# On the syntactic category of Akan compounds
## A product-oriented perspective

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**Abstract:** In accounting for the properties of morphological constructions, one may adopt a source-oriented view where every property of the whole emanates from the parts or a product-oriented view where the whole may have properties that do not come from the parts. Such properties are called holistic constructional properties. Studies on Akan compounds have been invariably source-oriented, assuming that every property in a compound, including the syntactic category, has to come from its constituents. I show that compounding in Akan is blind to the syntactic category of the constituents. Thus, notwithstanding the syntactic category of the constituents the Akan compound is invariably nominal. This paper, therefore, provides evidence of holistic properties of morphological constructions in the form of the syntactic category of Akan compounds. I also present a Construction Morphology modelling of the syntactic category of the Akan compound as a holistic constructional property which is inherited from a constructional meta-schema that is pre-specified to be nominal. Finally, I posit and exemplify four schemas which inherit the category N from the meta-schema but differ in terms of the presence and position of a head constituent.

**Keywords:** Akan; compounds; Construction Morphology; constructional schema; holistic properties

## 1. Introduction

The purpose of this paper is two-fold. The first is to show that the process of compounding in Akan (Kwa, Niger-Congo) is blind to the syntactic category of the compound members, so that notwithstanding the syntactic category of the individual constituents the Akan compound will be a noun. I argue that this widely accepted fact may be interpreted to mean that the nominal syntactic category of the Akan compound is a holistic constructional property of the compound which is inherited from a meta-schema for compound formation in Akan which is pre-specified to bear a syntactic category – noun. The position assumed here is consistent with the view that "systematic properties of compounds need not be derived from the head, but can be seen as holistic properties of the compound construction" (Booij 2012a, 345).

This property of Akan compounds calls for a framework that allows for the expression of holistic properties of a construction, including the syntactic category, without having to posit abstract categories as the source of the nominal syntactic category. Such a framework is provided in Construction Morphology one of whose foundational ideas is that morphologically complex forms can have holistic properties and so allows for the presentation of a consistent account of the formal and semantic properties of both compositional and non-compositional constructions. Thus the second purpose is to present a Construction Morphology modelling of the account.

This study is based on a collection of 443 compounds that occur in a dataset of 1000 complex nominals (the other 557 are affix-derived complex words) collected from a variety of sources, including a primary school reader on fishing, the Akan translation of the Universal Declaration on Human Rights, Akan translation of Plato's Apology of Socrates and a wordlist collected from Christaller's (1933) dictionary.

In the rest of this paper, I present brief introductions to Construction Morphology (section 2) and the notion of orientation in the analysis of complex words (section 3). In section 4, I discuss compounding in Akan, showing how the syntactic category of Akan compounds has been accounted for in the literature. In section 5, I present the Construction Morphology modelling of the constructionist view of the syntactic category of the Akan compound. I posit a meta-schema and four immediate subschemas that, I believe, account for all Akan compound types, at a coarse-grained level. Section 6 concludes the paper.

## 2.  Construction Morphology

Construction Morphology (CM) is a theory of linguistic morphology that "aims at a better understanding of the relations between morphology, syntax and the lexicon and of the semantic properties of complex words" (Booij 2010a, 543). The main tenets of CM are a theory of the notion **construction**, a theory of **word structure** and a theory of the **lexicon**.

The notion **construction**, as developed in Construction Grammar (Goldberg 1995; 2006), is employed to develop an insightful account of the morphological component of language, providing "a framework in which both the differences and the commonalities of word level constructs and phrase level constructs can be accounted for" (Booij 2010b, 1). Thus, in CM, words are morphological constructions, word-level form-meaning pairs that may have holistic properties, and they are formed not by word formation rules but by schemas that generalize over sets of existing com-

plex words and also serve as a recipe for forming new ones. Taylor (2002, 233) calls these the sanctioning and enabling functions of constructional schemas. The former means schemas allow constructions which are formed in accordance with the schemas to be rapidly categorized and interpreted and to be judged as fully acceptable in the language. The latter facilitates the rapid and effortless creation of an indefinite number of new expressions, in conformity with the specification of the schema. For example, the schema in (1) generalizes over all the non-specific properties of right-headed compounds. It also serves as a pattern for forming other right-headed compounds.

(1)  $\langle [[a]_{Xi}\ [b]_{Yj}]_{Yk} \leftrightarrow [\text{SEM}_j \text{ with relation R to } \text{SEM}_i]_k \rangle$[1]

Schemas and the constructions that instantiate them co-exist in what is referred to as the hierarchical lexicon, a structured repository of connected complexes comparable to a map, which is a conceptualization of the lexical knowledge of the speaker of a language. This is what Michaelis and Lambrecht (1996, 216) mean by the observation that "[t]he inventory of constructions is not unstructured; it is more like a map than a shopping list. Elements in this inventory are related through inheritance hierarchies, containing more or less general patterns."

Two types of relations hold within the hierarchical lexicon. They are "instantiation", which exists between a (word formation) schema and a word that is formed by the schema and the "part of" relation, which obtains between a complex word and its constituents. For example, right-headed compounds may be of any syntactic category depending on the language. Therefore, in a language with right-headed nominal compounds like Akan, there would be a more specific instantiating schema with the variables $a$ and $b$, substituted by the syntactic category, noun, as shown in (2).

(2)  $\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM}_j \text{ with relation R to } \text{SEM}_i]_k \rangle$
$$|$$
$\langle [[N]_i\ [N]_j]_{Nk} \leftrightarrow [\text{SEM}_j \text{ meant for } \text{SEM}_i]_k \rangle$

An even more specific schema with the variables substituted by specific lexical items instantiates the general template for Akan N-N compounds, showing what a word formed by the dominating schema looks like (3). Here,

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[1] The uppercase variables $X$ and $Y$ stand for the major lexical categories (N, V, A). The lowercase variable $a$ and $b$ stand for arbitrary strings of sound segments, whilst $i$, $j$ and $k$ are indexes for the matching properties of the constituents of the compound and the compound as a whole.

we see the two kinds of relations; the compound *àsòm̀dwòèékúó* instantiates the Akan N-N compound schema while its constituents, *àsòm̀dwòèέ* and *èkúó*, have a **part of** relation with the compound. The more specific schema inherits its non-unique properties from the dominating schema, to the extent that the inherited features do not conflict with its specific properties.[2]

(3)  $\langle[[a]_{Xi} [b]_{Yj}]_{Nj} \leftrightarrow [\text{SEM}_j \text{ with relation R to SEM}_i]_j\rangle$
     |
     $\langle[[N]_i [N]_j]_{Nk} \leftrightarrow [\text{SEM}_j \text{ meant for SEM}_i]_k\rangle$
     |
     $[[àsòm̀dwòèέ]_{Ni} [kúó]_{Nj}]_{Nj}$ 'The Peace and Security Council (UN)'
     /                      \
     [àsòm̀dwòèέ] 'peace' [èkúó] 'organization'

The hierarchical structure of the lexicon results from the fact that complex words bear multiple relations, with every complex word somewhat connected to another, which is also connected to another.[3] For example, (3) does not stand alone as an abstract word-formation schema. It is also connected to other words in the lexicon that contain either *àsòm̀dwòèέ*, such as *wíásé ásóm̀dwòèέ* 'world peace' or *èkúó* such as *èkúó m̀bá* 'group members'. This creates the network of related words.[4]

## 3.  Two types of modifications: source-oriented versus product-oriented

In accounting for the properties of morphological constructions, one may adopt a source-oriented view where every property of the whole is expected to emanate from the parts. This view works through modification of default options, where a base that is accessible whole (including an analytically complex form) is a **source** and the word that results from the modification of the source is a **product** (Zager 1981, 1124). Thus, in a source-oriented

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[2] The relation "R", in this case, is spelled out as 'for' as in 'an organization for peace'.

[3] This is the connectionist view of the mental representation of morphological knowledge (cf. Rumelhart & McClelland 1986).

