1. Introduction

This paper deals with the type of recursive rules which make possible multiple recursion of modifiers within the noun phrase. It is primarily concerned with the rule specifying embedding of sentences as relative clauses, and more incidentally with the rule specifying sentence conjunction. We think we can demonstrate that both types of recursive rules are needed in order to account for facts of both English and Luganda. We would like to regard these recursive rules as constraint on the deep/semantic structure. In addition, we would like to suggest that many other constraints that may operate in the grammar of restrictive relative clauses, and as a result of which several types of surface configurations may be blocked—either universally or in some specific language, are best construed as constraints on less-than-deep structure. Thus, while one must seek to understand deep-structure constraints at least in part on semantic grounds, one should not seek similar grounds to explain shallow-structure or surface-structure constraints.

Over the past few years, several formulations have been proposed to account for recursion of restrictive relative clauses (henceforth RRC) within the framework of generative grammar. Most of them have been based upon data derived almost exclusively from English. All of them were formulated in terms of constraints on deep structure—i.e., as base rules. Of these formulations, we shall discuss briefly only three, since it seems to us that the rest are in one way or another variants of those.

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1We would like to record our indebtedness to Andy Rogers, Sandra Annear Thompson, Paul Schachter and Benji Wald for very helpful comments on an earlier version of this paper.
a. The ART-S solution. This solution may be found in Chomsky [1965]. For sentence (1) below, it offers the P-marker (2):

(1) The professor (whom) I like . . .

(2) 

Proponents of this analysis claim that it captures the generality that, in some senses, a RRC acts just like a determiner or article in narrowing down the domain of the modified noun phrase, or restricting it. However, the solution is open to criticism on two fundamental grounds. First, it may very well be that articles and determiners are not deep-structure categories, but rather derive from conventions involving larger previous discourse, reference, and presuppositions. If this is indeed true, the node ART in (2) cannot be a deep-structure node, and the node DET then becomes superfluous, so that one may reduce the sub-rule responsible for structures such as (2) to:

(3) NP + (S) N

A more severe drawback, however, is the fact that a rule such as (3) (or its predecessor responsible for (2)) is not by itself a recursive rule, although it introduces the recursive category-symbol S. Given this symbol, one may obtain recursivity either through the S-conjunction sub-rule:

(4) S → S and S (and S)*

or through further expansion of S to NP-VP etc. While rule (4) may account for conjoined RRC's, rule (3) cannot correctly characterize the recursivity involved in stacked RRC's--i.e., that the first modifier modifies only the head noun, while the next one modifies the already-modified noun phrase. The necessity of assuming that stacked RRC's do
indeed exist will be discussed later on. Given a rule such as (3), however, sentence (5) below can only be characterized by the P-marker (6):

(5) The man who was here whom I saw left

(6)

P-marker (6) portrays I saw the man as modifying the head noun of The man was here, not the already-modified noun phrase the man who was here. While it is true that an elaborate transformational machinery may permute (6) to yield the correct configuration, there exists a solution which would yield the correct configuration without recourse to that machinery.

b. The conjoined solution. Thompson [1971] has suggested that all relative clauses, including restrictive ones, arise from sentence coordination through a rule such as (4), not from embedding. She claims that (7) below is derived from the conjoined source in (8):

(7) I met a girl who speaks Basque.

(8) (I met girl).(girl speaks Basque)

Several explicit assumptions are associated with Thompson's analysis [1971:3-5]: (a) that definiteness is not a deep-structure category/feature; or, in her words: "... that the choice of the definite determiner will in general correlate with certain presuppositions which the speaker makes about the extent of his listener's knowledge ..."
(b) "... that the distinction between 'matrix' and 'constituent' sentences in relative clause structures can be seen to relate to nothing in the structural portion of the representation of such sentences ..."
(c) "... the 'restrictiveness' of a relative clause is also shown not to be a property best described in terms of an embedding underlying representation ..."

Thompson further claims that sentences (9) and (10) below are identical in meaning, as are also (11) and (12):

(9) I met a girl and she speaks Basque.
(10) There's a girl who speaks Basque and I met her.
(11) I met a girl who speaks Basque.
(12) A girl I met speaks Basque.

Implicit in her claims, however, is the assumption that structural features such as topic-comment and presuppositions are not part of the deep structure of utterances.

