

Serial Verb Constructions in Categorial Grammar*

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1.0. Introduction

This paper provides analyses within the categorial grammar framework of a number of constructions that have been labeled serial verb constructions.¹ The constructions analyzed occur in Sranan and Yoruba, and the data on which I based the analyses are from Sebba (1987), George (1975) and Lawal (unpublished paper, and personal communication). I focus on properties of serial verb constructions that are especially relevant to the theory of categorial grammar.

1.1. Overview of Categorial Grammar

There are a number of features of categorial grammar that are significant for the treatment of serial verb constructions. First, unlike most syntactic theories, categorial grammar contains only a very limited number of syntactic rules. Most versions of the theory contain three basic rules: function-argument application, functional composition, and typelifting. (Other rules that have been proposed are generally similar to these in nature.) Of these rules, the only one I'll refer to in this paper is function-argument application. Second, each syntactic rule in categorial grammar is parallel to a semantic operation of the same kind. For example, a rule of function-argument application in the syntax corresponds to function-argument application in the semantics. The meaning that results from function-argument application is determined by the meaning of the words involved. Most of the information about how specific categories of words eventually combine with other categories of words to form syntactic structures is contained in the lexical category specification of the words themselves; that is, lexical categories of words contain information about what categories of words they combine with, what the resulting category is, and what semantic relation the categories being combined stand in to one another. This is information that in other theories is found for the most part in phrase structure rules.

1.2. Overview of Serial Verb Constructions

In analyzing serial verb constructions, I took as a starting point the definitional criteria from Sebba (1987: 86–87):

* I would like to thank David Dowty for immensely helpful discussion and suggestions on this paper.

¹ The analyses provided here are at this point still preliminary, and many details remain to be filled in. Still, they give a relatively clear picture of how serial verb constructions could be treated within the categorial grammar framework.

- (1) (a) They have only one overtly expressed (syntactic) subject;
- (b) They contain two or more verbs without overt markers of coordination or subordination;
- (c) The actions expressed by the verbs are either simultaneous or consecutive, and all verbs are interpreted as having the same tense;
- (d) Negation, whether marked once or more than once, applies to the whole string;
- (e) Tense, aspect, mood and polarity (or whichever of these a language has) are either marked only once in the string, or else each verb in the string is marked as having the same tense, aspect, mood and polarity as V_1 ;
- (f) Either: the semantic subject of V_i is the subject of V_{i+1} , or: the object of V_i is the semantic subject of V_{i+1} .

Sebba also divides serial verb constructions into two types: coordinating and subordinating, and provides the following criteria for subordinating serial verb constructions (Sebba 1987: 112):

- (2) (i) Although two or more verbs are present, the sentence is interpreted as referring to a single action rather than a series of related actions. Although the action may involve several different motions there is no possibility of a temporal break between these and they cannot be performed, for example, with different purposes in mind.
- (ii) There is a strict ordering relationship between the verbs.
- (iii) Furthermore, the first verb in a series may subcategorise for a particular verb or class of verbs to follow it.
- (iv) In some cases, each transitive verb in the series has its own object In many other cases, however, where V_2 is transitive its object is apparently the same as the object of V_1 . In this event the object of V_1 is not repeated or pronominalized, but simply omitted.
- (v) A series-internal non-reflexive pronoun . . . may not be an anaphor of any of the arguments of the verbs in the string.

Sebba (1987: 112) notes that in Sranan, subordinate serial verb constructions all occur with specific verbs in the V_2 (second) position. Most of the constructions considered in this paper fall into the category of subordinate serial verb constructions, although I also discuss an example of the coordinate variety.

The characteristics of serial verbs that are especially important for the analysis provided here paper are the following:

- a. Verbs that appear in serial verb constructions are also able to occur as the sole verb in a sentence.
- b. There may be language-specific restrictions on which verbs may occur in the various positions in the constructions.
- c. Serial verb constructions have a semantic interpretation that seems to be different from straightforward conjunction.
- d. A single NP may be a semantic argument of one or both of the verbs in the construction, and is not necessarily the same semantic argument of both.