[4] Adopting a hierarchical lexicon has advantages. One is that formally, for each individual word, only those properties that are not inherited from the dominating schema may be specified. Two, because a word may inherit properties from more than one dominating node, it helps explain what may appear as conflicting properties in the same word, as in the case of the so-called mixed categories (Malouf 2000a;b). Three, a property of a base may not recur in the complex word, just as not all information on a higher node may be preserved in a lower node.

approach, the way to show the relatedness of two forms is to assume that a base is taken and its properties modified in some precise way to derive the more complex form either by attaching a formal piece or applying some process to it. Zager (*idem.*) observes that the function of the modification process is to categorize the new with the old. So that, in the simplest case, the product is a subcategorization of the source and the source remains maximally recoverable, since the product is to be understood as a variety of the source.

The source-oriented view is employed in most work in morphology (*inter alia,* Aronoff 1976; Roeper & Siegel 1978; Lieber 1980; Williams 1981; Selkirk 1982; Scalise 1984; Lieber 1989; 1992; 2004).

Alternatively, one may adopt a product-oriented view where the whole may have properties that do not necessarily emanate from the properties of the constituents. As Zager (1981, 1124) puts it, "[i]n many instances, the product category has some overt characteristic markers – an ending, a stress pattern, or some such".

Constructionist approaches to morphology, including CM, adopt the product-oriented view, stressing the fact that morphological constructions often have properties that do not emanate from those of their constituents. Such properties are said to be holistic or output properties of the constructions themselves (Booij 2010b; 2012a;b).

The output-oriented view has its foundation in psycholinguistic studies of the early 1980s (cf. Zager 1981; Bybee & Slobin 1982; Bybee & Moder 1983) which suggested that "a model of the mental representation of morphology should include schemas of morphological categories to explain various properties of morphological rules that the traditional IA (Item-and-Arrangement) and IP (Item-and-Process) models failed to account for" (Haspelmath 1989, 32).

A set of output-oriented properties of morphological forms of a particular category defines a schema, a terminology from cognitive science that refers to a data structure for representing generic concepts stored in memory (Rumelhart 1980). This terminology is, therefore, apt for capturing generalizations across all levels of linguistic and non-linguistic abstractions.

The trend in the early 1980s was to assume that schemas were just one of many ways of organizing lexical information for more efficient accessing and that they were needed to account for exceptional unproductive cases such as the past tense forms of English irregular verbs (cf. Bybee & Slobin 1982, 286). However, in the late 1980s (Köpcke 1988; Haspelmath 1989) it was demonstrated that it is not the case that just a marginal aspect

of the lexicon is organized by means of output-oriented schemas. Rather, major aspects of the morphology of a language such as plural formation in German (Köpcke 1988) and Hausa (Haspelmath 1989) may be organized by means of such output-oriented schemas.

The modest contribution of the present paper is the suggestion that the nominal syntactic category of the Akan compound is to be seen as the property of an output meta-schema that is pre-specified to be nominal. Thus, the Akan compound is invariably nominal because it ultimately instantiates this meta-schema and inherits the nominal syntactic category from it.

## 4. Compounding in Akan

In Akan, compounding, the process of forming a word by putting together two potentially free forms, has been studied for about a centuries and a half (Christaller 1875; Dolphyne 1988; Anyidoho 1990; Abakah 2004; 2006; Marfo 2004; Obeng 2009; Anderson 2013; Appah 2013a). However, Akan compounding is still a relatively under-researched area compared to studies on compounding in languages like English, Italian, Greek and German. Also, most of the available studies have focused on the phonology of Akan compounds. Be that as it may, many interesting properties of Akan compounds have been identified. For example, it has been observed that, in Akan, compounding is about the most productive word formation process (Appah 2013b) because practically any two lexical items may be put together in virtually any order to form a compound.

Previous studies (Dolphyne 1988; Anyidoho 1990; Anderson 2013) identified six classes of Akan compounds based on the syntactic category of the constituents. They are Noun-Noun (N-N), Noun-Adjective (N-A), Adjective-Noun (A-N), Noun-Verb (N-V), Verb-Noun (V-N) and Verb-Verb (V-V). However, Appah (2013a) has argued rather convincingly that the class of A-N compounds does not exist in Akan and that the compounds that were previously thought to belong to this class are indeed N-N compounds with de-adjectival nominal left-hand constituents. This leaves only five types of compounds based on the syntactic category of the constituents – N-N, N-A, N-V, V-N and V-V.

In terms of headedness, Akan compounds are mostly right-headed (cf. Appah 2013a, 84–85) much in agreement with the universally preferred head position in compounds (cf. Williams 1981; Dressler 2006). However, within specific compound types like N-N, and N-V, we may find both left-headed and right-headed compounds. For instance, out of the 443 com-

pounds, there are 208 (47%) N-N compounds. 42 (20.6%) of them are exocentric and 166 (79.8%) are endocentric.[5] The endocentric N-N compounds are distributed as follows: 139 (83.7%) are right-headed, 21 (10.1%) are left-headed and 6 (2.9%) are dual-headed.[6]

An interesting feature of all the identified Akan compounds is that, notwithstanding the syntactic category of the constituents, the resultant Akan compound is invariably nominal. In other words, in Akan, the composition of two nouns yields a noun. The composition of a noun and an adjective yields a noun. The composition of a noun and a verb yields a noun. Even the combination of two verbs to form a compound results in a noun (Dolphyne 1988; Anyidoho 1990; Anderson 2013; Appah 2013a;b). Thus, all the compounds in (4) are nouns, although the constituents are a noun and a verb (4a), two nouns (4b), a noun and an adjective (4c), a verb and a noun (4d) and two verbs (4e).

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[5] This difference is statistically significant; $p < .0001$ (df $= 1$, $\chi^2 = 73.9231$).

[6] The head of a compound is the constituent of which the whole compound is a hyponym. Thus, in a compound like *sky blue*, *blue* is the head because *sky blue* is a type of *blue* and not a type of *sky*. Some scholars distinguish between a formal head and a semantic head which may not necessarily be coextensive (cf. Selkirk 1982; Abakah 2004; Katamba & Stonham 2006; Scalise & Guevara 2006). The semantic head is the constituent that shares its lexical conceptual information with the whole compound, so that the compound will be a hyponym of the semantic head (Scalise & Guevara 2006, 190). The formal head is the constituent that shares its lexical category and subcategorization frame with the whole compound, so that the whole compound has the same distributional properties as its formal head (*idem.*). In this paper, when I mention the head of a compound, it will be in reference to the semantic head. It is worth adding that Dressler (2006, 32–33), distinguishes between a semantic head, a syntactic head and a morphological head. He argues that in *pickpocket*, there is no semantic head because the referent of the compound is not named in the compound itself. *Pick* is the syntactic head because it is that which selects *pocket* as its internal argument. *Pocket* is the morphological head because, when the compound is pluralized, the plural marker attaches to *pocket* as in *pickpocket-s* and not *pick-s-pocket*. Dressler (2006) again argues that even languages that have either predominantly or exclusively left-headed compounds may have the tendency to mark inflectional categories on the right constituent. However, as discussed in the literature (Booij 2007; Bauer 2010), the problem with Dressler's position on morphological head is that the position of the inflectional element may be a default in the language and may not necessarily identify a morphological head.

(4)   a.   **[N-V]**<sub>N</sub>

| Base 1 | Base 2 | Compound |
|---|---|---|
| òsé 'outry' | bɔ́ 'hit/make' | òsé!bɔ́[7] 'jubilation' |
| èhá 'hunting' | yé/yɔ́ 'do' | àhá!yɔ́ 'hunting' |
| ǹtɛ́ḿ 'speed' | pé 'want' | ǹtɛ́ḿ!pé 'haste' |
| àsó 'ear' | twé 'to pull' | àsó!twé 'punishment/penalty' |
| àsɛ́ḿ 'matter' | bìsà 'to ask' | àsɛ̀m̀bí!sá 'question' |
| àbùsùá 'family' | bɔ́ 'to join' | àbùsùàbɔ́ 'being a family member' |
| bàká 'lagoon' | nú 'to stir' | bàkànú 'fishing in a lagoon' |
| àdé 'thing' | sùà 'to learn' | àdèsùá 'education, learning' |

b.   **[N-N]**<sub>N</sub>

| Base 1 | Base 2 | Compound |
|---|---|---|
| òdwáń 'sheep' | òníní 'male' | òdwàníní 'ram' |
| ɔ̀báá 'woman' | ɔ̀táń 'parent' | ɔ̀báátáń 'mother' |
| àsààsé 'earth' | m̀fòní 'photo' | àsààsèm̀fó!ní 'map/photo of the earth' |
| ànìm̀gùàsé 'shame' | àdé 'thing' | ànìm̀gùàsèdé 'disgraceful thing/act' |
| àsòm̀dwòèé 'peace' | èkúó 'group' | àsòm̀dwòèékúó 'The UN Peace Council' |

