The Mirror Principle and the Order of Verbal Extensions: Evidence from Pular

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Abstract

As an empirical generalization, the Mirror Principle (MP, Baker, 1985) says that there is a close parallelism between morphology and syntax, but it does not specify according to which general principles are affixes merged into syntactic structure. Following Cinque (1999, 2006), I assume that affixes are merged in a fine-grained hierarchy of functional projections to check the corresponding features. In particular, I will claim that argument structure changing affixes in Pular are merged in a fixed hierarchy of theta-related functional heads and that the complements they introduce are merged in the specifiers of these functional projections. As evidence, I will show that verbal affixes in Pular occur in a fixed order which is not based on semantic scope and that the order of the affixes matches the underlying order of their complements.

0. Introduction: two approaches to morphology[+]

The traditional view on morphology is that word-formation takes place in the lexicon, and that morphological rules are different in nature and operate on different primitive elements than syntactic rules: morphology operates on stems and morphemes to produce words, while syntax operates on words to produce phrases and sentences. This view has been formalized as the *lexical integrity principle* (LI)[1], which makes sure that syntactic rules cannot operate on word parts, so that, for instance, affixes cannot be detached from a word by syntactic rules. An alternative approach has been initiated by the seminal work of Baker (1988): syntax operates on both words and morphemes, and a complex word can be formed by syntactic rules, and more specifically head movement, through *incorporation* of a lexical root to a morpheme. This approach can account for generalizations that cover both morphological and syntactic elements, the best known one being the *mirror principle* (MP, Baker (1985)), which states that morphological derivation reflects syntactic derivation (and viceversa). If the morphological structure of a complex word is derived through head-movement of the lexical root to the heads where the morphemes are base-generated, the MP follows straightforwardly: "the order of morphemes in a complex word reflects the natural syntactic embedding of the heads that correspond to those morphemes" (Baker (2002, 326))[2]. Notice that this approach also captures LI effects, since the result of the incorporation process is still a word-level (i.e a X°) category. This sets the incorporation model apart from other syntactic

[+] Thanks are due to Guglielmo Cinque, the supervisor of my thesis, Damonte (2004), on which this work is based. Heartfelt thanks also to my long-suffering informant, Rabiatou Diallo, who provided judgments on all the examples in this paper and many more. As usual, all mistakes are my own responsibility.

[1] Cfr. Di Sciullo and Williams (1987) and Bresnan and Mchombo (1995), among many others.

[2] Note that this only holds if incorporation is an adjunction process and adjunction is only to the left of the category being adjoined to. In the antisymmetric framework of Kayne (1994), adopted here, no such assumption is necessary, as right-adjunction is impossible.

approaches to morphology, where it is assumed that a complex word is formed of distinct lexical words in syntax, and these only form a word at the phonological level[3]. In this case, LI effects need to receive an independent explanation.

This paper is organized as follows: in section 1 I propose a formulation of the MP based on syntactic features; in section 2 I propose that theta roles are also syntactic features; in section 3 the system of argument structure changing verbal extensions found in Pular, an agglutinative Atlantic language, is briefly introduced; section 4 describes the order of these affixes and section 5 the order of the corresponding complements. In this section a syntactic test is used to show that the *underlying* order of the complements matches the order of verbal extensions. Finally section 6 provides the conclusions.

