

Liberation and Kikuria Relative Clauses

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Liberation and Kikuria Relative Clauses  
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Discontinuous constituents pose a clear challenge to non-transformational grammarians. A monostratal theory like GPSG has no recourse to transformations to account for order variations beyond the limits of constituent boundaries. McCawley (1981, 1987) and Ojeda (1987) propose to account for discontinuous constituents by allowing trees to have crossing branches; under their analysis, discontinuity does not necessarily involve changes in hierarchical constituent structure. Pullum (1982) and Stucky (1983) use "liberation metarules" to account for discontinuous constituents; these rules rewrite immediate dominance rules, or "ID" rules, by replacing a category with its daughters. In contrast to the crossing branches approach, the liberation approach does assume that discontinuity involves a change in constituent structure. Zwicky (1986) and Levine (1987) abandon liberation metarules in favor of a "direct liberation" approach, in which the categories to be liberated are specified in the ID rules themselves. In this paper, I will present data on discontinuous constituents in the Kikuria VP, and I will show how the direct liberation approach gives a straightforward account of these facts. I will then present data on unbounded dependencies involving relative clauses, and I will show how these "movements" can be accounted for with the same liberated VP structure proposed for the discontinuous constituents. Finally, I will discuss the modifications in the direct liberation proposal which my analysis entails.

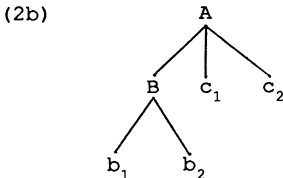
In Zwicky's 1986 direct liberation proposal, each ID rule specifies which of its daughters can be liberated. A liberated constituent is replaced by its daughters. ID rules are written as ordered triples, as in (1):

- (1) (M, C, L)

where M is the mother, C is the set of daughters which must be concatenated, or fully structured, and L is the set of daughters which can be liberated. Consider, for example, the toy grammar in (2a):

- (2a) 1. (A, [B], [C])  
 2. (B, [b<sub>1</sub>, b<sub>2</sub>], 0)  
 3. (C, [c<sub>1</sub>, c<sub>2</sub>], 0)

The first rule introduces B and C as daughters of A. B must be fully structured, but C may be liberated into A; in other words, C may be replaced by its daughters, which will be sisters of B in the branchings. The second rule introduces b<sub>1</sub> and b<sub>2</sub> as daughters of B; the third rule introduces c<sub>1</sub> and c<sub>2</sub> as daughters of C. These three rules, then, would license the tree in (2b):



B, c<sub>1</sub> and c<sub>2</sub> appear as daughters of A; C is replaced by its daughters c<sub>1</sub> and c<sub>2</sub>, and C itself does

not actually appear in the tree. In classical GPSG, each minimal tree is directly licensed by a single ID rule. This approach makes a crucial distinction between the ID rules and licensed branchings. C is a constituent of ID rule 1. In the direct liberation schema, subcategorization and semantic interpretation both operate on instantiated ID rules rather than on the licensed branchings. C, then, would be treated as a category for the purposes of both subcategorization and semantic translation, even though it never appears in the tree.

I will now present data on noun-modifier discontinuity within the Kikuria VP, and I will show how the direct liberation approach gives a straightforward account of these facts. Kikuria is a Bantu language; like most Bantu languages, it has unmarked SVO order. It is a pro-drop language; in all of the examples in this paper, agreement prefixes on the verb function as pronominal subjects. All nominal modifiers agree with their head nouns for noun class. Adjectives, demonstratives and genitive prepositional phrases all follow the nouns they modify, but relative clauses can occur before or after their heads. The examples in (3a) through (d) show nouns and their modifiers in the expected positions:

- (3) a. nkoogi-riaa-n-de omo-saacha o-no ibiinto  
 wash-app-I-be 1-man 1-this dishes  
 "I am washing dishes for this man."  
 b. na-kor-re ama-tagito ama-berretu inyoongo  
 I-made-app 6-clay 6-red pot  
 "I made the pot with red clay."  
 c. naa-temere ibi-icha ibya-baana gu-sukuuri  
 I-hung 8-pictures 8.of-children loc-school  
 "I hung the children's pictures in the school."  
 d. n-darok-era isweeta ichi-seendana chi-no  
 I-knit-app sweater 10-needles 10-which  
omosaani a-njaaye  
 friend s/he-me.gave  
 "I knit a sweater with the needles which my friend gave me."