Thompson points out (in private conversation) that her solution can indeed characterize stacked RRC's, by the use of a transformational machinery that, given various presuppositions, would presumably convert a batch of conjoined sentences into the right stacked configuration. Presumably, the stacked interpretation will be then obtained by some surface structure interpretation rule.

The data from Luganda presented in this paper indicate that in that language one must account for at least the following surface configurations of RRC's:

(a) Three types of conjoined RRC's, with the conjunction manifested on the surface; and,
(b) Stacked RRC's, with no conjunction manifested on the surface.

Given Thompson's solution, the following machinery must be available for converting deep to surface structure in Luganda:
(a) Transformational rules which will be able to decide which conjoined sentences are to be converted to conjoined RHC's, and which are to be converted into stacked RRC's;
(b) Transformational rules converting some conjoined sentences into the appropriate sequence of stacked RRC's;
(c) Rules of surface interpretation assigning the 'contrastive' meaning to stacked RRC's.

None of these rules is needed in order to account for the data of Luganda in the alternative solution given below.

c. The NP-S solution. Several current formulations of this, notably that of Ross [1967], generate RRC's through a recursive sub-rule such as (13):

(13) NP → NP S

For a sentence such as (14), this solution would assume the P-marker (15):

(14) The boys I saw had beards
(15)

This analysis is probably closer to the surface facts of most languages in which relative clauses follow the head noun (notable exceptions to this are Basque, Amharic and Japanese), though this is not necessarily relevant to its merits. Further, as we shall see below, this is the only solution that characterizes structurally the stacked RHC's construction, without recourse to added transformational or interpretative machinery. Further, it characterizes properly the difference between stacked and conjoined RRC's, the first arising from reapplication of the recursive rule (13), the second from one application of rule (13) and then from the sentence-conjunction rule (4).
2. **Stacked restrictive modifiers in Luganda**

Stockwell, Schachter and Partee [1969:471] have noted that for some native speakers of English a surface chain of RRC's can only be interpreted as *conjoined*, but never as *stacked*. That is, in terms of the NP-S model described above and given rules (4) and (13), a recursive chain of RRC's is assigned only the structural interpretation (16), but never (17):