1. The Mirror Principle and syntactic features

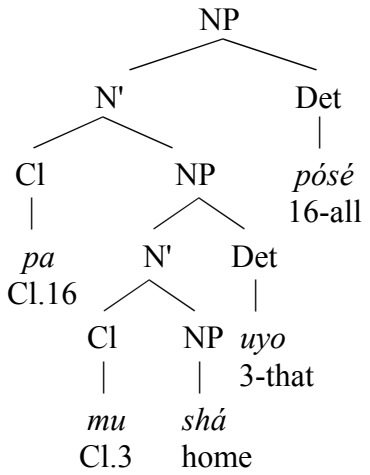
LI per se does not prevent the features of a word to be visible to syntax. A noun, for example, has person, number and gender features, and these must be made available to syntax for agreement to take place between the noun and an adjective or verb. The LI though, at least in the strong formulation of Di Sciullo and Williams', does prevent the *relationship* between the features of a word and its internal structure to be relevant to syntax (Di Sciullo and Williams (1987, 49)). The LI is thus incompatible with the syntactic approach to morphology but also with empirical generalizations such as the MP. More generally, the two approaches make quite different predictions about the relationship between syntax and morphology: if the syntactic approach is correct, there should be a systematic parallelism between the order of morphemes and the order of the corresponding phrases, while if the LI (in its strong form) is correct, there should be no such parallelism. A neglected question, and one that will be the focus of this article, is which morphemes and phrases are expected to show this parallelism and which ones are not. A relevant example is discussed by Bresnan and Mchombo (1995, 216 – 217). They quote the absence of agreement between phrasal modifiers and some class prefixes in Chichewa as evidence that class-marked nouns are generated in the lexicon. Their argument is based on Myers' (1987) analysis of nouns with two class prefixes in Shona: he proposes that each prefix heads its own syntactic projection, and can therefore agree with a modifier in its specifier:

(1) *Alternative concord in Shona* (Myers (1987, 104))

a. *Pa-mu-shá uyo p-ósé p-a-káchén-a*
Cl.16-Cl.3-home (Cl.3)that Cl.16-all Cl.16-white
"At that whole white house"

[3] This is the case of Myers' (1987) analysis of class prefixes in Shona, on which see the next section. A similar syntactic analyses of prefixes has been proposed by Julien ((2002).

b.



Myers' analysis correctly captures the agreement properties of the class prefixes that can occur together on the same noun: the external one agrees with the last modifier, and the internal one agrees with the modifier following the noun (the so-called "alternative concord"), as shown in (1b)[4]. Bresnan and Mchombo (1995, 201) then claim that the impossibility of agreement between the internal class prefix and a modifier in Chichewa shows that the class prefixes that can appear noun-internally are merged with the noun in the lexicon, not in the syntax[5]. For the purposes of our discussion, the relevant point is that the authors' argument is based on the assumption that class-agreement morphology represents a case of (necessary) parallelism between morphology and syntax: an affix which (class-)agrees with a modifier belongs to the same projection of the modifier. But class agreement in Bantu languages seems to extend over a wider domain than "agreement" in languages without a class system. In particular, note that the external prefix in (1) is a locative class prefix meaning "at" and "agrees" with the adjectival modifier *all* to the exclusion of the noun. On the basis of standard theories of agreement this is unexpected, and putting the locative prefix and the adjective together in the same functional projection, as proposed by Myers, and accepted by Bresnan and Mchombo, does not shed any light as to why these two elements show class-agreement in the first place. It thus seems that class agreement in Bantu languages spells out different syntactic operations than standard "agreement"[6]. From the viewpoint of the incorporation approach to morphology, not discussed by Bresnan and Mchombo, this means that class-agreement prefixes in Bantu languages are not expected to (uniformly) fall under the MP, as they do not correspond to a single syntactic operation..

Going back to the question of which morphemes and phrases are expected to obey the MP and which ones are not, it thus seems that the question should be rephrased

[4] Note that in this analysis no syntactic mechanism makes sure that the prefix and the noun form a word. In Myers' account, this only happens in the phonological component (Myers (1987, 12)).

[5] Actually, in the case in which the external prefix is one of the locative class-markers, as in the Shona example (1a), alternative concord is possible in Chichewa as well. Bresnan and Mchombo (1995, 201) conclude that locative class prefixes are generated in the syntax in both languages. In Chichewa, if the external prefix is not locative, then all modifiers must agree with the external prefix (Bresnan and Mchombo (1995, 198 – 199)). See also below in this section and the following footnote.

