PERM}$ and may$_{POSS}$ are inserted :

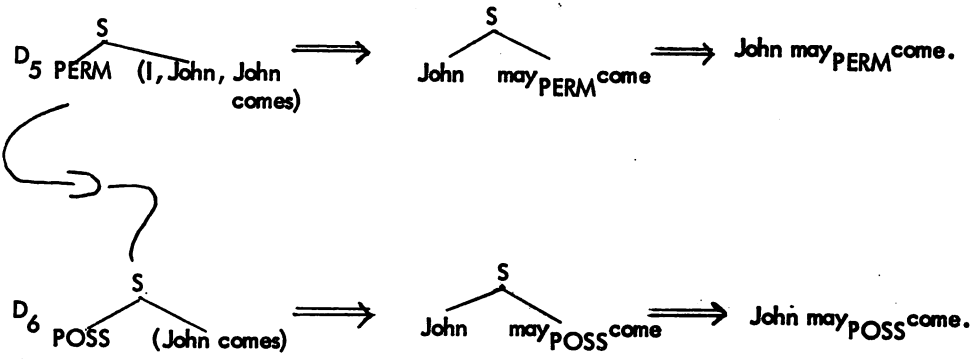


Now the utterance of the output of D_3 is identical to the utterance of the output of the implied D_4. That is, in uttering the output of D_3 I am necessarily also uttering the output of D_4.

Apparently what we have is a transderivational constraint :

In assertional structures, if there is a derivation D_1 with the initial phrase-marker containing PERM(a,b,S) and a later phrase-marker with may $_{PERM}$ inserted for PERM, then there is another derivation D_2 with an initial phrase-marker containing POSS(S) and a later phrase-marker where may $_{POSS}$ has been inserted for POSS (except where there are general constraints on the distribution of POSS in phrase-markers (as for example in "You may come").) Furthermore the utterance of the output of D_1 is identical to the utterance of the output of D_2.

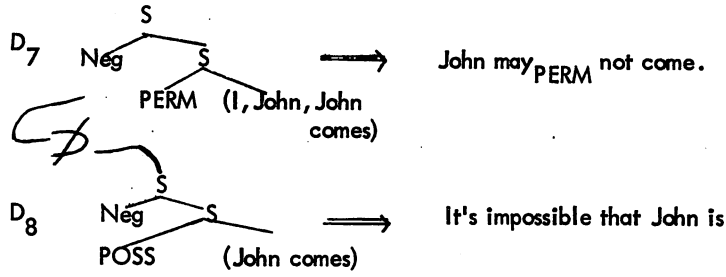
In this way we can interpret the dual reading of "John may come" as follows :



Note that the postulate does not allow ~POSS(S) to be inferred from ~PERM(a,b,S) :

$$\begin{array}{ccc} PERM(a,b,S) & \supset & POSS(S) \\ \sim PERM(a,b,S) & \not\supset & \sim POSS(S) \end{array}$$

"John may not come" does not imply "It is impossible that John is coming" :

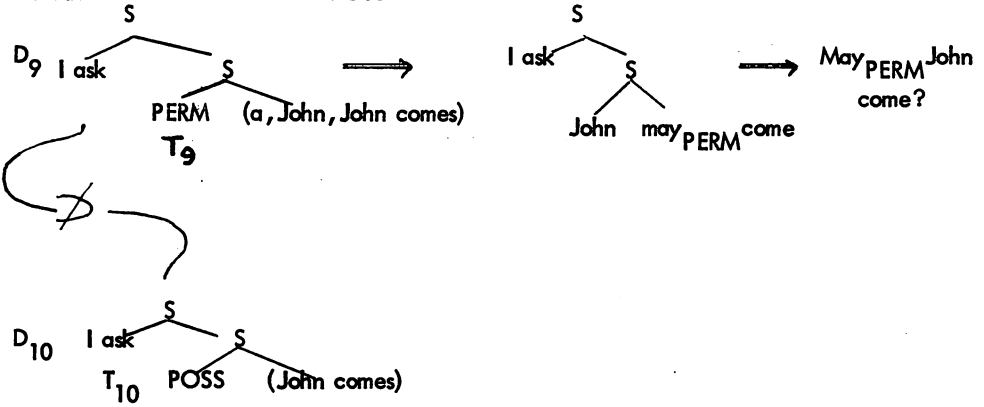


All the postulate allows us to say is that we can not rightly conclude anything about POSS(S). And to say POSS(~S) is about as close as one can get to saying just this - without being trivial. The constraint therefore is consistent with the reading of "It's possible that John is not coming" for "John may not come".