c.   **[N-A]**<sub>N</sub>

| Base 1 | Base 2 | Compound |
|---|---|---|
| ɔ̀báá 'woman' | búnú 'unripe/raw' | ɔ̀báábúnú 'virgin' |
| ètíré 'head' | bɔ̀né 'bad' | ètìrìbɔ̀né 'bad luck' |
| àfòwá 'sword | síń 'half' | àfòwàsíń 'penknife' |
| ǹwá 'snail' | òníní 'male' | ɔ̀wàníní 'a large snail' |
| tèkyèrèmá 'tongue' | òníní 'male' | tèkyèrèmàníní 'a sharp tongue' |

d.   **[V-N]**<sub>N</sub>

| Base 1 | Base 2 | Compound |
|---|---|---|
| dí 'to assume' | bèá 'place' | díbèá 'rank' |
| ká 'to remain' | àkyíré 'behind' | káàkyíré 'youngest family member' |
| kúḿ 'to kill' | èkɔ́ḿ 'hunger' | kúm̀kɔ́ḿ 'species of maize' |
| sùsú 'to measure' | dùá 'stick' | sùsúdú!á 'yardstick/measuring rod' |

e.   **[V-V]**<sub>N</sub>

| Base 1 | Base 2 | Compound |
|---|---|---|
| gyé 'receive' | dí 'eat' | gyédí 'faith/belief' |
| fá 'to take' | kyé 'to gift' | fákyé 'forgiveness' |
| dí 'to eat' | má 'to give' | dímá 'advocacy' |
| brè 'to suffer' | nyá 'to gain' | brènyá 'suffer to gain (a name)' |

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[7] Downstep is indicated by an ! before the syllable bearing the downstep high tone.

The foregoing facts suggest, as noted in the introduction, that compounding in Akan is blind to the syntactic category of the constituents (Jackendoff 2009, 113). Thus, the syntactic category of Akan compounds cannot be said to emanate from the constituents without being forced to posit various, possibly covert, nominalizations in cases where what seem to be the head of the compound, and the expected source of the nominal syntactic category, is itself not nominal. I will show below that this has been the approach to accounting for the nominal syntactic category of the Akan compound.

## 4.1. Previous accounts of the syntactic category of Akan compounds

Generally, studies on Akan complex nouns, including compounds, have been source-oriented. For example, the tonal melody of Akan compounds is accounted for by means of various tone rules that modify the underlying tonal melody of the source (Anyidoho 1990; Abakah 2004; 2006; Marfo 2004; Obeng 2009; Anderson 2013). The way the syntactic category of Akan compounds is treated is no different.

The view that compounding in Akan is a nominalization process is acknowledged widely in the literature. The difference between previous accounts and the one proposed in the present paper, therefore, lies in how the nominal syntactic category of the Akan compound is to be accounted for.

Previous studies (Christaller 1875; Anyidoho 1990; Obeng 2009; Anderson 2013) have assumed, without argumentation, that the nominal category of Akan compounds emanates from one of the constituents. Therefore, even where there is no nominal that may be regarded as the source of the nominal syntactic category of the compound they tweak the syntactic category of one of the constituents. Indeed, Christaller (1875) regarded all verbal constituents of compounds as nominalized prior to becoming part of the compound, calling them verbal nouns that form composite with their subjects or objects. Anyidoho (1990), on her part, argues that if the second stem of a compound is not a noun, it has to nominalize so that the head of the compound is always a noun. This is a position that Anderson (2013) seems to share.

The issue is that their position is required for the source-oriented approach they adopt. For instance, in $[\text{N-V}]_N$ compounds, exemplified in (4a) and repeated in part here as (5) for convenience, the nominal syntactic category cannot be said to be from the left-hand nominal constituent since that is not the head of the compound. That leaves the right-hand constituent as the head and possible source of the nominal syntactic category.

Except that it has the "wrong" syntactic category; it is a verb whilst the compound is a noun.

(5)

| Base 1 | Base 2 | Compound |
|--------|--------|----------|
| òsé 'outry' | bɔ́ 'hit/make' | òsé!bɔ́ 'jubilation' |
| èhá 'hunting' | yέ/yɔ́ 'do' | àhá!yɔ́ 'hunting' |
| ǹtέḿ 'speed' | pέ 'want' | ǹtέḿ!pέ 'haste' |
| àsó 'ear' | twé 'to pull' | àsó!twé 'punishment/penalty' |

Faced with these data type, previous studies (see Boadi 1966; Anyidoho 1990; Anderson 2013) assumed the prior nominalization view, pointing to evidence from the tonal melody of these compounds. They observe that the right-hand constituent is nominalized by a low tone nominalizing prefix which then deletes, leaving the tone to float and exert a lowering effect on the tone of the first syllable in the verb base.

Anderson (2013) argues that the structure and derivation of the N-V compounds in Akan is analogous to the pattern of synthetic compound formation in English where the right-hand constituent is a nominalized form of the verb (Roeper & Siegel 1978; Selkirk 1982; Lieber 1983). However, whilst in English the derivation of the right-hand constituent is marked by overt suffixes like *-er, -ation, -al, -ure, -ment,* and *-ing,* in Akan the putative nominalization and subsequent deletion of the nominalizing prefix are only felt through the characteristic downstepping occasioned by the floating low tone (Anderson 2013, 94). He illustrates his conception of the derivation of the synthetic compound in (6).

(6)  Derivation of Akan compounds with downstepping on the right constituent

| UR | /è-tíré bɔ́/ |
|----|-------------|
| Nominalization | è-tíré à-bɔ́ |
| Vowel Prefix Deletion | è-tíré-!bɔ́ |
| PR | [è-tíré-!bɔ́] |
| | 'the act of hair braiding' (Anderson 2013, 94) |

However, not all the N-V compounds exhibit the observed downstepping occasioned by the floating L-tone. Thus, for compounds that do not have the characteristic downstep in the second syllable, like those in (7), Anderson, in an earlier version of his paper, suggested the derivation in (8). His point is that, in such compounds, we cannot expect the downstepping because all the tones preceding the putative nominalizing low tone prefix are low so the condition that will trigger the downstepping is not met. Abakah (2000) presents a similar analysis. However, as Anyidoho (1990) acknowledges, not all N-V compounds are amenable to this account.

(7)

| Base 1 | Base 2 | Compound |
|---|---|---|
| àbùsùá 'family | bɔ́ 'to join' | àbùsùàbɔ́ 'being a family member' |
| bàká 'lagoon' | nú 'to stir' | bàkànú 'fishing in a lagoon' |
| àdé 'thing' | sùà 'to learn' | àdèsùá 'education, learning' |
| m̀mìrìká 'race' | tú 'to engage in' | m̀mìrìkàtúó 'the act of running' |

(8) Derivation of Akan compounds without downstepping on the right constituent

| | |
|---|---|
| UR | /m̀mìrìká + tú/ |
| Nominalization | m̀mìrìkà àtúó |
| Vowel Prefix Deletion | m̀mìrìkàtúó |
| PR | [m̀mìrìkàtúó] |
| | 'the act of running' |

The class of V-V nominal compounds, as exemplified in (9) are particularly difficult to account for in a typical source-oriented framework. They epitomize the observation that a morphological construction can have holistic properties. They also constitute the strongest evidence yet that compounding in Akan is essentially a noun-forming process. This is because the compounding of two lexical items of the same form-class (V+V) yields a compound with a completely different form-class (N).