[6] This conclusion holds even if locative class markers are not analyzed as prepositions, an option refuted by Bresnan and Mchombo (1995, 208 – 213). Remember that this type of "outer agreement" between the most external prefix and the modifier(s) of the noun is the only possible one in Chichewa when the external prefix is not locative, see preceding footnote.

as follows: which *syntactic operations* are mirrored in the order of morphemes? An answer to this question is provided by the work of Cinque (1999). On the basis of a vast cross-linguistic survey, he reports that the order of temporal, modal and aspectual (TMA) verbal suffixes in agglutinating languages is fixed and matches (modulo the MP) the order of the corresponding adverbs in non-agglutinative languages. Crucially, this correspondence can be established only with a very fine-grained classification of adverbs and TMA suffixes in narrow semantic classes, such as *past*, *epistemic* or *completive*; a simpler classification in temporal, modal and aspectual modifiers would not have been able to establish such a generalization. Cinque further proposes that this specific semantic classes are represented in the grammar as syntactic features, which in turn project their own projection, such as PastPhrase, EpistemicPhrase, CompletivePhrase and so forth. The crucial point is that all formatives which carry a specific syntactic feature are supposed to be base-generated in the syntactic projection corresponding to that feature, independently of their categorial status. Thus, the PastPhrase projection will host past tense adverbs and suffixes, but also all formatives with that meaning, including prefixes, auxiliaries, functional particles, PPs and so forth. If this is correct, then the MP can be rephrased at a more abstract level as establishing a correspondence between abstract *syntactic features* and *syntactic positions* rather than morphemes and phrases:

(2) *A feature-based Mirror Principle*[7]
All exponents of the same syntactic feature are associated with the same syntactic position

Returning to the "alternative concord" case discussed by Bresnan and Mchombo (1995), this version of the MP does *not* predict that all word-internal class prefixes should be able to have an agreeing modifier, since class agreement in Bantu languages does not seem to depend on a syntactic feature carried by either the modifier or the prefix, as clearly shown by example (1), where a locative prefix meaning "at" agrees in class with the adjective *all*. More generally, a formulation of the MP based on syntactic features allows us to *motivate* the association between morphology and syntax, and therefore to make more precise hypotheses about which morphemes and phrases are associated and which ones are not.

2. Argument structure changing morphology

The feature-based version of the MP in (2) is both weaker and stronger than the original version: it is weaker, in that it does not assume that all syntactic operations are reflected in morphology; and it is also much stronger, in that it covers all specifier and head material carrying a given feature, suffixes and DPs being just one case of a much wider correspondence between syntax and morphology[8]. In this paper I will not explore the

[7] The hypothesis put forward in (2) is implicit in much work on functional projections, and has been proposed explicitly by Cinque (2006, 44), but I remain solely responsible for the way it is formulated and used in this paper.

[8] And between different types of phrases and different types of heads. According to (2), a temporal PP like *nella scorsa settimana* "in the last week" should have the same underlying syntactic position of a DP with the same meaning, such as *la settimana scorsa* "last week". Likewise, the past suffix *-ed* in English

consequences of the MP as defined in (2) for other types of phrases and heads, referring the reader to Cinque (2006) for an extension of the hypothesis to "restructuring" predicates and to Schweikert (2005) for a discussion of adverbial PPs within the same framework. I will instead focus on the consequences of a feature-based MP for the analysis of the empirical domain on which the MP was originally formulated by Baker (1985), namely "grammatical function changing", or "argument structure changing" verbal morphemes. More precisely, I will study whether there is a parallelism between the order of argument structure changing morphemes (so called "verbal extensions") and the complements[9] associated with these morphemes in Pular[10] (Atlantic, Niger Congo), an agglutinating language with a vast array of verbal extensions. The following example illustrates the comitative extension:

(3) *O habh-id-ii e Aboubakar*
he fight-Com-Past with Aboubakar
"He fought with Aboubakar"

As (3) shows, the comitative meaning of the complement of the verb is marked twice: by the affix *-(i)d-* on the verb and by the preposition *e*. A feature-based MP then predicts that both the complement and the affix have the same order with respect to other complements and affixes, respectively. I will argue that even if the surface order of verbal extensions and complements sometimes do not match, an independent syntactic test will show that the *underlying* order of the complements is indeed the same as that of the affixes. Note that the feature which associates the affix and the complement is related to a thematic notion, namely "comitative", as this seems to be the relevant meaning that both the affix and the phrase share. I will therefore assume the following hypothesis:

(4) *Thematic Functional Projections Hypothesis*
The functional structure of the clause contains a fixed hierarchy of labeled functional projections that introduce the complements (both arguments and adjuncts) of the predicate, in different positions according to their thematic relationship[11].