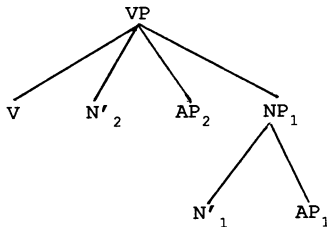
In these sentences, the modifiers immediately follow the nouns they modify. In (3a), the demonstrative *ono* immediately follows *omosaacha*, "man." In (3b), *amaberretu*, "red," immediately follows *amatagito*, "clay." In (3c), *ibyabaana*, "of the children," immediately follows *ibücha*, "pictures." In (3d), the head noun *ichiseendana*, "needles," is immediately followed by its relative clause, *chimo omosaani njaye*, "which my friend gave me," although it might just as easily have been preceded by the relative clause. The orders in (3) are unsurprising; we would expect sub-constituents of an object NP to be contiguous. But Kikuria also allows any of the nominal modifiers to be separated from their head nouns by an intervening object NP or PP:

- (4) a. nkoogi-riaa-n-de omo-saacha ibiinto o-no  
 wash-app-I-be 1-man dishes 1-this  
 "I am washing dishes for this man."
- b. nakor-re ama-tagito inyoongo ama-berretu  
 I-made-app 6-clay pot 6-red  
 "I made the pot with red clay."
- c. naa-tem-ere ibi-icha gu-sukuuri ibya-baana  
 I-hung 8-pictures in-school 8.of-children  
 "I hung the children's pictures in the school."
- d. n-da-rok-era chi-no omosaani a-nyaaye  
 I-knit-app 10-which friend s/he-me.gave  
 isweeta ichi-seendana  
 sweater 10-needles  
 "I knit a sweater with the needles which my friend gave me."

Sentence (4a) is identical to (3a), except that the demonstrative pronoun *ono* is separated from the noun it modifies, *omosaacha*, "man," by an intervening object NP, *ibiinto*, "dishes". (4b) is identical to (3b), except that *amaberretu*, "red," is separated from the noun it modifies, *amatagito*, "clay," by another NP, *inyoongo*, "pot". In (4c), genitive prepositional phrase *ibyabaana*, "of the children," is separated from its head, *ibiicha*, "pictures," by adverbial PP *gusukuuri*, "in the school." In (4d), the relative clause, *chimo omosaani nyaaye*, "which my friend gave me," is separated from its head, *ichiseendana*, "needles," by the object NP *isweeta*, "sweater". In all these examples, the constituents of NP are mixing freely with their erstwhile aunts.

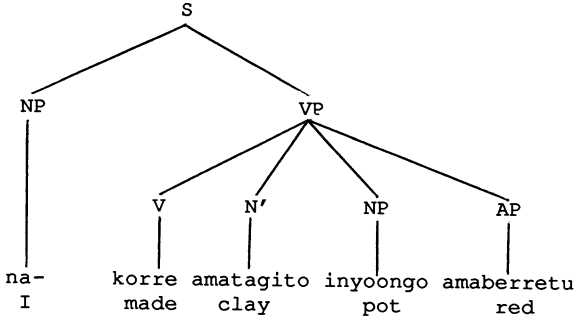
To account for these facts, I propose the direct liberation ID rule in (5), which expands a ditransitive VP. This rule licenses the discontinuous constituents in (4):

- (5)  $(VP, [V, NP_1], [NP_2])$



The VP is in the first place in the triple; thus it is the mother. V and NP<sub>1</sub> are in the second place in the triple; thus they will appear as fully structured daughters of VP. NP<sub>2</sub> is in the third position in the triple; this NP can be liberated, and its daughters will take its place in the tree as sisters of V.<sup>1</sup> Assuming that NP<sub>1</sub> and NP<sub>2</sub> each consist of a noun modified by an adjective, the rule in (5) will license the tree immediately below it. Sentence (4c), in which the adjective is separated from the noun it modifies by another object noun, thus has the tree in (6):

(6)



The daughters of the NP<sub>2</sub> have liberated; thus the adjective and the noun can occur on either side of the other object, NP<sub>1</sub>. Recall that the examples in (4) show not only the separation of an adjective from the noun it modifies, but also the separation of demonstratives, genitive PPs and relative clauses from their heads; the full range of nominal modifiers are subject to this kind of separation. The rule in (5), then, by allowing one NP to be replaced by its daughters in the branchings, makes precisely the correct predictions about what kinds of order variation should be possible.