(9)

| Base 1 | Base 2 | Compound |
|---|---|---|
| gyé 'receive' | dí 'eat' | gyédí 'faith/belief' |
| fá 'to take' | kyé 'to gift' | fákyé 'forgiveness' |
| dí 'to eat' | má 'to give' | dímá 'advocacy' |
| brὲ 'to suffer' | nyá 'to gain' | brὲnyá 'suffer to gain (a name)' |

Anderson acknowledges the problem that such V-V nominal compounds in particular pose for the prior nominalization view and the associated tonal perturbation evidence, noting that:

> "Since all compounds seem to be nominal and right headed, nominal compounds derived from two verbs ([V-V]$_N$) pose derivational problems. As argued in Anyidoho (1990), if the second stem of a compound is not a noun, its should nominalize so that the head is always a noun; however, these compounds do not exhibit the downstepping pattern described above. [...] no downstepping occurs where predicted. Furthermore the tonal patterns contradict the analysis of tone rules for [N-N]$_N$, [Adj-N]$_N$, and [N-Adj]$_N$ compounds [...] where a L[ow] on an initial stem becomes H[igh]. Nonetheless, it is clear that they are indeed compounded forms evidenced by the vowel harmony." (Anderson 2013, 92)

To account for the form-class of the [V-V]$_N$ compounds, one of two source-oriented approaches may be assumed. In the first, there is an initial V-V verbal compounding and a subsequent conversion from verb to noun, with no overt marking of the process, because conversion is not regarded as an affixation process, as shown in (10) with the compound *gyédí* 'faith'. In the second approach, the same initial verbal compounding occurs, but this time, it is an abstract nominalizer which turns the putative verbal compound into a noun. This is shown for the same example in (11).

(10)

```
        N
        |
        V
      /   \
     V     V
     |     |
    gyé    di
```