The hypothesis in (4) says that the interpretations usually associated with theta roles (i.e "comitative", "instrumental", "benefactive" etc.) are represented in syntax through

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should be merged in the same head as the auxiliary *did*.

[9] The phrases associated with a given verbal extension may be an argument of the verb or an adjunct. Since the argument or adjunct status of these phrases will not be discussed in this paper, I will refer to them with the neutral term "complement".

[10] The informant I worked with, Rabiatou Diallo, was born in Lab é, in the Fuuta Jaloo region of the Republic of Guinea. For typographical reasons, I will write the implosive consonants as <bh, dh, yh> and the palatal nasal consonant as <ny>.The language is spoken all over west Africa and has different names in different regions: in eastern dialects the name of the language is *Fulfulde*, in Senegal *Pulaar*, and in Guinea *Pular*. Other names of the language used by European scholars include *Peul*, *Fula* and *Ful*. I will refer to the language as "Pular", and when reference will be made to other dialects, they will be called with the name of the language in the dialect. Diallo (2000) is the only modern grammar of Fuuta Jaloo Pular.

[11] Cfr. Damonte (2004). The hypothesis is actually a formalization of those theories that postulate theta-related functional heads and it is implicit in the works of Cinque (2006) and Schweikert (2005), where functional projections such as "BenefactivePhrase" are proposed.

syntactic features. These features are identical to the TMA ones studied by Cinque (1999): they head their own projections and occupy a fixed position with respect to other functional projections in the structure of the clause, the only difference being that they also introduce a complement. A feature-based MP will in turn force all the lexical formatives that are associated with a specific theta role to be merged in the corresponding "thematic" projection. The complement will thus be base-generated in the specifier and the verbal extension in the head of the relevant thematic projection. The (partial) structure of (3) would then be the following:

(4) $[_{\text{ComitativeP}} [_{\text{PP}}$ *e Aboubakar*] *-id-* $[_{\text{VP}}$ ... *habh-* ...]]

In this paper I will try to show that the formulation of the MP proposed in (2) together with the hypothesis in (4) that there is a fixed hierarchy of theta-related functional projections can account for the close parallelism found between the order of argument structure changing verbal extensions and their corresponding complements in Pular, thus providing clear evidence in favour of the incorporation approach to morphology.

3. Verbal extensions in Pular

"Verbal extension" is the traditional label used for those verbal affixes that "extend" or change the lexical meaning of the verb, as opposed to TMA affixes, which do not change the basic meaning of the verb[12]. For this reason verbal extensions are usually considered derivational affixes, and rules that extend verbs with these affixes are supposed to take place in the lexicon. Pular has a vast array of such affixes, as shown in the following table[13], and there is already a relevant theoretical literature about them[14].

[12] The names of the extensions are the ones used in the literature on Pular and go back at least to Arnott (1970). Note that the term "extension" can be used ambiguously to refer to either the affix (such as "the extension *-(i)t-*") or the meaning (such as "the reversive extension").

[13] Some verbal extensions were omitted from the table, namely several rare unproductive extensions, whose precise meaning is sometimes not easy to establish, on which see Breedveld (1995, 151 – 164); and the "celerative" and "simulative" extensions. The first means "to do X quickly" and the simulative "to pretend to X", where X is the base verb.

[14] The most important works are Sow (1966), Arnott (1970), de Wolf (1986), Gottschligg (1992), Fagerli (1994),Breedveld (1995) and Paster (2005), among others.

Meaning	Affix	Examples
Reversive Repetitive Reflexive Intensive	-(i)t-	*udd-* "close", *udd-it-* "open", *yah-* "go", *yah-it-* "go again" *war-*"kill", *war-t-* "kill oneself" *hel-* "break", *hel-t-* "smash"
Comitative, Completive	-(i)d-	*yah-* "go", *yaa-d-* "go with someone", *heew-* "be full", *heew-d-* "be completely full"
Causative	-(i)n-	*and-* "know", *and-in-* "inform"
Modal, Locative, Instrumental	-(i)r-	*yah- "go", yaa-r*"go in a certain manner" *art-* "return", *art-ir-* "return from some place" *tayh-* "cut", *tayh-ir-* "cut with something"
Benefactive	-an-	*yah-* "go", *yah-an-* "go for someone"
Reciprocal	-indir- -ondir	*and-* "know", *and-indir-* "know each other" *wall-* "help", *wall-ondir-* "help each other"
Distantive	-oy-	*sood-* "buy", *sood-oy-* "go and buy"