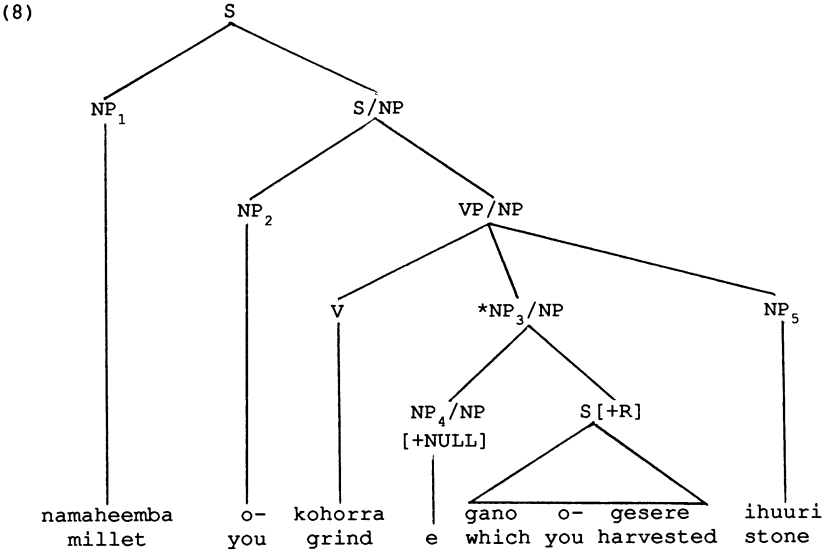
I have shown how a direct liberation analysis accounts for discontinuous constituents in the Kikuria VP. I will now show how such an analysis can also account for data on unbounded dependencies involving relative clauses.

In the sentences in (7), topicalized object nouns have left their relative clauses behind, in post-verbal position:

- (7) a. n-ama-hEEmba o-ko-hor-ra                    ga-no o-gEsere  
 f-6-millet    you-top-grind-app    6-which you-harvested  
 ihuuri  
 stone  
 "You are grinding with a stone the millet which you harvested."
- b. n-aba-geni to-kor-eeeye ichaahE ba-no baa-chere  
 f-2-guests we-made-app tea                    2-who 2-came  
kurwa nyaamtiro  
 from Nyamtiro  
 "We made tea for the guests who came from Nyamtiro."
- c. n-ichii-ngebo ba-gor-eeeye                    mwiita chi-no  
 f-10-clothes they-bought-app Mwiita 10-which  
maroa aa-re kuhuria  
 Marwa he-be selling  
 "They bought the clothes which Marwa was selling for Mwiita."

In (7a), the topicalized noun, *amahEEmba*, "millet," is modified by a post-verbal relative clause, *gano ogEsere* "which you harvested." In (7b), the topicalized noun, *abageni*, "guests," is modified by a post-verbal relative clause, *ba-no baachere kurwa nyaamtiro*, "who came from Nyamtiro." In (7c), the topicalized noun, *ichiingebo*, "clothes," is modified by the post-verbal relative clause, *chino maroa aare kuhuria*, "which Marwa was selling."

Without recourse to liberation, we would have to assign (7a) the illegal structure in (8):



We can see why the starred subtree  $NP_3$  is illegal when we consider the Slash Termination Metarule as presented in Gazdar, Klein, Pullum and Sag (1985) (henceforth GKPS), shown in (9). The STM terminates an unbounded dependency by introducing the feature [+NULL], which ensures that a category of the form  $XP/XP$ , which marks the gap out of which the "movement" has occurred, will be phonologically empty.

(9) Slash Termination Metarule (GKPS, 1985)

$X \rightarrow W, X_2$

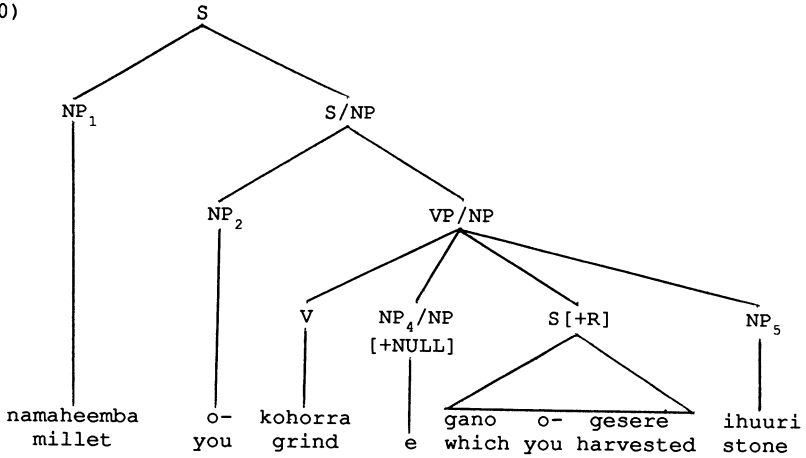


$X \rightarrow W, X_2 [+NULL]$

Since metarules only apply to lexical rules, we must assume that  $W$  contains a lexical head. In other words, built into this mechanism is the Lexical Head Constraint, first proposed by Flickinger (1983), which claims that all gaps have lexical heads as sisters. In (8), the only sister of the gap  $NP_4$  is  $S[+R]$ , the relative clause, which is neither lexical nor a head.