(11)

```
          N
        /   \
      Nom    V
           /   \
          V     V
          |     |
         gyé    di
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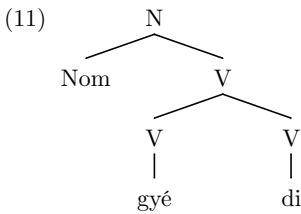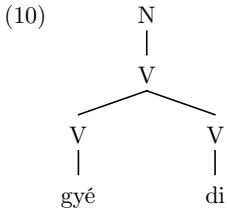
Both these approaches have been proposed in the literature by Obeng (2009) and by Anderson (2013, 17) who represents the example in (11) as (12). The problem with the first approach, however, is that Akan is not noted to employ conversion at all. Therefore, that may be ruled out, leaving only the second approach.

(12)  gyé       +   dí      →   ∅-gyé-dí
      get           eat          NOM-get-eat
      'to get'      'to eat'     'faith'

There are three issues with the second approach. Firstly, there is no independent motivation for positing the abstract/zero nominalizer in (12) except the desire to make the compound fit a source-oriented view of endocentric compounding by which all the properties of the whole are assumed to be present in the parts. Secondly, the putative [V-V]$_V$ compound base required for this approach is unattested in Akan, since compounding is a noun-forming strategy in Akan. Finally, even if we find enough motivation for positing the abstract nominalizer, we have to deal with the fact that

the final process becomes affixation and not compounding. In other words, the formation of the nominal will involve an initial V-V compounding and a subsequent affixation, but verbal V-V compounds do not exist in Akan.

The point I have tried to make here is that attempting to account for the nominal syntactic category of Akan compounds by assuming that every verbal constituent is nominalized prior to becoming part of the compound may appear to work but a careful search returns data that defy that source-oriented approach because there is simply no evidence for it, as in the case of the V-V compounds.

This problem becomes not-so-serious if we assume a product-oriented view where the nominal syntactic category can be a holistic property of the compound construction. This view, as noted in the introduction, is consistent with Booij's (2012a) observation that the systematic properties of compounds must not necessarily come from the head but can be seen as a property of the compound per se. I will present the proposed product-oriented approach in the next section.[8]

## 5. CM modelling of the syntactic category of Akan compounds

In section 4.1, I showed that accounting for the syntactic category of the Akan compound is not a straightforward matter because, for some Akan compound types, the syntactic category cannot be shown to emanate from

[8] A reviewer is concerned that in this paper source-orientedness and product-orientedness are set up "as a polarity", and questions: "is it the case that all compounds in Akan have properties not available in the original constituents?" To some extent, yes, the two orientations may be construed as such. For example, as far as the syntactic category of the Akan compound is concerned, I have argued that it is inherited from the construction itself. Thus, we cannot say that the syntactic category comes from any constituent, even if the whole compound has the same syntactic category as the head. We will be contradicting ourselves. However, that does not mean that the construction does not have any other property coming from the constituents. The two types of relations that are held to obtain within constructions, **instantiation** and **part-of**, address the concern of the reviewer. A property that is inherited from the constituent becomes "part of" the construction while every property that is not in any constituent is assumed to be a property of the construction itself. Thus, in any construction, we may find properties from both the dominating schema and the individual constituents. This is the case in most Akan compounds because, as argued in this paper, they inherit their syntactic category from the abstract schema, but other properties, including meaning, may come from the constituents. This is implemented by means of default inheritance which makes it possible for specific properties of constructions to override general properties inherited from dominating constructions or abstract schemas (Booij 2012b).

any constituent. In other words, there is a property in the product that is not accounted for in the source. This can be a source of embarrassment to source-oriented approaches to the analysis of complex words. I have also indicated that this situation will not be a serious problem from a product-oriented perspective because the syntactic category, which is invariably nominal, can be construed as a holistic constructional property that the compound inherits from a constructional schema bearing the syntactic category – noun.

As Haspelmath (1989, 59–60) observes, the way to proceed, in dealing with constructions that share certain features, is to abstract the properties that are common to the relevant constructions and to construct a *meta-schema* that dominates all relevant schemas. Such a meta-schema, as illustrated in section 2, when I discussed the hierarchical lexicon, will not contain features that are specific to any particular instantiating construction. Thus, we can express the fact about the syntactic category of Akan compounds by defining a meta-schema like (13), which generalizes over all Akan compounds.

(13)   Meta-schema for Akan Compounds
       $\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk} \leftrightarrow [[\text{SEM}]_{i|j|k}$ realizing a relation R between $[a]$ & $[b]]_k \rangle$[9]

The schema states that given any two lexical items, whether from the same or different classes, the compound formed will be a noun. This is captured by the N label on the outer bracket, to the immediate left of the double arrow. Again, the schema states that the semantic properties of the compound so formed could be related to either, both or neither of the constituents. This specification is expressed through co-indexation.

[9] The upper-case variables $X$ and $Y$ stand for the major lexical categories ($X = $ N & V | $Y = $ N, V & A). Note that upper case $X$ in (13) can be either V or N only because, as noted above, Appah (2013a) has argued convincingly that A-N compounds do not exist in Akan. I take that as a point of departure. But the more general point is that we do not find adjectives occurring as the left-hand constituents of compounds in Akan. Thus, A-V compounds do not occur in Akan and they seem to be cross-linguistically dispreferred (see Fradin 2009, 420 on French). Additionally, there are no attested cases of adverbial compounds or adverbs occurring as constituents of compounds in Akan. It has not been reported in the literature and I have not found any in my dataset. This may be because in Akan adverbs constitute a rather restricted class, usually not distinguishable from adjectives or clearly belonging to other word classes but being used adverbially on occasion. Thus, the schema in (13) sufficiently captures the facts of Akan compounding.

The lower-case variable $a$ and $b$ stand for arbitrary strings of sound segments, whilst $i$, $j$ and $k$ are indexes for the matching properties of the constituents of the compound and the compound as a whole.

A reviewer considers the specification of the semantic pole of the proposed schemas too vague. However, it aptly reflects my conception of how the semantic relation within compounds may be specified at the schematic level, above the level of the individual instantiating compound where specific restrictions may be specified. This is also the approach adopted in CM.

There are two basic approaches to accounting for the semantics of compounds, which are characterized as **Lees' solution** and **Downing's solution**, named after Lees (1960) and Downing (1977) respectively (Spencer 2011). Lees' solution assumes a small(-ish) fixed set of general semantic relations in noun-noun compounds. In this approach, we need to enumerate a set of semantic properties associated with the head and find some appropriate corresponding property in the non-head and construct a paraphrase which defines the compound. The set of semantic properties is assumed to be finite, including broad-based categories like *purpose* (writing desk), appearance (catfish), location (garden chair), event participant–agent (flower seller), patient (swan song), etc. With this view, *tree house* is possible because a house has to have a location (cf. Spencer 2011, 490).

The attraction of Lees' solution lies in the fact that it works very well for the majority of conventionalized (lexicalized) compounds which can indeed be paraphrased with a smallish set of concepts. This is the case especially for instances in which a subcategorized complement or argument of a predicate seems to be obligatorily denoted by a non-head, as in English synthetic compounding (or noun incorporation, where the language permits it). However, this approach is not particularly useful because in reality there is no restriction on the semantic relation that may hold between the constituents of a compound. It is our knowledge of the world that tells us that *flower seller* is one who sells flowers whilst *street seller* is one who sells on the street. Clearly, what is needed is that there be some kind of pragmatically sensible relation between the constituents of the compound. This is what Downing's solution provides.

Downing's solution assumes that the relation between the constituents of compounds is specified pragmatically and hence could be any relation at all. That is, proponents believe that there is some arbitrary, pragmatically and contextually determined relation $\mathfrak{R}$ or R (Allen 1978). This relation may very well be some kind of semantically definable relationship (e.g., 'N2 is located at N1'). However, it needs not necessarily involve any semantic predicate associated with any lexeme in the compound. Downing's solution assumes that on a given occasion of use, the hearer is expected to construct some plausible (though not necessary unique or determinate) relation between the modifier and the head. With this understanding, *bike*