2.0. Analyses of serial verb constructions

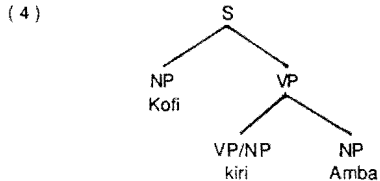
Before embarking on analyses of specific serial verb constructions, I'd like to give an idea of the general approach I'm going to take in analyzing them.

2.1. General approach

As I mentioned before, in categorial grammar the syntactic structure of sentences is a result not of phrase structure rules, but of the syntactic categories of the lexical items in those sentences. Consider the following sentence (this is a constructed example that I would expect to be grammatical in Sranan):

- (3) Kofi kiri Amba
Kofi kill Amba
'Kofi killed Amba'

Under a categorial grammar approach, the syntactic structure of this sentence results from the fact that the verb *kiri* is of the syntactic category VP/NP. A verb with this syntactic category must be able to combine with two NPs in order to form a sentence. The following tree shows the structure associated with such a combination:



Given the idea that all structures result from the syntactic categories of their constituent expressions, in a categorial grammar analysis, one way to account for serial verb constructions is to say that at least one of the expressions in them has a more complex syntactic category than in a simpler construction like (4). Thus, in a serial verb construction like the one shown in (5) (Sebba 1987: 109), one of the items in the construction would have a more complex category than the basic category that item has when it occurs in a construction like (4).

- (5) Kofi naki Amba kiri
Kofi hit Amba kill
'Kofi struck Amba dead'

If we accept this assumption, the only remaining task is to identify which expression in a serial verb construction should have a more complex category, and what that category should be. The crucial data in making these determinations are facts about lexical restrictions on the appearance of verbs in the different positions in these constructions, facts about the constituent structure of the final structure, and facts about the resulting semantic interpretation of the construction.

Complex categories of the type discussed above may be analyzed in categorial grammar as arising through the application of a category-changing rule. Such a rule might apply at the phrasal level or at the lexical level (in which case it would apply in the lexicon to some or all words of a certain category, depending on how productive the rule is). One treatment of lexical category-changing rules within Montague Semantics is found in Dowty (1982). An example of a simple category change given is "Unspecified Object Deletion" (Dowty 1982: 91), which takes a (two-place) relation and deletes one of its arguments to form a set:

- (6) S5: <F5, <TV>, IV> ("Unspecified Object Deletion")
Semantic Operation: $\lambda x (\exists y [\alpha' (y) (x)])$
English: F5 (α) = α

The first line of the rule shows an ordered triple which consists of the name of a syntactic operation (in this case, F5), the category that is the input to the rule (here, TV, or equivalently VP/NP), and then the category of the output of the rule (IV, or VP) (Dowty 1982: 85). The second line describes the semantic operation that corresponds to the syntactic operation, and the third line describes any changes in the form of the verb (in this case, the form of the verb stays the same). The fact that the rule given here is lexical is given by the fact that the rule is specified as applying to lexical categories, and it is specified as applying in the lexicon. The idea behind the semantic operation given here is that a verb that used to require two arguments both syntactically and semantically now only requires one argument on both of these levels.

A more complex example is the lexical rule resulting in the addition of the suffix *-able* (Dowty 1972: 300). Rather than showing the formal rule here, I will simply give an informal description of its effect. Basically, the rule takes something of category VP/NP (that is, a transitive verb) and changes it into something of category ADJ, at the same time making a change in the English form of the verb by adding the suffix *-able*. The important point about this category-changing rule is that its result is more complicated than mere relation reduction.

The approach I take in this paper involves lexical category-changing rules similar to the ones just discussed. As mentioned in (2.1), verbs that can appear in SVCs also appear as the sole verbs in sentences (cf. (3)). The rules given here will operate on a basic verbal syntactic category to give a new, more complex category with a new semantic interpretation. The semantic translations for these constructions make the NPs in the constructions the appropriate semantic arguments of the verbs, and establish a semantic connection of some kind between the meanings of the two verbs. I'll be providing semantic operations in a Montague-semantics framework to represent some aspects of the meanings of the SVCs. Like the relation-reducing rule in (6), these rules involve no morphological change in the verbs that undergo them (zero conversion).