Now consider the structure in (10), in which  $NP_3$ , which dominates the relative clause and its head in the fully structured tree, has been liberated. The structure of the VP is licenced by the ID rule presented in (5), which allows one object NP to liberate. Note that  $NP_3$  does not appear in the tree:

(10)



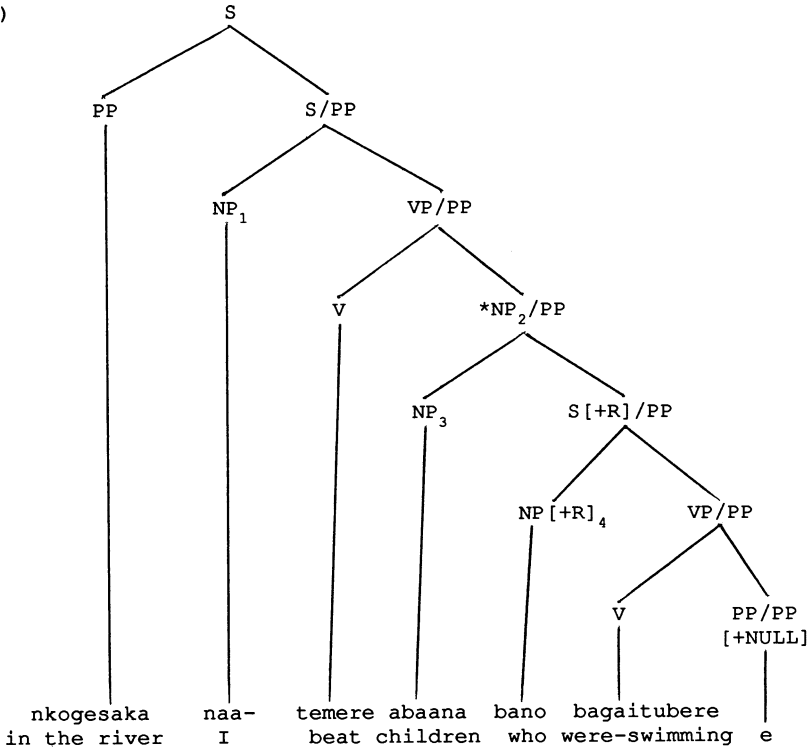
Here, the gap NP<sub>4</sub> does, indeed, have a lexical head sister: it is a sister of V. If we allow such structures, in which NP has liberated into VP, the dependency will be able to terminate, and we can account for head topicalizations out of relative clauses like the examples in (7).

We have seen how the liberated structure of VP proposed to account for head-modifier separation in NPs can also account for one kind of unbounded dependency in Kikuria. Essentially, this analysis involves the interaction of liberation with the instantiation of SLASH, GPSG's mechanism for handling unbounded dependencies. We will now see how a similar interaction of SLASH with the same liberated VP structure can account for movements out of relative clauses. Unlike English, Kikuria does allow movements out of relative clauses, in apparent violation of the Complex Noun Phrase Constraint (CNPC), as we see in (11):

- (11) a. n-ko-gesaka naa-tEmere aba-ana ba-no ba-gaitubere \_\_\_\_\_  
 f-in-river I-beat 2-children 2-who 2-were swimming  
 "It's in the river that I beat the children who were  
 swimming \_\_\_\_\_."
- b. n-ekegaambo ke o-haanchere umw-iiseke \_\_\_\_\_  
 f-language which you-like 1-girl  
 o-no a-go-soma \_\_\_\_\_  
 1-who 1-top-read  
 "Which language do you like the girl who is reading?"