*girl* can denote a girl with some relation to the notion 'bike' (e.g., she rides to work on a bike, she mends them for a hobby/living, she has just left hers in the driveway, etc.). In the same way, *pea princess* can be given any number of interpretations, limited only by artistic imagination. Finally, given an imaginary society where roads are individual properties that are bought and sold freely, so that people specialize in selling streets, *street seller* could well refer to one who sells streets.

Downing's solution has a clear advantage over Lees' solution because the set of accessible interpretations made available by Downing's solution will at any particular time properly include those that may be postulated in a Lees's solution approach. Thus, I adopt a Downing's solution approach to the semantics of the compounds.

Various subschema of (13) can be defined which will unpack, as it were, the presence and position of a head constituent in the instantiating compound. All of them will inherit the nominal syntactic category from the meta-schema. We can immediately posit four such subschemas, as shown in (14).

(14)  Akan Compounding schemas (ACS) 1, 2, 3 & 4

$$\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM}_{i|j|k}\ \text{realizing a relation R between } [a]_i\ \&\ [b]_j]_k \rangle$$
|

    a.   ACS-1 $\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM}_j \text{ with a relation R to SEM}_i]_k \rangle$

    b.   ACS-2 $\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM}_i \text{ with a relation R to SEM}_j]_k \rangle$

    c.   ACS-3 $\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM } ([\text{SEM}_i\ |\ \text{SEM}_j])]_k \rangle$

    d.   ACS-4 $\langle [[a]_{Xi}\ [b]_{Xj}]_{Nk} \leftrightarrow [\text{SEM}_{ij}]_k \rangle$

The first subschema (ACS-1) abstracts over all right-headed compounds. The second subschema (ACS-2) generalizes over left-headed compounds whilst the third (ACS-3) generalizes over exocentric compounds, where a crucial semantic feature of the whole is not named in the compound constituents. The fourth (ACS-4), for which the index on the semantic pole is a collection of the indexes of the constituents, captures the properties of compounds in which the constituents are equipollent and the meaning is a compositional function of the meanings of the constituents.

Clearly, ACS-1 and ACS-2 are uncontroversial given the fact that both left-headed and right-headed compounds are abundantly attested in Akan as well as other languages of the world (Ceccagno & Scalise 2006; Bauer 2009; Ceccagno & Basciano 2009; Pepper 2010). The status of schemas ACS-3 and ACS-4 is not so straightforward, especially how the semantic

pole is rendered and the use of indexes. I believe, though, that they are well-motivated. Therefore, I will attempt to justify these postulations.[10]

## 5.1. The schemas

I will now attempt to illustrate the workings of the schemas. I will go through the various classes of Akan compounds, showing which type instantiates which schema. I will be more interested in non-noun-headed compounds (like V-V and N-V), since, for our present purposes, noun-headed compounds will not be particularly insightful. I will, however, show the classes of noun-headed compounds that instantiate the various schemas like N-N and N-A compounds. Before going on, I need to note that this section presents broad details only. Extensive discussion of the individual schemas and their instantiations together with all possible semantic nuances is simply beyond the scope of the present paper. Indeed, each schema and the instantiating compounds are the subject of a different paper in progress.

### 5.1.1. ACS-1

The first schema generalizes over right-headed compounds, those for which the whole compound is a subtype of the right-hand constituent. This is

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[10] A reviewer has suggested that by positing ACS-1 and ACS-2 for right-headed and left-headed compounds, respectively on the one hand, and ACS-3, on the other hand for those compounds for which we cannot designate a head among the constituents, I am assuming a dichotomous distinction between transparent and opaque compounds. For the reviewer, this is a problem because it does not recognize that there may be varying degrees of opacity. I would like to note that, whereas I share the view that there are varying degrees of opacity in compounds, there are clear cases of hyponymous relations obtaining between compounds and their head constituents, whether the head occurs on the right or on the left. Those are the types of compounds that the first two schemas account for. All other compounds for which either no head constituent may be identified or the compound is not a hyponym of the head, if present, are accounted for by ACS-3. These would include both metonymy/metaphor-based compounds, as discussed below in 5.1.3. The way to account for such compounds, as discussed below, is to specify any extra-compositional property as an operator over the meanings of either the individual constituents or the combined meaning of the constituents. Specific statement of the idiosyncratic properties of such compounds will be at the individual compound level. Thus, all varying degree of opacity will be clearly accounted for by the set of schemas posited in this section of the paper and the subschemas that may be posited for specific subcategories of the various classes of compounds.

cross-linguistically the most common type of compound, as far as head-edness is concerned. This is what seems to have led Williams (1981) to posit the right-hand head rule which was originally presented as a language universal but later research showed that right-headedness was only the dominant pattern and that Romance languages, for example, have predominantly left-headed compounds (Scalise 1988; 1992; Scalise & Fábregas 2010).

Given the fact that all Akan compounds are nominal we have to assume that the right-hand constituents are nouns. This seems redundant, though, given our position that the nominal syntactic category is inherited from the meta-schema, as shown in (15).

(15) $[[a]_{Xi} \ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM}_{i|j|k} \text{ realizing a relation R between } [a]_i \ \& \ [b]_j]_k\rangle$

$\langle[[a]_{Xi} \ [b]_{Yj}]_{Nk} \leftrightarrow [\text{SEM}_j \text{ with a relation R to SEM}_i]_k\rangle$

It must be noted, however, that the possibility of attributing the syntactic category to either the right-hand constituent or the constructional schema is not a problem because the features concerned do not conflict. It is when a feature in a schema conflicts with one in its instantiation that we have to make a choice. Even here, one of the features will take precedence over the other and, in our case, we assume that the feature in the dominating schema takes precedence, overwriting the one in the constituent.[11] Examples (3) and (16) illustrate ACS-1, further examples are in (16a–l).

The relation **R** will be spelled out separately for each instantiating compound, much in keeping with the understanding that the actual interpretation of each compound depends on the meaning of the constituents and the encyclopedic knowledge one brings to the interpretation process.

(16)     $\langle[[a]_{Xi} \ [b]_{Yj}]_{Nk}$     $\leftrightarrow$     $[\text{SEM}_j \text{ with relation R to SEM}_i]_k\rangle$

        $\langle[[N]_i \ [N]_j]_{Nk}$     $\leftrightarrow$     $[\text{SEM}_j \text{ of SEM}_i]_k\rangle$

    $[[àsààsé]_{Ni} \ [mfóní]_{Nj}]_{Nk}$        'map (land photo)'

    $[àsààsé]$ 'land' $[m̀fòní]$ 'photo'

a.  àgórú áhyíàé
    play   meeting.place
    'theatre/sport stadium'

---

[11] As Copestake (1993, 227) observes, "[t]he effect of default unification is that incompatible values for attributes are ignored, rather than causing unification failure".

b. ànòdí-!séḿ
  contract-matter
  'declaration/contents of an agreement'

c. àníbéré-séḿ
  seriousness-matter
  'serious matter'

d. ànìm̀gùàsé-dé
  shame-thing
  'disgraceful thing/act'

e. àpàá   ḿ-bóá
  Apam PL-net
  'fishing net (from Apam)'

f. àsààsé-ḿfóní
  earth-photo
  'a map (photo of the earth)'

g. àséténá-ḿ áhíàdéé
  life-in     need
  'basic necessities of life'

h. àyèfóŕ   ńdá-áwɔ̀twé
  wedding day-eight
  '8th day after wedding'

i. ɔ̀báá-táń
  woman-parent
  'mother'

j. bɔ̀ǹ-fákyé
  sin-forgiveness
  'forgiveness (of sin)'

k. bàgùàfó   átràé
  counsellors seat
  'seat of councillors/council'

l. bàkà-náḿ
  lagoon-fish
  'fish caught in a lagoon'

## 5.1.2. ACS-2

As noted above, the second schema (ACS-2) dominates left-headed com-
pounds; the compound is a subtype of the left-hand constituent with some
relation **R** to the right-hand constituent. We find left-headed compounds

in the various classes of Akan compounds, including N-A, N-N and a small class of N-V compounds. These compounds tend not to be very productive. The apparent exception in this regard seems to be N-A compounds since they are systematically left-headed. However, as a class, N-A compounding is not very productive, given that there are only 39 N-A compounds making 8.8% of the 443 compounds in my dataset. The examples in (17) instantiate ACS-2, other examples are in (17a–m).

(17)        $\langle[[a]_{Xi}\ [b]_{Yj}]_{Nk}$        $\leftrightarrow$ [SEM$_j$ with relation R to SEM$_i$]$_k\rangle$
                          |
           $\langle[[N]_i\ [A]_j]_{Nk}$        $\leftrightarrow$ [SEM$_i$ *which is* SEM$_j$]$_k\rangle$
                          |
     [ɔbáá]$_{Ni}$ [búnú]$_{Aj}$]$_{Nk}$ 'virgin'
         /            \
     [ɔbáá] 'woman' [búnú] 'unripe'

a. àfòwà-síń            nàǹ-kὲsé              àdwὲǹ-pá
   sword-half          fish-big              mind-good
   'penknife'          'big fish'            'good intensions/discretion'

b. àsààsè-bó!níní       nàǹtwì-níní           àdwènè-háré
   earth-barren        cow-male              mind-fast/light
   'infertile land'    'bull'                'light-mindedness/perceptiveness'

c. àdàǹsè-kú!rúḿ        ɔhὲṁ-póń             àsὲṁ-pá