Like many if not most lexical rules, the rules given here are for the most part not entirely productive: that is, they don't apply to every word of a given category. In languages in which only a limited class of verbs belong to the more complex serial verb category, only those verbs would be subject to the lexical rule. The rule would be more productive in languages in which almost any word of the basic type can occur in the serial verb construction.

2.2. Analyses of specific constructions

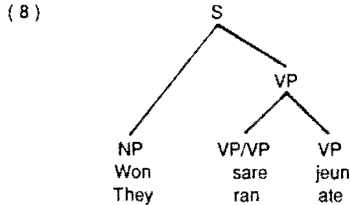
The constructions I am considering here from Sranan and Yoruba are representative of the full range of serial verb constructions in these languages. Constructions I have not analyzed are similar in nature, so I assume they could be analyzed in a similar way within the categorial grammar framework. Since the way the verbs combine syntactically with their arguments (the basic syntactic category of the verbs) and the function-argument relationships in the resulting semantic interpretations are what I am most concerned with here, I've grouped the constructions into categories largely based on these characteristics.

2.2.1. Serial verb constructions with 'run,' 'come' and 'go'

The verbs meaning 'run,' 'come' and 'go' in languages with serial verb constructions are generally free to combine with any verb phrase to give a new verb phrase. In Yoruba, the intransitive verb *sare* ('run') can precede any verb, regardless of its syntactic category. In constructions of this type, *sare* takes on the meaning 'quickly.' The example in (7) illustrates this construction:

- (7) Won sare jeun
They ran ate
'They ate quickly' or 'They ran and ate'

Both *sare* and *jeun* have the basic category of IV (VP). With only this basic category, it would be impossible for the words in (7) to combine to form a sentence if we are relying only on the rule of function-argument application.² Since this construction in Yoruba only occurs with the verb *sare*, we can write a rule that changes *sare* from an intransitive verb to a more complex category. The new category should be one that can combine with another verb phrase to form an intransitive verb phrase: that is, a VP/VP. The tree in (8) shows how this category can combine with a verb phrase to form a new verb phrase.



The lexical rule effecting the category change could be written as shown in (9):

² Another, less attractive alternative would be to posit a new syntactic rule which combines two like categories to form another category of the same type. This is essentially what a coordination rule might do. But the semantics of this construction is different from straightforward coordination, and since the construction is limited to just a certain set of verbs, it seems more plausible to account for it using a lexical rule than a syntactic one.

- (9) Lexical rule for Yoruba (applies to *sare*):
 If β_1 is a lexical item of category VP,
 there is another lexical item β_2 of category VP/VP.

Although the form of this rule is general, it actually applies only to the single lexical item *sare*. I've left out the semantic operation for this rule because it is different from the others I'll be discussing here. The slash notation I am using in this paper is directional, so that the slash in the category VP/VP indicates both the fact that this category must combine with something of category VP to result in something of category VP and also the fact that the thing combined with must be to the right. In the directional slash notation I am using, a backslash will indicate that the category combined with must be to the left.

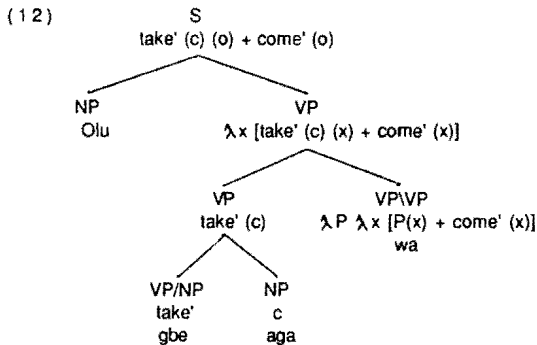
The Yoruba verbs *wa* ('come') and *lo* ('go') are similar to *sare* in that they can combine with another VP, but these two verbs follow another verb rather than preceding it. An example with *wa* is shown in (10):

- (10) Olu gbe aga wa
 Olu take chair come
 'Olu brought the chair'

For these verbs, we need a new category that allows them to combine with a preceding verb. The rule given in (11) accomplishes this:

- (11) Lexical rule for Yoruba (applies to *wa* and *lo*):
 If β_1 is a lexical item of category VP,
 there is another lexical item β_2 of category VP\VP.
 The semantic translation of $\beta_2 = \lambda P \lambda x [P(x) + \beta_1(x)]$.