Interrogative structures. Given A⊃B. If I question A, then the answer I receive might tell me something about B, but it does not follow that I am questioning B. Consider (8) :

(8) If Harry sings a song, Sue will dance.

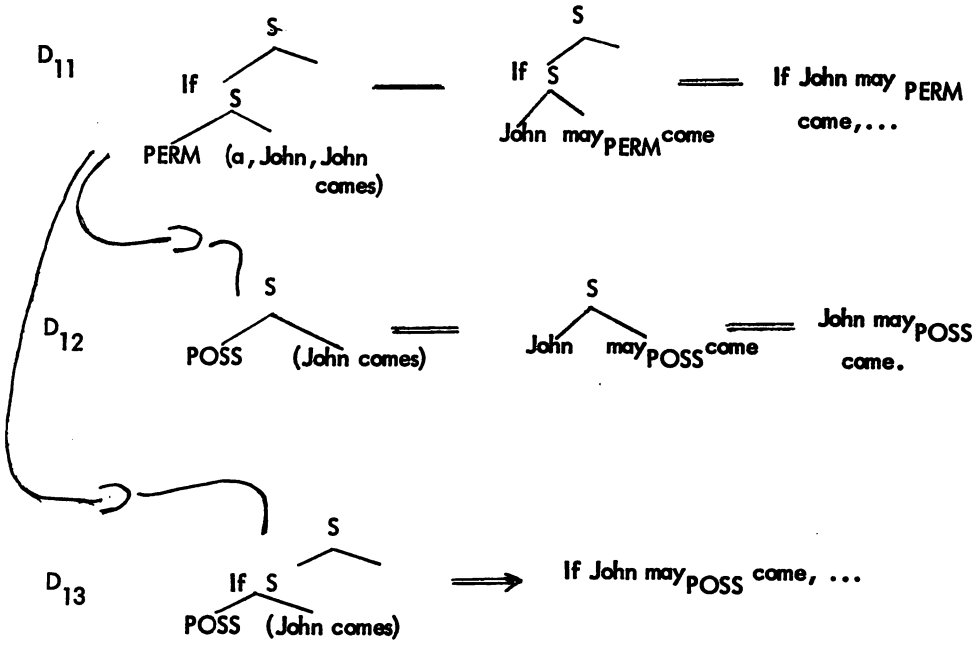
If I ask "Will Harry sing a song?", then a yes-answer will tell me something about Sue, having accepted the implication in (8). A no-answer to "Will Harry sing a song?" does not imply a no-answer to "Will Sue dance?". That is, in asking "Will Harry sing a song?", it does not follow that I ask "Will Sue dance?". Hence "May John come?", derived from may_{PERM}, does not imply "May_{POSS} John come?"



We are not saying that T_{10} is not a well-formed tree; of course it is. We are only saying here that a derivation of "May_{POSS} John come?" from T_{10} does not follow from D_9.

Thus, the transderivational constraint may not be invoked in interrogative structures.

Conditional structures. Given A⊃B. If I suppose A, it follows that B is the case. It does not follow that I also suppose B. Again consider (8). If I suppose that Harry will sing a song, I can conclude on the basis of (8) that Sue will dance. I can not go on to suppose Sue will dance when I already accept as true that Sue will dance. Hence, a derivation of "If John may come, ..." from PERM does not imply a derivation from POSS of "If John may_{POSS}come, ...":



D_{11} does imply D_{12}, but the output of D_{12} (John may_{POSS}come) is not identical to the output of D_{11} (If John may_{PERM} come, ...). One can not argue here, as one could with assertional structures, that in uttering the output of D_{11} I am necessarily uttering the output of D_{12}.

Thus, because of general facts about implication in language (namely, that the interrogative of an antecedent does not imply the interrogative of the consequent and that supposing the antecedent does not imply supposing the consequent), we can rule out the transderivational constraint in the case of interrogative and antecedent structures.