   witness-crooked     king-great            news-good
   'false witness'     'paramount chief'    'goodnews (the Gospel)'

d. bàsà-fá             ǹhwìròmà-tséń         ǹ-nè-bɔné
   arm-half            whistle-straight      PL-thing-bad
   'half of a arm-length' 'sweet whistles'   'evil deeds'

e. àbàsà-mú            ǹ-kɔtɔ  pá            ǹsù-káńkáń
   arm-whole           PL-crab good          water-fetid
   'full-arm length'   'type of crab'        'smelling water'

f. dùà-síń             ɔ-wà-níní             àkwàǹ   dzéń
   tree-fraction       SG-snail-male         paddling hard
   'stump'             'a large snail'       'strong paddling (of a canoe)'

g. ɔ-bà-nyíń           ὲkwàṁ-mɔné            àsὲǹ-kὲsé
   SG-child-male       way-bad               matter-big
   'man (male child)'  'evil means/way'      'big issue'

h. tὲkyὲrὲmà-níní       ǹsùò-nwínú            ɔsɔfòpànyíń
   tongue-male         water-cold            priest-elder
   'a sharp tongue'    'cold water'          'chief priest/senior minister'

i.  ǹ-dù-pɔ́ń              dìm̀-mɔ̀né            ǹ-sɛ̀m̀-húnú
    PL-tree-great          name-bad             PL-matter-useless
    'huge trees'           'name name'          'useless/senseless matter/talk'

j.  bádwá   késéɛ́         à-kwàǹ-tséń          nà-pányíń
    assembly big           NMLZ-way-straight    mother-senior
    'General Assembly'     'highway/road'       'mothers elder sister'

k.  à-kwáń-síń             kyè-húnú             ǹtéń-kyéẃ
    PL-way-fraction        arrest-vain          judgement-crooked
    'mile/kilometre'       'arbitrary arrest'   'skewed judgment/miscarriage of justice'

l.  ɔ̀-báà-pányíń           ɔ̀-báá-búnú           máń-síń
    SG-woman-elder         SG-woman-unripe      nation-fraction/half
    'elderly woman'        'virgin'             'a district in a political system'

m.  àkókɔ́-níní             nà-kúmá
    fowl-male              mother-younger
    'cock, rooter'         'younger mother (Uncle's wife, mother's younger sister)'

N-A compounds pattern like NPs in which attributive adjectives modify head nouns because, in Akan, attributive modification is done to the right of the modified element (cf. Saah 2004).[12]

In the class of N-N compounds, there are 21 (10.1%) for which the whole is a hyponym of the left-hand constituent. These compounds pattern after Akan N-A compounds in terms of the distribution of the head and the modifier (see (18a–k)) and, unsurprisingly, nouns of the type that occur as the right-hand constituents in these compounds (e.g., *ténènèé* 'righteousness' (18b); *tsìǹtsìmíí* 'printed X' (18e); and *fɔ̀nèé* 'muddied X' (18k)) have been treated as adjectives (cf. Osam 1999). That, however, is not accurate; they are nouns that express property concepts whose meanings are realized by adjectives in other languages.

The structure and the relation between the schema and the instantiating left-headed N-N compounds may be represented as (18), further examples are below in (18a–k).

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[12] This formal similarity to NPs, means that although the constructions discussed in this section have been called compounds, there may be room for debate as to whether they may not be treated as lexicalized phrases.

(18)      $\langle[[\mathrm{a}]_{X_i}\ [\mathrm{b}]_{Y_j}]_{\mathrm{N}k}$         $\leftrightarrow\ [\mathrm{SEM}_i\ \text{with relation R to } \mathrm{SEM}_j]_k\rangle$
                   |
        $[[\mathrm{N}]_i\ [\mathrm{N}]_j]_{\mathrm{N}k}$            $\leftrightarrow\ [\mathrm{SEM}_i\ \text{with PROPERTY}_j]_k$
                   |
    $[[\text{àtèǹ}]_{\mathrm{N}i}\ [\text{ténènèé}]_{\mathrm{N}j}]_{\mathrm{N}k}$   'justice/righteous judgement'
        /              \
   [àtéń] 'judgement' [ténènèé] 'righteousness'

    a.    àsèǹ-trénèé
        saying-righteousness
        'a just saying'

    b.    àtèǹ       ténènèé
        judgement righteousness
        'righteous judgement/justice'

    c.    àsòrèkyé-ḿ-bá
        waves-PL-child
        'little/minor waves'

    d.    ɔ̀bó-táń
        stone-parent
        'rock'

    e.    m̀fònyíń   tsìǹ∼tsìmí-í
        picture    RED∼print-NMLZ
        'drawing'

    f.    máń-táń
        nation-parent
        'region of a country'

    g.    m̀mèrè-sáńtéń
        time-line/queue
        'eternity'

    h.    náḿ ḿ-bá
        fish   PL-child
        'fingerlings'

    i.    à-pòfò-m̀-bá
        PL-fishermen-PL-member
        '(group of) fishermen'

    j.    àséń-tɔ́ẃ
        matter-compact
        'sentence'

k. ǹsù    fòn-èé
   water make.muddy-NMLZ
   'muddying water/muddied water'

There is a couple of left-headed compounds of the N-V type, occurring in my dataset. They are shown in (19) and their general properties captured by the constructional schema in (20). These compounds are different from other N-V compounds in two significant ways. First, they are the only left-headed N-V compounds, being hyponyms of their respective left-hand constituents: a *solid/firm rock* is a *rock* and a *decrepit net* is a *net*.

(19) a.  ɔbɔ̀tàǹ-tíḿ
         rock-be.firm
         'firm/solid rock'

     b.  ébóá gów
         net    be.weak
         'decrepit net'

(20)    $\langle[[a]_{Xi}\ [b]_{Yj}]_{Nk}$    $\leftrightarrow$ $[\text{SEM}_i$ with relation R to $\text{SEM}_j]_k\rangle$
                |
        $\langle[[N]_i\ [V]_j]_{Nk}$    $\leftrightarrow$ $[\text{SEM}_i$ about which $\text{SEM}_j$ is predicated]$_k\rangle$
                |
    $[[ɔbɔ̀tàǹ]_{Ni}\ [tíḿ]_{Vj}]_{Nk}$    'solid rock'

Secondly, the verbs are intransitive. Thus, the noun constituent is the subject of the verb. This means that the constructions have the same linear order of constituents as typical intransitive constructions. However, they are not sentences because the verbs cannot be marked for tense/aspect, which receive obligatory formal marking in the corresponding syntactic construction, unless the verb is in the stative or habitual (Dolphyne 1988; Osam 1994; 2004; 2008). Additionally, in the analogous intransitive construction, the noun has to be modified in some way (e.g., by the definite determiner), but modification of the noun in the N-V compounds is prohibited.[13]

Finally, these N-V compounds illustrate the fact that in Akan, property concepts that are expressed in other languages by means of adjectives may be expressed through stative verbs. Even colour concepts, including

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[13] This is consistent with the lexical integrity principle (Chomsky 1970; Bresnan & Mchombo 1995; Lieber & Scalise 2007; Booij 2009). That is, modifying a nominal with a determiner is a syntactic operation. Therefore, allowing it in the present context will amount to violating the lexical integrity of the compound.

the three primary colours (*white, red* and *black*), may be expressed this way. Balmer and Grant (1929, 84) call them verbal adjectives.

### 5.1.3. ACS-3

The third schema (ACS-3) generalizes over compounds in which a crucial semantic feature of the whole is not present in the compound constituents. In extreme cases, the meaning of the compound may not at all be related to the meaning of the individual constituents. In other words, such a compound may pair a form and a meaning directly, since the meaning is that of the construction and may not necessarily be related to those of the constituents. The parenthesized portion of the semantic pole expresses this observation that the meaning of the whole may be optionally related to the meanings of the constituents.

Where the meaning of the compound can be related to the meaning of either constituent or to their combined meaning, but the meanings of the constituents do not exhaust the meaning of the compound, the extra-compositional meaning may be represented as a semantic operator (the unindexed SEM) over the meaning of the compound, or the meaning of the relevant constituent. This is captured by the disjunction (|).

The kinds of compounds that this schema dominates are varied indeed. They include all exocentric compounds, even cases where the compound may be metaphorically or metonymically related to one or both of the constituents, as well as some coordinate compounds which have properties of both of their constituents but may not refer to either exclusively. These are exemplified by the so-called compromise type of coordinate compounds, like English *blue-green* (Bauer 2008, 13).

In the class of V-N compounds, there is a class that seems to have a VP provenance, as shown in (21). These compounds are not completely exocentric. Rather, they exemplify the situation where the meaning of the compound is only metonymically related to the meanings of the constituents. For example, in (21), a characteristic activity (fetching water) is metonymically used to refer to the one who fetches the water. Thus the compound refers to the agent of the action designated by the verb. Yet, none of the constituents names the agent.

(21)    Related VP         Compound

    a. kɔ̀ ǹsúó         kɔ́-ǹsúó

      go water         go-water

      'fetch water'      'a person who fetches water'

    b. kɔ̀ àyíé         kɔ́-àyíé

      go funeral       attend-funeral

      'attend a funeral'    'one who attends funerals habitually'

    c. dà   àmòná       dá-àmòná

      sleep hole        sleep-hole

      'sleep in holes'     'an animal that sleeps in holes'

    d. kùm̀ kɔ́ḿ       kúm̀-kɔ́ḿ

      kill   hunger      kill-hunger

      'kill hunger'      'hunger killer (a species of maize)'

The constructional schema in (22) captures the properties of the compounds in this class.

(22)      $\langle[[a]_{Xi}\ [b]_{Yj}]_{Nk}$      $\leftrightarrow [\text{SEM}\ ([\text{SEM}_i\ |\ \text{SEM}_j])]_k\rangle$

               |

       $\langle[[V]_i\ [N]_j]_{Nk}$        $\leftrightarrow [\text{ANIMAL which habitually does SEM}_i\text{ at SEM}_j]_k\rangle$

               |

     $[[\text{dá}]_{Ni}\ [\text{àmòná}]_{Vj}]_{Nk}$     'an animal that sleeps in holes'

       /          \

    [dá] 'sleep' [àmòná] 'hole'