(16)

```
NP
  NP
    S
      S
      S
```

(17)

```
NP
  NP
    S
    S
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They further note, "... it appears that stacking of relative clauses may be a fairly deep kind of basis for dialect differentiation, such that some speakers have the ART-S deep structure (which is easily constrained against stacking), where others have some sort of N-S structure (here the distinction between the NP-S and NOM-S is of no consequence ...)."

In other words, the difference between these 'dialects' is assumed to involve the base rules, i.e., it is ascribed to constraints on deep structure.

In this section we shall illustrate the existence of stacked-interpreted relative clauses (and other modifiers) in Luganda. In a following section we will illustrate the existence of conjoined RRC's in Luganda. Eventually, by presenting evidence concerning various constraints on the distribution of stacked and conjoined restrictive modifiers in Luganda, we shall claim that constraints of the kind discussed by Stockwell,
Schachter and Partee [1969] should be best viewed as constraints on less-than-deep structure, but not on the base rules of the grammar.

One preliminary note must be given to modifying adjectives in Luganda. The rule of Relative Clause Reduction in Luganda, which pertains to embedded adjectives, and by which (18) below is embedded as a modifying adjective in (19):

(18) omusajja mu-lungi
    man   good
    'the man is good'

(19) omusajja o-mu-lungi a-genze
    man   good    left
    'the good man left'

is in many ways different from a similar rule operating in English. For one thing, the deletion of the copula and tense marker in the present tense is obligatory in Luganda, so that (20) is therefore ungrammatical:

(20) *omusajja e ali (o)mulungi a-genze
    man who is good    left
    'the man who is good left'

Further, there are strong reasons to believe that the initial vowel of the VCV-agreement prefix of the adjective (i.e., the o in o-mu-lungi), functions like a relative pronoun. This means that the Relative Clause Reduction rule deletes the copula but retains the relative pronoun. Since in Luganda the embedded adjective modifier follows the head noun much like relative clauses do, a formal distinction between embedded adjectives and relative clauses, as in English, is not as meaningful. This will be reflected at times in the English glosses given to Luganda adjectival modifiers, where we may use interchangeably adjectival (reduced) or relative clause (unreduced) translations.

Stacked restrictive modifiers in Luganda may obtain for relative clauses, adjectives and 'possessives' (we shall disregard other possibilities here). We will not attempt to illustrate here all possible combinations. Now, consider the following:
(21) omusajja omu-lungi omu-nene a-genze
    man    good big    left
    'the big good man left'
    (but not the small good one)

Contrast it with (22) below, in which the order of the two modifiers has
been changed:

(22) omusajja omu-nene omu-lungi a-genze
    man big    good left
    'the good big man left'
    (but not the bad big one)

For speakers of Luganda a clear contrast in meaning exists, and the mean­
ing change associated with the order change (and typical of all stacked
chains of RRC's) can be rendered as with the following: while the modi­
fier closer to the head noun modifies only the head noun itself, the one
next to it modifies the entire modified NP preceding it. In other words,
each added modifier in the chain further restricts the domain of the
noun phrase.

The same contrast may be obtained with unreduced RRC's:

(23) omusajja gwe o-labye (e) a-badde wano a-genze
    man whom you-saw who was here    left
    'the man whom you saw who was here left'
    (but not the one whom you saw who wasn't here)

(24) omusajja (e) a-badde wano gwe o-labye a-genze
    man who was here whom you-saw left
    'the man who was here whom you saw left'
    (but not the one who was here whom you didn't see)

Given the NP-S analysis, the difference between (23) and (24) above can
be represented by the P-markers (25) and (26), respectively:
The P-markers (25) and (26) above correctly characterize the semantic interpretation of stacked RRC's, namely, that the second (stacked) modifier does not modify the head noun alone, but rather the entire modified clause preceding it.
3. **Conjoined restrictive modifiers in Luganda**

There are two major types of conjoined RRC's construction in Luganda. Before we turn to examine them, however, notice first that subject head nouns may be ambiguous with respect to the feature [specific/generic]. We shall demonstrate this by using a construction with two stacked RRC's:

(27) omusajja omulungi omunene mu-zira
    man good big (is) brave

Sentence (27) above may be assigned one of the following interpretations:
(a) (specific): 'the big good man is brave'
(b) (generic): 'a/any big good man is brave'

Now, coming back to conjoined RRC's in Luganda, the first conjunction type involved that of simultaneous properties or events. With the specific lexical conjunction ate nga, it may be used only to conjoin RRC's which modify generic head nouns. The second type is the conjunction of consecutive events or, alternatively, of a state and a consecutive event. It may be used only if the conjoined RRC's modify a specific (or referentially transparent) head noun.

a. **Conjunction of simultaneous properties or events.** Note the following:

(28) abasajja a-ba-kola ate nga ba-yimba ba-lungi
    men who work and sing (are) good
    '(any) men who work and also sing are good'

(29) abasajja a-ba-lungi ate nga ba-nene ba-zira
    men who (are) good and (are) big (are) brave
    '(any) men who're good and also big are brave'
    'good, big men are brave'

The generic nature of the head noun involved is also evident from the fact that it cannot take a Demonstrative modifier, so that (30) is ungrammatical:

2Under certain circumstances, with the use of the lexical conjunction eera (or eera nga), it is possible to obtain structures in which the conjunction of simultaneous events/properties modifies a specific noun. (see section 4, examples (65), (66)).
Though without the Demonstrative, (31) is grammatical:

(31) omusajja omulungi ate nga munene mu-zira

man good and big (is) brave

'a/any man who's good and also big is brave'

b. Conjunction of consecutive events. Observe the following:

(32) omusajja e ya-genze ne a-komawo mu-lungi

man who left and returned (is) good

'the man who went and then came back is good'

'any man who left and then came back is good'

The second, generic, interpretation is of course a correct English sentence, but is the wrong interpretation for (32), where a specific head noun is obligatory. The specific nature of the head noun is also evident from the fact that it may be modified by a Demonstrative, as in:

(33) omusajja ono e ya-genze ne a-komawo mu-lungi

man this who left and returned (is) good

'this man who left and then came back is good'

One can also demonstrate the consecutive nature of this conjunction. Note first that the 'tense' is the second verbal in the conjunction must be the narrative (unmarked) tense; i.e., the stem -kola in (34) below is preceded only by the subject-agreement morpheme a-:

(34) omusajja e ya-genda ne a-kola mu-lungi

man who left and work (is) good

'the man who left and then worked is good'

This is a rule of obligatory tense deletion, presumably under some conditions of tense identity, or perhaps conditions of tense sequence, i.e., that the tense in the second verbal indicates the same or a later time category than that in the first verbal. For this reason, all the alternatives in (35) below are ungrammatical, though semantically conforming to the sequentiability requirement:
(35) *omusajja e ya-genda ne \{ ya-kola \}
    \{ ya-koze \} a-koze 
    man who left and worked (is) good

By themselves, ya-genda 'left long ago', ya-kola 'worked long ago',
ya-koze 'worked within 18-24 hours' and a-koze 'has just worked'.
Thus, the violation responsible for the ungrammaticality of (35) is not
a deep semantic one, but rather a violation of the obligatory, late
(possibly even a second-lexicon) rule of equi-/sequi-tense deletion.
This rule probably applies to sentence-conjunction as well, so that while
the following, with an 'unmarked' tense in the second verbal, is
grammatical:

(36) omusajja ya-genda ne a-kola
    man left and work
    'the man left and then (he) worked'

the following is just as ungrammatical as (35):

(37) *omusajja ya-genda ne \{ ya-kola \}
    \{ ya-koze \} a-koze 
    man left and worked

In addition, one could also demonstrate that the constraint requiring
sequentiality (consecutiveness) is indeed a deep semantic constraint.
This may be done by choosing two events which may occur only in one
specific order, but not the other. Thus:

(38) omusajja gwe na-laba ne m-mu-lamusa a-genze
    man whom I-saw and I-greet-him left
    'the man whom I saw and greeted left'

but not:

(39) *omusajja gwe na-lamusa ne m-mu-laba a-genze
    man whom I-greeted and I-see-him left
    'the man whom I greeted and then saw left'