This rule would apply only to the verbs *wa* and *lo* in Yoruba. The syntactic structure of the sentence in (10) is shown in (12):



Notice that the complex category resulting from the rule in (12) is identical to the one in (9) except for the direction of the slash.

Under the syntactic category of each node in the tree, I have given the semantic translation.³ The '+' in the semantic translation for the new lexical item is intended to represent the indeterminate relationship that holds between the two propositions in the translation. The translation for the sentence in (10) is shown in (13):

(13) Semantic translation for (10): take' c(o) + come' (o)

For simplicity, I am assuming that the same relationship (indicated by the + symbol) holds between the propositions in most of the serial verb constructions I discuss here. I won't attempt to characterize what this relationship is at this point.⁴ The important thing about the semantic translations for the new categories in the rules I give here is that they represent the semantic function-argument relationships that exist between the different NPs and the verbs in the constructions. The translation in (11), for example, allows the verb to first combine with another verb, which via lambda conversion replaces the *P* in the translation, and then allows the representation of the subject of the entire sentence to replace the *x* in the formula. (The linear order of the variables being lambda-ed in must match the order in which the category combines with its arguments).

The rule in (12) applies only to intransitive verbs. However, *wa* and *lo* also occur with NP complements, both alone and in serial verb constructions. An example is shown in (14):

(14) Ajao rin lo oja
Ajao walked go market
'Ajao walked to the market'

For *wa* and *lo* with NP complements, we need a different rule, one that allows the verbs to first combine with their complements and then with the preceding VP. This rule is shown in (15)⁵:

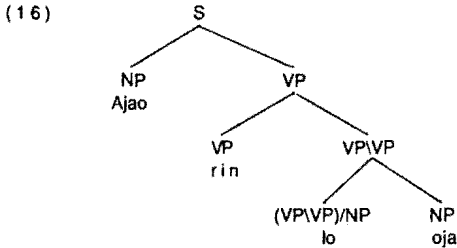
(15) Lexical rule (applies to *wa* and *lo*):
If β_1 is a lexical item of category VP,
there is another lexical item β_2 of category VP\VP/NP.
The semantic translation of $\beta_2 = \lambda y \lambda P \lambda x [P(x) + \beta_1(y)(x)]$.

³ Throughout this paper, I am using a simplified notation that must be commented on. The translations given are all within a Montague Semantics framework. To make this notation easier to read, I am using small letters to represent all NPs (in Montague Semantics small letters are normally used only for representing individuals, not sets of individuals). In addition, I treat NPs extensionally rather than intensionally, again for clarity and ease of exposition.

⁴ Although I am not making an attempt to identify it here, the nature of this relationship is important in that it may be able to account for some of the semantic restrictions on the first position in these constructions.

⁵ I'm ignoring here the relationship between the complement-taking and non-complement-taking *wa* and *lo*. This relationship could also be indicated via a lexical rule, which could make the rule in (14) superfluous.

As shown in the tree in (16), the rule in (15) creates a category that can combine first with the original complement, then with the preceding VP, and finally with the subject NP.



With each syntactic combination (syntactic function-argument application), a parallel function-argument application takes place in the semantics. The final semantic translation for the sentence is shown in (17). This translation insures that the NP that is the syntactic subject of the sentence is the semantic subject of both verbs.

(17) Semantic translation for (15): walk'(a) + go'(m)(a)

2.2.2. Constructions with Object Sharing

In these constructions, two transitive verbs flank an NP that functions as the direct object of both of them. The examples in (5) and (17) from Sranan and Yoruba (George 1975: 82) illustrate this type of serial verb construction:

(5) Kofi naki Amba kiri
Kofi hit Amba kill
'Kofi struck Amba dead'

(18) Ajao ra epa je
Ajao bought peanuts ate
'Ajao bought and ate the peanuts'

Lexical restrictions on the verbs that can appear in this construction vary quite a bit from language to language. In Sranan, for example, only certain verbs can occur in the second position (Sebba 1987: 43). However, in Yoruba, constructions like the one in (17) have been claimed to occur with almost any transitive verb in either position (Adenike Lawal, personal communication).