Another class of compounds that instantiates ACS-3 is the class of exocentric N-N compounds (see (23)). In this class, we find cases where the compound has a meaning that is completely unrelated to the meanings of the constituents. An example of this is *àbòròkyíŕ-ábá* (23c), for which there is no conceivable link between the idiomatic meaning of the compound and the meanings of the individual constituents, so that, there is no way to tell that the two constituents combined will/can refer to a particular fruit used as a bait during fishing.

(23)  a.  ànò-kórɔ́

       mouth-one

       'unity'

    b.  ḿbóáduá             dò

       a.place.for.keeping.fishing.nets top

       'the location of "mboadua"'

c. àbòròkyíŕ-ábá
   oversees-seed
   'a fruit used as a bait for fishing'

d. dùá-ásé
   tree-under
   'name of a town'

e. ènyì-káḿ
   eye-mark
   'earmark (lit. eyemark)'

f. àfí-ásé
   house-under
   'prison'

g. hònáḿ-ásé
   skin-under
   'feelings/condition in the flesh/self'

h. àkɔ́ḿ-ásé
   fetish.dance-under
   'location of a fetish dance'
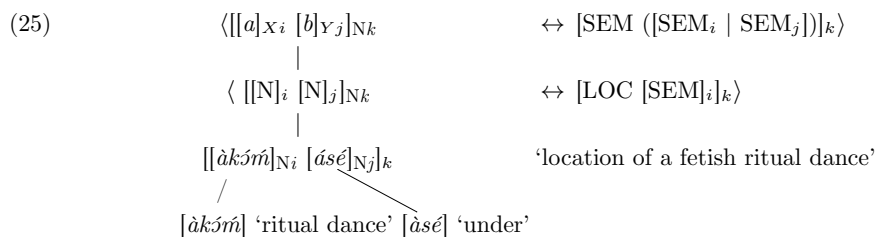
i. m̀-mòfrá-ásé
   PL-child-under
   'childhood (time)'

This class of compounds may be represented as shown in (24), where the parenthesized part of the semantic pole is not part of the meaning of the compound because the meaning of the compound is not related to the meanings of the constituents at all.

(24)  $\langle [[a]_{Xi}\ [b]_{Yj}]_{Nk}$          $\leftrightarrow [\text{SEM}\ ([\text{SEM}_i\ |\ \text{SEM}_j])]_k \rangle$
       |
       $\langle [[N]_i\ [N]_j]_{Nk}$          $\leftrightarrow [\text{SEM}]_k \rangle$
       |
       $[[àbòròkyíŕ]_{Ni}\ [ábá]_{Nj}]_k$          'a fruit used as a bait for fishing'
       /          \
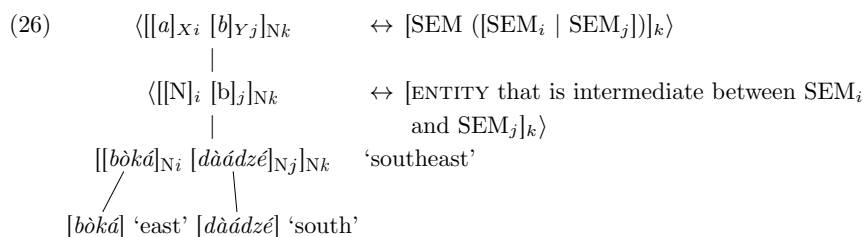       $[àbòròkyíŕ]$ 'oversees' $[àbá]$ 'seed'

There are some N-N compounds for which one may be able to link the meaning of the whole to the meaning of one or both of the constituents but the compound still violate the IS A condition (Allen 1978) or the hyponymy test (Bauer 2010b). For examples, the constituents of *ànò-kórɔ́* (23a) are *ànó* 'mouth' and *kór(ɔ́)* 'one', but the idiomatic meaning of the compound

is 'unity' which is neither a type of *mouth* nor a type of *one*. Yet, we are able to see that being of "one mouth" is a metaphor for *unity*. Again, the literal meaning of *àkɔ́ḿ* 'fetish ritual dance' and *àsé* 'underside/bottom' (23h) is 'underside of the ritual fetish dance', but the compound refers to the location rather than the "underside/bottom" of the dance. Here too, we may say that *àsé* 'underside/bottom' is a metaphor for location.

As noted above, LOCATION is not directly coded in either constituent of *àkɔ́ḿ-ásé*. Hence, it has to be treated as a constructional property. This meaning will be represented as an operator over the meaning of *àkɔ́ḿ* the head of the construction, as shown in (25).

(25)
$$\langle[[a]_{Xi}\ [b]_{Yj}]_{Nk} \qquad\qquad \leftrightarrow [\text{SEM}\ ([\text{SEM}_i\ |\ \text{SEM}_j])]_k\rangle$$
$$|$$
$$\langle\ [[\text{N}]_i\ [\text{N}]_j]_{Nk} \qquad\qquad \leftrightarrow [\text{LOC}\ [\text{SEM}]_i]_k\rangle$$
$$|$$
$$[[àkɔ́ḿ]_{Ni}\ [ásé]_{Nj}]_k \qquad\qquad \text{'location of a fetish ritual dance'}$$

[*àkɔ́ḿ*] 'ritual dance' [*àsé*] 'under'

I assume that for the compromise type of coordinate compounds, where the referent of the compound is intermediate between the meanings of the two constituents but is neither exclusively, we can posit the schema in (26).

(26)
$$\langle[[a]_{Xi}\ [b]_{Yj}]_{Nk} \qquad \leftrightarrow [\text{SEM}\ ([\text{SEM}_i\ |\ \text{SEM}_j])]_k\rangle$$
$$|$$
$$\langle[[\text{N}]_i\ [b]_j]_{Nk} \qquad \leftrightarrow [\text{ENTITY that is intermediate between SEM}_i$$
$$\text{and SEM}_j]_k\rangle$$
$$[[bòká]_{Ni}\ [dàádzé]_{Nj}]_{Nk} \qquad \text{'southeast'}$$

[*bòká*] 'east' [*dàádzé*] 'south'

The final class of Akan compounds that instantiates ACS-3 are V-V compounds, as exemplified in (9) and repeated here as (27) for convenience. In these compounds, two verbs are put together to form a noun.

(27)

| Base 1 | Base 2 | Compound |
|---|---|---|
| gyé 'receive' | dí 'eat' | gyédí 'faith/belief' |
| fá 'to take' | kyé 'to gift' | fákyé 'forgiveness' |
| dí 'to eat' | má 'to give' | dímá 'advocacy' |
| bɛ̀ɛ̀ 'to suffer' | nyá 'to gain' | bɛ̀ɛ̀nyá 'suffer to gain (a name)' |

The discussion of the data above (in section 4.1) showed that this type of compound presents the greatest challenge to the source-oriented view adopted in previous accounts of Akan compounds because it defies all putative evidence for the purported prior nominalization of verbal constituents of compounds, as acknowledged by Anderson (2013, 92, cited above). This compound type also provides the strongest support yet for the product-oriented approach proposed for the analysis of the syntactic category of the Akan compound.

We will represent the structure and properties of this compound type and how they come to possess the nominal syntactic category as (28).

(28)       $\langle[[a]_{Xi}\ [b]_{Yj}]_{Nk}$        $\leftrightarrow$ [SEM ([SEM$_i$ | SEM$_j$])]$_k\rangle$
                      |
            $\langle[[V]_i\ [V]_j]_{Nk}$        $\leftrightarrow$ [CONCEPT metaphorically related to SEM$_i$
                      |                              and SEM$_j$]$_k\rangle$
            $[[gyé]_i\ [dí]_j]_{Nk}$        'faith/belief'

     $[gyé]$ 'receive' $[dí]$ 'eat'

The nominal syntactic category is inherited from the dominating schema, as argued previously. The semantics is rendered as a concept that is metaphorically related to the combined meaning of the constituents because, for one to believe, one has to, metaphorically speaking, *receive* some message and *eat* it (cf. Balmer & Grant 1929).
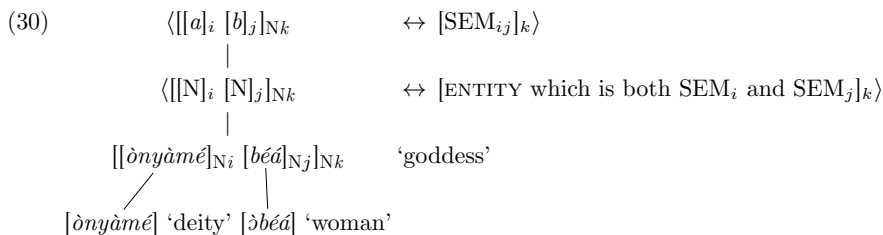
### 5.1.4.  ACS-4

The fourth schema (ACS-4), for which the index on the semantic pole is a collection of the indexes of the constituents, captures the properties of coordinate compounds in which the constituents are equipollent and the meaning is a compositional function of the meanings of the constituents. That is, the referent of the compound encapsulates the properties of both constituents. In the literature, such compounds are called the appositional coordinate compounds (Bauer 2008) or the multifunctional type (Renner 2008). For example, the English compound, *singer-composer* refers to a person who is both a singer and a composer at the same time and carries out both functions simultaneously (Bauer 2010a).[14]

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[14] Since coordinate compounds have various types (cf. Bauer 2008) some subtypes of coordinate compounds will not instantiate this schema. For example, the special class called co-compounds (cf. Wälchli 2005; Bauer 2008, 2010a) behaves, in terms of their

I have not found Akan compounds that are exclusively of this type. Rather, some N-N compounds may have this reading within appropriate contexts. For example, the Akan compounds in (29) has a clear determinative reading where the right-hand constituents modifies the left-hand constituents. However, there are situations where the two constituents are interpreted as if they were linked by a coordinating conjunction. In that case, the compound may be regarded as a coordinate compound and thus, instantiating schema (30).[15]

(29)  a.  ònyàmé-béá
          deity-woman
          'goddess'

      b.  ɔ̀hém̀-máá
          king-woman
          'queen (mother)'

(30)            $\langle[[a]_i \ [b]_j]_{Nk}$            $\leftrightarrow [\text{SEM}_{ij}]_k\rangle$
                      |
                $\langle[[N]_i \ [N]_j]_{Nk}$            $\leftrightarrow [\text{ENTITY which is both SEM}_i \text{ and SEM}_j]_k\rangle$
                      |
          $[[\grave{o}ny\grave{a}m\acute{e}]_{Ni} \ [b\acute{e}\acute{a}]_{Nj}]_{Nk}$     'goddess'
                /            \
          $[\grave{o}ny\grave{a}m\acute{e}]$ 'deity' $[\grave{o}b\acute{e}\acute{a}]$ 'woman'

In this section, I have posited a meta-schema for Akan compounds which is pre-specified to bear the syntactic category – noun. I have argued that it is this syntactic category which is inherited by all instantiating constructions. I have also posited and exemplified various subschemas of the meta-schema based on the presence and position of head constituents in the compound as well as the unique relation between the semantics of the compound and the semantics of the constituents.

## 6. Conclusion

In this paper, I have shown that Akan compounding is a noun-forming process because notwithstanding the syntactic category of the constituents the resultant compound will be a noun. I argued that this fact shows that Akan

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semantics, like exocentric compound. Therefore, they can be seen as instantiations of ACS-3.

[15] Note that in ACS-4, upper case X stands for either nouns or verbs because the only attested coordinate compounds in Akan are N-N and V-V.

compounding is blind to the syntactic category of constituents and that this blindness should be interpreted to mean that the syntactic category of the compound is a holistic property of the Akan compound construction. That is, the nominal syntactic category of the Akan compound is a property of a meta-schema for compounding in Akan. Every instantiating compound construction inherits this property from the meta-schema. I have presented a construction morphology modelling of the nominal syntactic category of Akan compounding. Previous accounts of the nominal syntactic category of the Akan compound assumed that all non-nominal potential/actual head constituents were nominalized prior to becoming part of the compound. Such accounts sometimes relied on the tonal melodies of the individual constituents and the compound as a whole. However, I have shown that whereas those approaches failed to account for all Akan compounds, the account proposed here accounts for all Akan compounds without exception. This paper has provided evidence of holistic properties of morphological constructions as argued form in the literature on CM.

## Acknowledgements

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