There exists a stylistic variant, with somewhat less restricted distribution, for rendering the second (unmarked) verbal of the conjunction. It involves repeating that second verbal in its infinitival form (when contrasts exist, this variant seems to stress further the consecutive nature of the conjunction). In certain constructions this variant is obligatory, though in the following it is optional:

(40) omusajja e ya-kola ne a-yimba ne oku-yimba a-geenze

man who worked and sing and to sing left

'the man who worked and then sang left'

(41) omusajja gwe na-laba ne m-mu-lamusa ne oku-mu-lamusa a-geenze

man whom I-saw and I-him-greet and to-him-greet left

'the man whom I saw and then greeted left'

Another interesting feature of this conjunction of consecutive events is that it cannot be used to conjoin two adjectives, which in Luganda are all stative and thus may not be construed as events. So that the following is ungrammatical in Luganda:

(42) *omusajja o-mu-lungi ne mu-nene a-geenze

man who (is) good and big left

Sentence (42) may be made grammatical with a slight adjustment, but then it ceases to be a conjunction of modifiers to the same head noun, and becomes a conjunction of two non-coreferential noun phrases, the second of which uses an adjective as an anaphoric head:

(43) omusajja omulungi ne o-mu-nene ba-geenze

man good and big-one left (pl. concord)

'the good man and the big (one) left' (good man ≠ big one)

As to the level at which the constraint barring the conjunction of stative modifiers can be expressed, it seems clear that it could not be a surface structure constraint, since it holds true also for the conjunction of unreduced relative clauses containing the same adjectives (we here assume that modifying adjectives are indeed derived from those), so that the following is also ungrammatical:
Thus, the constraint is in some sense a **semantic** constraint in Luganda. Sentence (45) above may again be slightly changed, to yield a grammatical sentence—in which the conjunction is again of noun phrases (non-coreferential) rather than of modifiers to the same head. That is:

(46) omusajja e yali omulungi ne a yali omunene ba-genze  
man who is good and who is big left (pl. concord)  
'the man who's good and the (one) who's big left'  
(the man who's good ≠ the one who's big)

There are grounds to believe, however, that the semantic constraint on this conjunction type involved only the non-statity of the second conjoined modifier. This is apparent from the fact that (45) may be changed into the grammatical (47) by substituting 'be' with 'become':

(47) omusajja e yali omulungi ne a-fuka omu-bl a-genze  
man who was good and become bad left  
'the man who was good and then became bad left'

As to universality of the seemingly semantic constraint on this type of conjunction, its validity is not readily apparent. Sentences such as:

(48) The man who was here today and there tomorrow . . .  
The man who was brave one day and cowardly the next . . .

seem to be perfectly natural and in no way semantically 'odd'. This opens an interesting question, one which we do not intend to fully answer here. It has been customary in recent years to assume that deep (semantic) structure is more universal than surface structure. Could this be

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3There is probably a considerable difference between the lexical item 'be' in English and the copula -li in Luganda. English 'be' is either ambiguous with respect to 'be' vs. 'become', or at least allows elliptic uses which correspond to non-stative interpretations (see Givón [forthcoming]). The Luganda copula carries only the meaning of the strictly-stative 'be'.
also extended to the various constraints operating on deep versus less-than-deep structures? The data presented above, as well as some more to follow, suggest that an extension of this kind is by no means guaranteed. That is, that some semantically definable constraints (and thus, presumably, deep structure constraint, within our frame of reference), may turn out to be of less than universal validity.

4. The stacking of conjoined modifiers

In the preceding two sections we have shown, separately, the two types of recursivity available for RRC's in Luganda: stacked RRC's and conjoined RRC's. We have suggested that a recursive rule such as (13), together with the sentence conjunction rule (4), can account for both types of recursivity. These rules predict, however, that at any 'stacked' node arising from the application of rule (13), conjunction may arise as a result of applying rule (4). That is, that structures such as both (49) and (50) below are possible (here one may also read 'interpretations' for 'structures', if one so wishes):

(49)