In (11a), a prepositional phrase, *nkogesaka*, "in the river," has topicalized out of a relative clause, *abaana bagaitubere kogesaka*, "the children were swimming in the river." In (11b), a NP, *ekegaambo ke*, "which language," has topicalized out of the relative clause *ono agosoma ekegaambo ke*, "who is reading which language?". In a fully structured tree for sentence (7a), like the one in (12), such movements would be blocked by the Head Feature Convention, as they are in English:

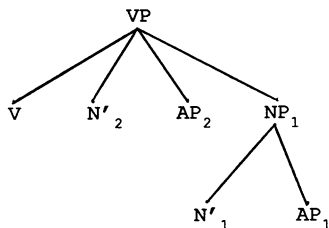
(12)



It is claimed in GKPS that SLASH is a HEAD feature; its instantiation is governed by the Head Feature Convention (HFC). The HFC states that mothers and heads must share SLASH feature values. Consider the starred subtree  $NP_2$ . The head daughter of  $NP_2$  is  $NP_3$ ; SLASH should be forced onto  $NP_3$ , rather than onto  $S[+R]$ , the relative clause. As Flickinger (1983) has shown, it is precisely this structure which blocks CNPC violations in English. But if we allow a liberated structure for VP like the one proposed in (5), we remove the obstacles to movements out of relative clauses. Consider now the tree in (13):



(5) (VP, [V, NP<sub>1</sub>], [NP<sub>2</sub>])



It is intuitively clear why we would want to assign a semantic interpretation to the instantiated ID rule rather than the tree: we want to assign a semantic role to the entire NP<sub>1</sub>, not to the scattered and arbitrary fragments of it which appear as daughters of VP in the liberated tree. Furthermore, we want to capture the relationship that obtains between the liberated components of the invisible NP; we can only do this by treating this invisible NP as a proper semantic entity.

It is equally intuitive why we would want subcategorization, too, to apply to the rule rather than the tree it licenses. The ID rule in (5) constitutes the subcategorization frame for ditransitive verbs. Clearly, we want to characterize these verbs as taking two NP arguments, as expressed in the ID rule, rather than, for example, a NP, and a N-bar with a coindexed AP, as in the tree. Metarules, it is claimed, apply only to lexical ID rules; this restriction was intended to capture the link between metarule application and subcategorization. It follows that if subcategorization is relevant at the ID rule level, then metarules, too, operate on ID rules rather than on licensed branchings.

Now consider the operation of feature instantiation. Levine and Zwicky claim that feature instantiation, too, operates at the ID rule level; to some extent, this must be true. The feature spreading principles ensure that all sub-constituents of NP (including adjectives, demonstratives, genitive PPs, and relative clauses) agree with their head nouns for noun class. We need these instantiation principles to apply at ID rule level, when the phrasal N and its modifiers are still each other's only sisters.

There is good reason, then, to accept the version of the theory which claims that both metarule application and feature instantiation apply at the level of ID rules, rather than on the liberated trees. But the analysis of unbounded dependencies presented here relies crucially on the instantiation of SLASH on liberated branchings, and on the application of the Slash Termination Metarule to the licensed branchings rather than to the ID rules. An analysis of the facts presented here which required SLASH instantiation and termination to apply at the ID rule level would necessarily involve a considerable theoretical weakening: at the very least, the abandonment of the Lexical Head Constraint and the claim that SLASH is a HEAD feature. I am proposing, instead, that we make a fundamental distinction between the SLASH spreading mechanism and all of the other features and metarules in the grammar: crucially, that the various components of the SLASH mechanism operates on liberated trees rather than ID rules. There is reason to believe that SLASH is fundamentally different from all other features: it is the only feature which is both a HEAD and a FOOT feature, for example; and recent work indicates that the characterization of SLASH may have to be revised yet further. Similarly, the SLASH Termination Metarule is different from metarules like Passive in that it does not introduce or delete categories, does not alter the constituent structure of any of the categories involved and does not alter the mapping from the syntactic structure to a semantic interpretation. The STM merely introduces the feature [+NULL], which is, in effect, no more than a piece of phonological information.

I propose, then, the model in (14):

- (14) Immediate Dominance (ID) Rules - Subcategorization  
 Semantic translation  
 Metarule application  
 (except STM)  
 Feature instantiation  
 (except SLASH)  
 Liberated branchings - SLASH instantiation and termination  
 Linear Precedence (LP) rules

SLASH instantiation and termination both operate on liberated branchings, while instantiation of all other features and application of all other metarules operate on the ID rule outputs. Such a division of rule application does, of course, have historical precedent: it echoes the transformational notion of cyclic and post-cyclic rules. But the present proposal makes explicit claims about the nature of both word order freedom and unbounded dependencies, claims of a sort that would be unavailable to a transformational model or any of its derivatives. Rather than weakening our theoretical claims, this analysis enables us to propose the following hypothesis: that the kinds of unbounded movements a language allows will be directly related to the kinds of order freedom the language employs. We have seen that this model makes the correct predictions for a range of data in Kikuria. It remains to be seen whether it can account for the facts about word order freedom and discontinuous constituents in other languages.

#### Notes

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1. The subscript numbers on the NPs, here and throughout this paper, have no formal importance; they are included simply for ease of reference.

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