It's worth comparing the meaning of Sranan constructions like (5) with what Sebba has called coordinating serial verb constructions, as in (19) (Sebba 1987: 109):

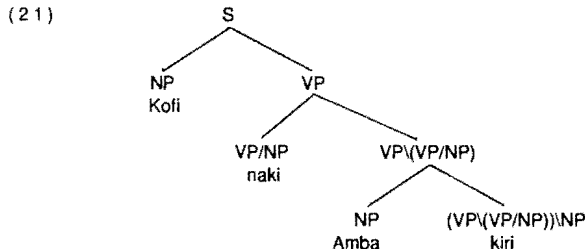
- (19) Kofi naki Amba kiri en
 Kofi hit Amba kill her
 'Kofi hit Amba and killed her'

An important syntactic difference between this construction and the ones with object sharing is that the two verbs in (19) have different NPs serving as their direct objects. There is claimed to be a difference in meaning between the two constructions (Sebba 1987: 109). In the sentence in (5), Kofi's killing Amba occurs because of his striking her; that is, by striking her, he kills her. In (19), however, it is possible that Kofi may have struck Amba repeatedly and then killed her. It seems that the kind of semantic interpretation we want for (19) is straightforward conjunction. A Montague-style semantic translation for this sentence will be $\text{hit}'(a)(k)$ & $\text{kill}'(a)(k)$. How to analyze the meaning of (5) is less clear, but what's important at this point is that, regardless of how the semantic interpretation of (5) is eventually described, it is considered by native speakers to be different from the semantic interpretation of (19). Because of this difference, I have assumed that we should have distinct semantic interpretations for the two structures. For the Sranan serial verb construction shown in (5), we will need a lexical rule that applies to the category of the second verb in the construction (since this is the position that is restricted to a specific set of verbs), changing it into a category that can combine with the other categories so that we eventually end up with a sentence. Since categories are typically assumed to combine only with adjacent categories, we need to change the second verb into something that can first combine with the NP that precedes it, and then with the transitive verb that precedes the NP, to finally result in a VP (that is, something that combines with a subject NP to give an S). The category we want is $(VP \setminus (VP/NP)) \setminus NP$. As shown in the tree in (21), this category is able to combine with the other categories in the sentence to give an S.

A lexical rule for changing category of second verb is shown in (20):

- (20) Lexical rule for Sranan (applies to *kiri*, *broko*, and *panya*):
 If β_1 is a lexical item of category VP/NP,
 there is another lexical item β_2 of category $(VP \setminus (VP/NP)) \setminus NP$.
 The semantic translation of $\beta_2 = \lambda y \lambda P \lambda x [\beta_2(y)(x) + P(y)(x)]$.

In a language like Yoruba, in which most if not all verbs can occur in such a construction, a lexical rule of this type would be more productive, possibly applying to any transitive verb.



- (22) Semantic translation for (5): $\text{hit}'(a)(k) + \text{kill}'(a)(k)$

2.2.3 Constructions with Object of First Verb as Semantic Subject of Second Verb

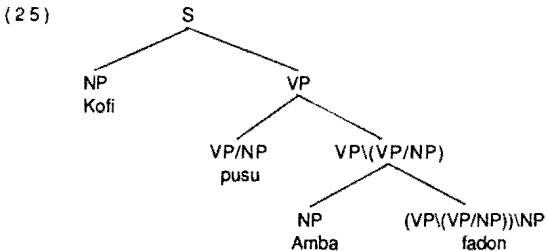
The constructions in this category are similar to those just discussed. The differences are that the second verb has the basic category of being an intransitive verb rather than a transitive one, and that the NP that is flanked by the two verbs acts as the semantic subject of the second rather than as its object. The second characteristic makes this type of construction especially different, since it is the only type in which the syntactic subject of the sentence is not the semantic subject of both verbs. An example of this construction in Sranan is shown in (23) (Sebba 1987: 91):

- (23) Kofi pusu Amba fadon
 Kofi push Amba fall
 'Kofi pushed Amba down'

Only a small set of intransitive verbs can occur in the second position in this construction, so the category-change rule must be formulated to apply to that category. The complex syntactic category that results from the rule will be the same as the one resulting from the rule in (20), but the semantic translation must be different to allow the second NP to be the semantic subject of the second verb. The following rule will do the job.