Table 1:Pular verbal extensions

In this article I will focus on those meanings which are associated with a complement. These uses are more extensively illustrated in (5) below:

(5) a. *Mi okk-in-ii Buuba baaba maako kaalis* (Causative)
I give-Caus-Past Buuba father his money
"I made Buuba give his father money"

b. *O habh-id-ii e Aboubakar* (Comitative)
he fight-Com-Past with Aboubakar
"He fought with Aboubakar"

c. *O wupp-ir-ii bagi on (e) saabunde* (Instrument)
he wash-Ins-Past cloth Det. with soap
"He washed the cloth with soap"

d. *O art-ir-ii Conakry* (Locative)
hereturn-Loc-Past Conakry
"He returned from Conakry"

e. *Rabiatou def-an-ii Mamadou* (Benefactive)
Rabiatou cook-Ben-Past Mamadou
"Rabiatou has cooked for Mamadou"

Verbal extensions that do not introduce a complement, such as the reflexive and reciprocal extension, as well as passive and middle voice, will not be discussed here, as the point under investigation is whether there is a parallelism in the order of verbal extensions and the order of their complements. Likewise, I will not consider the aspectual meanings of these affixes, even though the fact that many affixes have both an

aspectual and argument-structure changing meaning calls for a principled explanation[15]. Before proceeding to examine the order of verbal extensions, and then compare it to the order of their complements, certain characteristics of these affixes have to be pointed out, and in particular the differences between them and the better known applicative morpheme, with which they are often classified.

First, verbal extensions are associated with far more specific meanings than the applicative morpheme. So for instance, even if we consider only argument-structure changing meanings, the Swahili applied object has several different interpretations that require different verbal extensions in Pular[16]:

(6) *Interpretations of the applied object in Swahili*

a. Benefactive (Ngonyani, (1996, 4))
b. Malefactive
c. Goal
d. Instrumental
e. Motive
f. Locative
g. Reason

Second, verbal extensions are not agreeing markers, as they do not agree with the noun they introduce in number or class. Finally, not all verbal extensions can be analyzed as case markers or transitivizers, since some of them introduce PPs, and not DPs, see the cases of the comitative and instrumental extension illustrated in (5a) and (5c)[17]. This stands in contrast with the applicative morpheme, which only introduces DPs. This conclusion is further confirmed by the fact that some adverbial elements, which do not require case, also trigger the presence of a verbal extension:

(7) *Non hokk-ir-dhaa-mi-nga* (McIntosh (1984, 71))
thus give-Ins-you-me-it
"That's how you gave it to me"

In the preceding example *non* "thus" is clearly not a nominal element, since it lacks the class markers that all nouns bear in this language. If the extension *-ir* were a case assigner, there would be an undischarged case in (14), and the sentence would expected to be ungrammatical, contrary to fact. Furthermore, as both McIntosh (1984, 71) and Breedveld (1995, 178) point out, it is only manner adverbials that require the instrumental manner extension. This seems to show that the extension is sensible only to the interpretation of the complement or modifier it introduces, but not to its case requirements. I will therefore conclude that verbal extensions in Pular are purely argument structure changing devices, and that the semantic modification they cause can be described in terms of specific thematic relationships.

[15] In particular, it is a significant fact that the same combination of aspectual and argument changing meanings is found in verbal affixes in other languages: compare the Italian prefix *co-*, which can have both a comitative (*coprodurre*, "co-produce") and a completive (*cospargere*, "spread on") usage.

[16] The reader is referred to Ngonuani (1996) for extensive exemplification. For a unified analysis of the Swahili applicative and Pular verbal extensions, see Damonte (2004).

[17] See Gottschligg (1992) for an in-depth discussion of case and grammatical relations in Pular.