```
NP
  NP
    S
  NP
    S
    S and S
```

(50)

```
NP
  NP
    S
  S
    S
    S and S
```

In the space below we will attempt to investigate these predictions, separately for the two conjunction types involved.

a. The stacking of consecutive-conjoined RRC's. In the case of this conjunction (with the lexical conjunction ne), structures (or interpretations) such as both (49) and (50) are indeed obtained:
omusajja gwe na-laba e ya-koze a-genze (stacked with no conjunction)
'man whom I-saw who worked left'

omusajja gwe na-laba e ya-koze ne a-yimba ne-okuyimba a-genze (as in (50))
'man whom I-saw who worked and sing and to-sing left'

omusajja e ya-koze gwe na-laba a-genze (stacked with no conjunction)
'the man who worked whom I-saw left'

omusajja e yakoze ne a-yimba ne-okuyimba gwe na-laba a-genze (as in (49))
'man who worked and sing and to-sing whom I-saw left'

In structures (52) and (54) above, which involve conjunction as well as stacking, the presence of a conjunction in no way interferes with the characteristic stacked interpretation obtained.

b. The stacking of simultaneous-conjoined RRC's. At this point additional constraints begin to manifest their presence:

omusajja omulungi omunene a-kola nnyo (stacked with no conjunction)
'any good big man works hard'

omusajja omulungi omunene ate nga mu-zira a-kola nnyo (as in (50))
'any good man who's big and brave works hard'

omusajja omunene omulungi a-kola nnyo (stacked with no conjunction)
'any good big man works hard'

omusajja omunene ate nga muzira omulungi a-kola nnyo
'man beg and brave good works hard'
Further, on persistent examination, it turns out that the interpretation assigned to (56) above (i.e., assuming that it has some stacked structure in it), is also wrong and that, rather, the only interpretation assigned is a three-way conjunction of all three restrictive modifiers; that is:

\[(56') \text{ omusajja omulungi, omunene ate nga muzira a-kola nnyo} \]
\[\text{ 'any good, big and brave man works hard'} \]
\[\text{ 'any man who's good, big and brave works hard'} \]

In other words, (56) is interpreted as arising from neither structure (49) nor (50), but rather from:

\[(59)\]

We are thus left with a curious constraint on (at least) the distribution of surface strings in the presence of the \textit{ate nga} conjunction (of simultaneous properties/events). It may be formulated the following way:

\[(60) \text{ If a single conjunction of the simultaneous type is found to conjoin two RRC's in a longer chain of RRC's, the entire chain may never be interpreted as having a stacked structure (as in (49) or (50) above), but will always be interpreted as a multiple conjunction of RRC's (i.e., as in (59)).} \]

Given constraint (60) above, the ungrammaticality of (58) may simply arise from a (probably universal) restriction on surface conjunctions of the form:

\[(61) *A-and-B-C... \]

We have on purpose formulated constraint (60) as a surface-structure constraint. By that we only mean that it applies at a level of less-than-deep structure. An alternative would be, of course, attempting to
constrain the recursivity of rule (13) in some way; that is, regarding this constraint as a deep structure constraint. We feel this alternative is inappropriate, especially since constructions such as (49) and (50) seem in fact to be manifested in Luganda when the ne conjunction (consecutive) is involved. Rather, it may very well be that constraint (60) is in fact rooted in perceptual strategies, in the sense discussed by Bever and Langendoen [1970]. Thus, one may argue that the less-than-deep structure of (56) above:

\[(62) \quad [NP [\text{REL REL ate nga REL}]]_{np}\]

is indeed ambiguous with respect to the constraints on deep structure, i.e. given our rules (13) and (4). So that, in principle, given (62), two alternative structural interpretations are available to the Luganda speaker:

\[(63) \quad [ [NP \text{REL}]_{np} [\text{REL ate nga REL}]]_{np} \quad \text{(as in (50), stacked)}\]
\[(64) \quad [NP [\text{REL, REL ate nga REL}]]_{s} \quad \text{(as in (59), non-stacked)}\]

At the surface (or 'less-than-deep') structure level, however, constraint (60) operates, so that the speaker in fact assigns only the non-stacked interpretation (64).

There are several pieces of data which suggest that constraint (60) is not a deep structure constraint. First, notice that if a different structural type of a relative clause is involved (i.e., if it is not the case that all three modifiers are of the same internal structure), a stacked interpretation may be obtained in spite of the presence of a conjunction. For this, we need to digress a little.

We have noted earlier that the conjunction ate nga may conjoin only modifiers of non-specific head nouns. However, there exists in Luganda a conjunction of simultaneous properties-events which may conjoin the modifiers of specific head nouns, the conjunction eera. In the following example, the conjunction ate nga cannot be used (that is, the head noun must be specific) due to the presence of an object relative clause with a particular (non-generic) tense as well as a probably-referential
pronoun. However, if eera is used instead, a structural interpretation such as (49) is readily obtained:

(65) omusajja omunene eera mu-zira gwe na-laba a-kola nnyo
    man big and brave whom I-saw works hard
    'the big and brave man that I saw works hard'

Constraint (60) is seemingly incorrect, then, since (65) seems to violate it. One may of course argue that it is possible to re-formulate (60) in terms of either the conjunction ate nga or, alternatively, the non-specificity of the head noun. There are reasons to believe, however, that it is not the semantic nature of the conjunction or the head noun that is involved in this particular constraint, but rather the interaction of universal perceptual strategies with respect to coordinate constructions. First, note that (66) below, which could have been, presumably, assigned both a stacked (as in (50)) and conjoined (as in (59)) interpretation, is assigned only a conjoined interpretation—in spite of the fact that the first RRC is not of the same structural type as the two conjoined ones:

(66) omusajja gwe na-laba omunene eera mu-zira a-kola nnyo
    man whom I-saw big and brave works hard
    'the man whom I saw, who is big and who is brave works hard'
    'the man whom I saw who's big and brave works hard'

We would like to suggest that the fact that (65) is assigned a stacked interpretation while (66) is not, is due to the interaction of three perceptual principles pertaining to the interpretation of coordinate structures:

(a) A principle by which structures of the same structural type are more likely to be interpreted as conjoined than structures of dissimilar structural type;⁴

⁴From notes of a lecture given by Thomas Bever at U.C.L.A. in May, 1970, we find: "In 'x...y conjunction, Z...', in which x,y,...z are identical constituent types of type T, then the entire sequence is a conjoined phrase of the type T..." as an example of a perceptual strategy with respect to the assignment of conjoined interpretations.
(b) Constraint (61) proscribing conjoined structures of the form A-and-
B-C . . . .

(c) Constraint (60), or at least the part of it which suggests that in
the presence of one overt conjunction in a chain of modifiers, the entire
chain is likely to be interpreted as conjoined.

We would further suggest that constraint (60) be reformulated and principle (a) above incorporated into it, to then read:

(67) If a single conjunction of the simultaneous type is found in a
chain of RRC's, and if all the RRC's in the chain are of the
same structural type, then the entire chain may not be inter-
preted as involving a stacked structure (as in either (49) or
(50)), but only as a multiple conjunction of the RRC's (as in
(59)).

Let us now see how (67) and (61) can account for the facts of Luganda.
We shall assume here that they are conjunctively ordered with (67) apply-
ing first:

Sentence (56):

The structures of the RRC's are identical and a conjunction is pres-
ent; constraint (67) assigns a multiply-conjoined interpretation; con-
straint (61) does not apply.

Sentence (58):

The structures of the RRC's are identical and a conjunction is pres-
ent; constraint (67) assigns a multiple-conjunction interpretation; con-
straint (61) blocks it as ill-formed; both possible interpretations are
blocked, and the utterance is thus ungrammatical.

Sentence (65):

The structures are not identical, so that constraint (67) does not
automatically assign a multiply-conjoined structure; constraint (61),
further, blocks a conjoined interpretation altogether; the only inter-
pretation left is a stacked one, which is thus assigned.
Sentence (66):
The structures are not identical, but a conjunction is present; con­straint (67) does not block a stacked interpretation; but constraint (61) does not block a conjoined interpretation either; since the conjoined interpretation seems to win over the stacked one, another principle govern­ing the relation between (61) and (67) is required, namely:

(68) If (67) and (61) allow both interpretations, the conjoined interpretation wins over the stacked.

Principle (68) can probably be incorporated as a modification of (67), though for the moment we shall refrain from so doing.

5. Other surface-structure constraints on RRC’s

In the preceding section we have argued that some constraints on the distribution of stacked and conjoined modifiers in Luganda can be best understood as perceptually motivated constraints on less-than-deep struc­ture. In this section we would like to show that perceptual principles as those invoked above, and in particular the principle of structural similarity with respect to conjoined structures, play an important role in constraining the output of RRC’s in Luganda.

Note, first, that while one may stack restrictive adjectives in Luganda, one may not stack two subject-relative clauses in a row:

(69) omusajja omulungi omunene a-genze
    man good big left
    'the big good man left'

(70) omusajja e ya-kola a-genze
    man who worked left
    'the man who worked left'

(71) omusajja e ya-yimba a-genze
    man who sang left
    'the man who sang left'

but not:
However, while stacking is blocked here, conjoining is not, and one may obtain the following:

(73) \textit{omusajja e ya-kola ne a-yimba a-genze}\vspace{1em}
\textit{man who worked and sing left}

\textit{the man who worked and later sang left'}

(74) \textit{omusajja (e) a-kola atenga a-yimba mu-lungi}\vspace{1em}
\textit{man (who) works and sings good}

\textit{any man who works and also sings is good'}

(75) \textit{omusajja a-kola eera a-yimba mu-lungi}\vspace{1em}
\textit{man works and sings good}

\textit{the man who works and also sings is good'}

A similar restriction holds with respect to object relative clauses, which again cannot be stacked in a row—but only conjoined:

(76) \textit{omusajja gwe na-laba a-genze}\vspace{1em}
\textit{man whom I-saw left}

\textit{the man whom I saw left'}

(77) \textit{omusajja gwe na-lamusa a-genze}\vspace{1em}
\textit{man whom I-greeted left}

\textit{the man whom I greeted left'}

but not stacked in a row:

(78) \textit{*omusajja gwe na-laba gwe na-lamusa a-genze}\vspace{1em}
\textit{man whom I-saw whom I-greeted left}

Though again, the conjunction of the same RRC's is permitted:

(79) \textit{omusajja gwe na-laba ne m-mu-lamusa a-genze}\vspace{1em}
\textit{man whom I-saw and I-him-greet left}

\textit{the man whom I saw and then greeted left'}
Now, notice that if one of the RRC's in the chain is a subject relative clause, while the other is an object relative clause, stacking becomes permissible:

(80) omusajja e ya-kola gwe na-laba a-genze
    man who worked whom I-saw left
    'the man who worked whom I saw left'

(81) omusajja gwe na-laba e ya-kola a-genze
    man whom I-saw who worked left
    'the man whom I saw who worked left'

A similar dissimilation of structure may be also achieved with reduced adjectives:

(82) omusajja e ya-kola omulungi a-genze
    man who worked good left
    'the good man who worked left'

(83) omusajja omulungi e ya-kola a-genze
    man good who worked left
    'the good man who worked left'