- (24) Lexical rule (applies to *fadon*, *komato*, etc.):
 If β_1 is a lexical item of category VP, there is another lexical item β_2 of category $(VP \setminus (VP/NP)) \setminus NP$. The semantic translation of $\beta_2 = \lambda y \lambda R \lambda x [R(y)(x) + \beta_1(y)]$.

The tree in (25) shows the structure of (23):



- (26) Semantic translation for (23): push'(a)(k) + fall'(a)

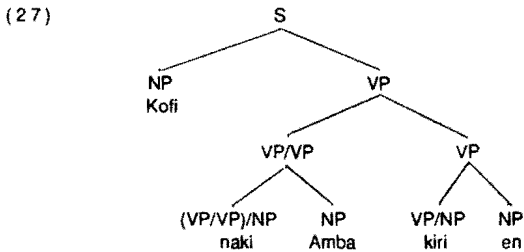
An important point to be seen from this type of construction is that two identical syntactic categories must have different semantic interpretations in order to account for the semantic difference between these constructions.

2.3.4. A Coordinate Construction

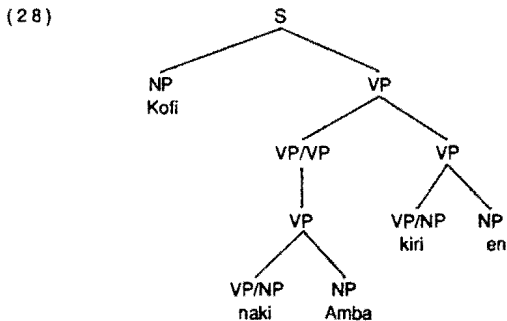
The constructions discussed in the previous sections have all been what Sebba called subordinate serial verb constructions. However, it's interesting to compare these constructions to the so-called coordinate constructions. The discussion that follows is a sketch of the different ways coordinate constructions might be treated in categorial grammar. An example of a coordinate construction was shown in (18), repeated below:

- (18) Kofi naki Amba kiri en
Kofi hit Amba kill her
'Kofi hit Amba and killed her'

There are essentially three ways this string of words could be analyzed within categorial grammar. First, it could arise from a category change rule that operates on one of the verbs. If the rule operated on the first verb, the following structure would result (If it had operated on the second verb, the structure would be the same except for the category labeling):

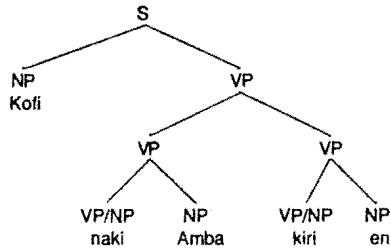


A second possibility is that a category-changing rule could apply at the phrasal level rather than the lexical level, as shown in (28). The VP dominating [hit Amba] is changed by this rule to a VP/VP, which can then combine with the VP to the right.



The last possibility is shown in (29). Here, an entirely new syntactic rule is added to the grammar, added to the set of rules that include function-argument application and function composition. This rule would be essentially a coordination rule that applies to two like categories, conjoining them without an overt marker.

(29)



3.0 Conclusion

Using lexical rules in a categorial grammar framework has the advantage of allowing us to create lexical categories that can combine with other words to form serial verb constructions. The lexical rule approach seems especially appropriate since there are frequently syntactic restrictions on the verbs that can occur in some position within the constructions. Finally, this approach provides different categories for each type of serial verb construction; the characteristic that groups all of the constructions into a class is the fact that a lexical rule has applied to a simple verbal category to create a more complex one.

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