4. Order of verbal extensions in Pular

Another crucial difference between verbal extensions and the applicative suffix is that verbal extensions can be stacked and quite complex verbal forms can be derived, as in the following example:

(8) *Debbo labbh-in-ir-an-i mo bee buurdhi* (Fagerli (1994, 51))
woman clean-Caus-Ins-Ben-Past him with brush
"The woman cleaned for him with a brush"

The restrictions on the order of these suffixes in agglutinating languages has attracted considerable attention (see Paster (2005), for an overview). The hypotheses put forward to account for the attested orders can be roughly divided in two classes: those that assume that the order is determined by a morphological template, such as the one proposed by Hyman (2002) for the whole Bantu language family; and those that claim that the order of affixes is determined by semantic scope, the most coherent proposal in this sense being that of Rice (2000)[18]. The semantic scope hypothesis seems to better capture those cases in which argument structure changing affixes are not rigidly ordered, and alternative orders are possible. These cases are problematic both for the templatic approach and the hypothesis adopted here, in that affixes are expected to mirror the order of the corresponding functional projections, and functional projections are not supposed to freely recur or be freely ordered. In this section I will then try to show that there is no conclusive empirical support for the semantic scope approach in Pular[19], and more precisely that not all possible scope orderings of verbal extensions are attested, and that when they are, they actually correspond to two different meanings, not two different scope positions of the same meaning. Before proceeding, though, we have to clarify the relationship between the (original) MP and the semantic scope hypothesis, as well as that between the templatic approach and the morphological component.

An often mentioned shortcoming of the MP, as applied to verbal argument structure changing morphology, is the "mobility" of some of these suffixes, meaning that even within a given language they can appear in different combinations. Baker (1988, 373) proposed to account for this variation by postulating different underlying orders of the non-incorporated lexical items[20] corresponding to the different ordering possibilities of the incorporated morphemes. The theory then predicts that different orders of the morphemes have different scope interpretations, with the most external suffixes always scoping over the internal ones, and the individual suffixes retaining their meanings. This in turn has led many to assume that the MP and the semantic scope hypothesis are two sides of the same coin and that one implies the other. This conclusion does not seem to be correct, though: the MP per se does not put any constraint on how the formatives corresponding to incorporated morphemes are ordered in the syntax. The MP only makes sure that the surface order of the morphemes in a

[18] See also Paster (2005), who claims that the order of (consonantal) affixes in Fuuta Tooro Pulaar is largely determined by semantic scope with some cases having a fixed templatic order. Another approach says that the order is determined by phonological constraints, such as the sonority scale. I will not discuss this hypothesis here: see Fagerli (1994, chp. 5) on Pular and Paster (2005) for a general overview.

[19] A conclusion also reached by Fagerli (1994, chp. 3).

[20] Recall that in Baker's (1988) original analysis, verbal argument structure changing affixes correspond to lexical items such as verbs and prepositions, which in turn are merged in lexical, not functional, projections.

complex word will be the "mirror" of the underlying syntactic order, whatever that order is. It is then up to our view of the argument structure changing operations to determine how are the formatives corresponding to surface morphemes merged into syntactic structure. If morphemes are syntactic affixes merged in the heads of the corresponding functional projections, and if these projections are rigidly ordered and are not free to recur or occupy different scope positions[21], then the (original) MP predicts that affixes will be rigidly ordered as well. Thus, the MP approach can be made compatible with templatic hypotheses about the order of affixes, showing that there is no inherent connection between the morphological component and templates or the MP and semantic scope.

This conclusion, though, seems to make the MP unable to deal with those cases in which affixes are not rigidly ordered, as discussed in the preceding paragraph. But while different orderings are a problem for the original MP, they can be successfully accounted for by the feature-based MP proposed in (2). The crucial point is that, given the formulation of the MP in (2), the parallelism between syntactic projections and affixes is indirect, because it is mediated by specific syntactic features. Thus, different orderings of affixes are not per se evidence against (2), *as far as the same affix has different meanings in different positions*[22]. To illustrate, let us examine the extension *-(i)t* in Pular. As shown in table 1, it has several meanings, including repetitive and reversive. The two meanings, though, are associated with two different positions of the affix:

(9) a. *Debbo on sow-it-id-ii bagiiji ndin fow*
woman Det. fold-Rev-Comp-Past cloths Det. all
"The woman unfolded all the cloths"

b. *Debbo on sow-id-it-ii bagiiji ndin fow*
woman Det. fold-Comp-Rep-Past cloths Det. all
*"The woman unfolded all the cloths"
"The woman folded all the clothes again"