(84) omusajja gwe na-laba omulungi a-genze
    man whom I-saw good left
    'the good man whom I saw left'

(85) omusajja omulungi gwe na-laba a-genze
    man good whom I-saw left
    'the good man whom I saw left'

It seems, then, that the principle of structural similarity acts here again as an important, though probably not sole, determiner of the speaker's ability to interpret chains of RRC's as either stacked or conjoined. There is no apparent semantic reason for blocking sentences (72) and (78). Their interpretations in English are both grammatical ('the man who worked who sang left', 'the man whom I saw whom I greeted left'), at least for people who accept stacked interpretations. The fact that even for those people these interpretations are somewhat odd, is not at
all surprising. It may very well be that the same perceptual mechanism which causes a construction to be 'fully ungrammatical' in one language, causes it to be 'only odd' in another. We shall return to this subject below.

Finally, we would like to illustrate that this constraint could not be a deep structure constraint. Notice that while it does not apply to modifying adjectives (presumably derived from fully reduced relative clauses), it does apply to relative clauses which carry the same semantic interpretation:

(86) omusajja omulungi omunene ya-li mu-zira
    man good big was brave
    'the big good man was brave'

(87) *omusajja e ya-li omulungi e ya-li omunene ya-li mu-zira
    man who was good who was big was brave

6. Conclusions

a. Constraint on deep structures. We have shown that of the three main models available for describing the recursive, embedded structure of restrictive relative clauses, only one—the NP-S model (as in Ross [1967]) is capable for fully accounting for the facts of Luganda (and, for that matter, of English). Neither the ART-S model (as in Chomsky [1965]), nor the conjoined model (as in Thompson [forthcoming]) can account for the strong surface distinction between stacked and conjoined RRC's in Luganda in quite as satisfactory a manner. In particular, these two models are ill-suited for describing stacked RRC's. We would thus like to conclude

5Within the framework of a theory which does not wish to derive adjectives from relative clauses, this would of course be an added argument against deriving the former from the latter. In our opinion, an argument of this sort does not carry much weight in this case, since the constraints in question may well turn out to be indeed perceptually motivated—and applying to less-than-deep structures. This makes their use for resolving arguments about deep structures highly questionable.
that our recursive rule (13) and the recursive rule (4) (conjunction), are the only deep structure constraints needed for the grammar of restrictive relative clauses.

b. **Constraints on less-than-deep structures.** We have also shown, we believe, that in addition to the two deep structure constraints (recursive base rules) mentioned above, other constraints are also relevant for determining the surface distribution of RRC's. These constraints are complex and subtle, and we do not pretend to understand them fully. From the data presented above, however, it seems reasonably clear that many limitations on the distribution and interpretation of chains of RRC's as stacked or conjoined are explicable in terms of constraints on less-than-deep structures. It is also likely, we believe, that these constraints may turn out to be perceptually motivated, in the sense elaborated by Bever and Langendoen [1970]. It is likely, further, that constraints of this type may operate not at one point, but perhaps at several points of less-than-deep structure. The indications for this are not fully clear, but the question is still open. As to the universality of these constraints, it may well turn out that constraints on less-than-deep structures are as universal as those constraining deep structures. This should come as no surprise, of course, since if they are indeed motivated by perceptual strategies, one would hardly expect those to be of less than universal validity.

c. **Some reflections about constraints on RRC's in English.** Stockwell, Schachter and Partee [1969] claim that many speakers of English cannot assign a stacked—but only conjoined—interpretation to chains of RRC's. They claim that this may be a constraint on the deep structure grammar of these speakers. We would like to diverge sharply from this claim. Given the facts discussed above, we would like to suggest that while the grammar of RRC's in English is the same for all speakers—and includes a recursive rule such as (13) which allows for stacking, speakers may differ as to the degree to which perceptual strategies actually intervene and block certain structural interpretation of surface chains of RRC's. It is a fact, for example, that speakers who do not accept a stacked
interpretation of relative clauses, accept more readily a stacked interpretation of preposed adjectives. This is extremely reminiscent of the facts of Luganda discussed at the end of Section 5, above. It also suggests that it is not a constraint on deep structures which blocks a stacked interpretation for these speakers, but rather a perceptually motivated constraint on less-than-deep structures.

It also seems that the constraints involving the principle of structural similarity in conjunction may be manifest in English in some fashion. For example, it seems that with structurally similar RHC's, the conjoined (88) and (89) are much more acceptable than the stacked (90):

(88) The man who worked and sang . . .
(89) The man who worked and then sang . . .
(90) ?The man who worked who sang . . .

On the other hand, given the structurally dissimilar RRC's below, the stacked (91) and (93) seem preferable to the conjoined (92) and (94):

(91) The man (whom) I saw who left . . .
(92) ?The man (whom) I saw and who left . . .
(93) The man who left whom I saw . . .
(94) ?The man who left and whom I saw . . .

In short, it seems that perceptually motivated constraints of the kind we believe to exist in Luganda, may also exist in English.
REFERENCES