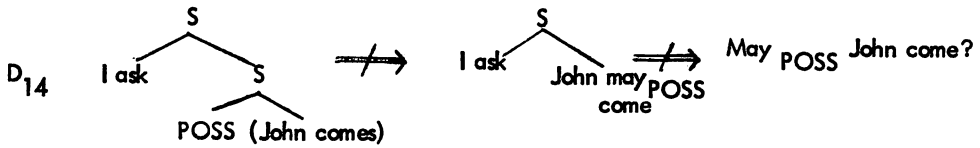
To summarise we have :

A lexical item, may_{PERM}, which is substituted for the predicate PERM.

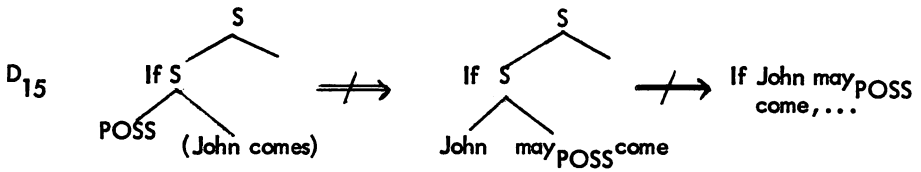
A lexical item, may_{POSS}, which is substituted for the predicate POSS.

A transderivational constraint, based on the meaning-postulate PERM(a,b,S)⊃POSS(S), which is operative on assertional structures.

We have not shown why may_{POSS} can not be freely substituted for POSS as in D_{14} and D_{15}.



(cf. Might John come?)



(cf. What if John might come!)

Apparently, may_{POSS} has the same distribution as the implication of the transderivational constraint. It is as though the transderivational implication also holds between meanings for a lexical item in the dictionary. In the syntax, we have :

S. Given a derivation with PERM⇒may_{PERM}, there is another derivation with POSS⇒may_{POSS} in assertions.

In the dictionary :

L. Given the dictionary entry "may" with meaning PERM, there is another meaning POSS in assertions.

But note how the nature of the implication differs in the syntax and the dictionary, for S is more precisely S' and L is more precisely L' :

S = S' (Given a derivation with PERM⇒may_{PERM}, there is another derivation with POSS⇒may_{POSS}) in assertions.

L = L' Given the dictionary entry "may' with meaning PERM, (there is another

meaning POSS in assertions).

As a consequence of L', D_{14} and D_{15} are inadmissable derivations. That a transderivational constraint based on a meaning-postulate should be so reflected in the dictionary meanings of a lexical item is not astonishing; it is less clear why the bracketings should be different in S' and L'.

In summary,

> Case I sentences allow the dual reading because the initial phrase-marker contains PERM and there is a second derivation proceeding from POSS (by virtue of a transderivational constraint).
>
> Case II sentences exclude the permission reading because of general constraints on the distribution of PERM.
>
> Case III sentences exclude the possibility reading either because of general constraints on POSS or because of a condition (L') on the insertion of may $_{POSS}$.

FOOTNOTE

1) (1) PERMIT(a,b,S) is true $\leftrightarrow (\exists w)$ ($w_o R_2 w \supset$ S is true in w)
The details of this bi-implication are not worked out by Lakoff but obviously any world w defined by the alternativeness-condition R_2 must be one in which not only is S true, but also one in which a fulfils the conditions of being a permitter and b fulfils the conditions of being a permittee.

(2) POSSIBLE(S) is true $\leftrightarrow (\exists w)$ ($w_o R_1 w \supset$ S is true in w)
By definition, for any world w to be related by the alternativeness-condition R_1 to W_o, there is no further requirement other than S be true in w.

Thus any world related to w_o by R_2 must necessarily be related to w_o by R_1, but not vice-versa, i.e.

(3) $(\forall w)$ ($w_o R_2 w \supset w_o R_1 w$)

From (1), (2), and (3) it follows immediately that - PERMIT(a,b,S) is true $\supset$ POSSIBLE(S) is true

REFERENCES

Lakoff, G. 1972 'Linguistics and Natural Logic', in D. Davidson and G. Harman (eds.), Semantics of Natural Language, Reidel : especially Section VIII, pp. 618-26.

Ross, J.R. 1969 'Auxiliaries as main verbs', in W. Todd (ed.), Studies in Philosophical Linguistics, Series One, Great Expectations Press.