As (10) shows, the suffix *-(i)t-* can convey the reversive meaning only if it occurs immediately after the verb root (10a), otherwise it can only be interpreted as the *repetitive* extension (10b). This shows that even if the *suffixes* are not rigidly ordered, the *meanings* they convey are[23]. Note that the same argument holds for phrases: an adverb, for instance, may have different meanings, but then, according to (2), it will only have one possible interpretation in a given syntactic position[24]. On the other hand, the same syntactic feature could be associated with different types of exponents in different contexts. For instance, past tense could be marked by an affix in some contexts and by a root change in others. The MP as formulated in (2) predicts that all these

[21] But Cinque (1999, 91) proposes that some aspectual features are associated with two different positions, with different scope readings.
[22] See Cinque (2006, chp. 7) for extensive exemplification.
[23] Paster (2005) reports that in Fuuta Tooro Pulaar the reversive extension can occur before and after the "comprehensive" extension *-(i)d*. But examples like (9b) in which the reversive follows the comprehensive extension were not accepted by my informant, and are not reported in any source I could check.
[24] For discussion of some Italian examples, see Cinque (2006, 125 – 126). For an extensive argument that this is also the case for adverbial PPs in German, see Schweikert (2005).

exponents should occupy the same syntactic position.

With these clarifications out of the way, let us examine the order of those Pular verbal extensions that introduce a complement. The following examples show that most pair wise combinations of these affixes are indeed rigidly ordered:

(10) Causative < Comitative

a. ??*O goll-in-d-ii-lan e Rabiatou*[25]
He work-Caus-Com-Past-me with Rabiatou
"He made me work with Rabiatou"

b. **O goll-id-in-ii-lan e Rabiatou*

(11) Causative < Instrumental

a. *Mi labbh-in-ir-ii oto on saabunde*
I clean-Caus-Ins-Past car Det. soap
"I cleaned the car with soap"

b. **Mi labbh-ir-in-ii oto on saabunde*

(12) Comitative < Instrumental

a. *Mi def-id-ir-ii e Rabiatou uurere nden*
I cook-Com-Ins-Past with Rabiatou pot Det.
"I cooked together with Rabiatou with a pot"

b. **Mi def-ir-id-ii e Rabiatou uurere nden*

(13) Causative < Benefactive

a. *Debbo on labbh-in-an-ii Mamadou oto on*
woman Det. Clean-Caus-Ben-Past Mamadou car Det.
"The woman cleaned the car for Mamadou"

b. **Debbo on labbh-an-in-ii Mamadou oto on*

(14) Comitative < Benefactive

a. *Mi def-id-an-ii Mamadou teewu on e Rabiatou*
I cook-Com-Ben-Past Mamadou meat Det.with Rabiatou
"I cooked the meat with Rabiatou for Mamadou"

b. **Mi def-an-id-ii Mamadou teewu on e Rabi*

(15) Instrumental < Benefactive

a. *Rabiatou labbh-in-ir-an-ii Mamadou oto on saabunde*
Rabiatou clean-Caus-Ins-Ben-Past Mamadou car Det. soap
"Rabiatou cleaned the car for Mamadou with soap"

b. **Rabiatou labbh-in-an-ir-ii Mamadou oto on saabunde*

[25]For the fully grammatical version of this sentence, see below example (17b) and related discussion.

As examples (10-15) show, there seems to be only one overall order for the verbal extensions examined here, namely (16):

(16) Causative > Comitative > Instrumental > Benefactive

The order in (16) is the same as that reported by Diallo (2000, 150), and is largely compatible with the one given by Arnott (1970) and Fagerli (1994), the only difference being a lower position of the causative extension, which Arnott (1970) and Fagerli (1994) put above the comitative extension. As discussed by Damonte (2004), though, this might be due to the fact that there seem to be two causative heads, with different uses and positions: the lower one introduces the external argument of the verb (cfr. Kratzer (1994)[26]; the higher causative head, instead, introduces a non-argumental causer. Evidence in favour of the hypothesis that the low causative head does not introduce an (external) causer comes from the fact that the causative extension is quite productively used in Pular to add an external argument to an unaccusative predicate, as illustrated by the extended root *labbh-in-* "clean", which is derived from the stative predicate *laabh-* "be clean". Evidence that the causative head which introduces causers lies in a higher position comes from the following examples:

(17) a. ??*O goll-in-d-ii-lan e Rabiatou*
He work-Caus-Com-Past-me with Rabiatou
"He made me work with Rabiatou"

b. *O goll-in-d-in-ii-lan e Rabiatou*
He work-Caus-Com-Caus-Past-me with Rabiatou
"He made me work with Rabiatou"

By hypothesis, the causative extension *-(i)n* in (17a) is in the low causative head and introduces the external argument of the verb, while the causer is introduced by a higher causative head, which is not spelled out in (17a). This analysis seems to be confirmed by the fact that although the variant (17a) is judged acceptable, the preferred form, and the one spontaneously produced by my informant, is (17b). In this example there are two causative extensions, but the sentence does not have a double causative meaning, that is, it does not mean "He made (someone) make me work with Rabiatou"[27]. This can be accounted for if the lower causative extension is assumed to introduce the causee *-lan* "me", while the higher one introduces the causer *o* "he". This analysis predicts that when the base lexical root is a stative predicate, the double causative form should again lack a double causative meaning, since stative predicates do not have external arguments. The hypothesis seems to be borne out:

[26] For concreteness, I will refer to this extension as "Agentiviser".
[27] According to my informant, the unmarked way to express a double causative form in Pular is by means of the auxiliary verb *wadh-* "make" and a causative-derived verb.

(19) *Men hey-dh-in-t-in-ii aadi men ndin*[28]
We new-Dev-Caus-Rep-Caus-Past decision our Det.
"We renovated our decision"

Note that the two different positions of the causative extension do not correspond to two different scope positions: if the interpretation of causative affixes were based on scope a double causative form should have different interpretations with different types of predicates: predicates without an external argument should not trigger a double causative interpretation, while predicates with their own external argument should. This is not the case, which shows that the higher and lower causative extension introduce different types of (agentive) arguments. Finally, note that there seems to be a morphological difference between the two causative extensions as well: as pointed out by Fagerli (1994, 68), verbal roots with a CVVC shape change to CVCC when causativised, but only if the verb is unaccusative[29]: *laabh-* "be clean" > *labbh-in-* "clean", but *dhaan-* "sleep" > *dhaan-in-* "make sleep". While the productivity and interpretation of double causative forms in Pular remains to be fully investigated, the hypothesis proposed here could account for the peculiar variability in the order of the causative and comitative extensions reported by Paster (2005, 179 – 180) and Fagerli (1994, 63 - 65). According to Fagerli, only the order comitative < causative is possible in Adamawa Fulfulde, but is compatible with both scope readings. For Fuuta Tooro Pulaar Paster reports that both orderings of the affixes are possible, with either scope reading. These facts can receive a unified explanation under the current hypothesis, if we assume that both causative heads are activated in (single) causative constructions, but only in Fuuta Jaloo Pular they can be both spelled out at the same time[30]. Different dialects would then vary in the way they spell out the two causative heads: Adamawa Fulfulde seems to be able to spell out only the higher one, Fuuta Jaloo Pular only the lower one[31], and Fuuta Tooro Pulaar both. The variation in the order of the causative and comitative affixes would then be only apparent, in that the underlying structure would be the same for all dialects of the language. Crucially, this variation is not directly linked to semantic scope, as both orderings of affixes allow either reading. Strikingly, the order of the affixes does not seem to be based on semantic scope even when only one scope reading is possible: both Paster and Fagerli provide unambiguous examples, but even in these cases the order of the affixes is fixed in Adamawa Fulfulde (namely *(i)n* < *(i)d*, cfr. Fagerli (1994, 64)), and free in Fuuta Tooro Pulaar (Paster (2005, 180)[32]. It thus seems that the current approach can capture the variability in the

[28] The verbal form in (19) is found in Diallo (2000, 147). Other double causative forms without double causative meanings are reported by Diallo (2000, 147) and Fagerli (1994, 42). Fagerli also reports that the causative extension is the most easily doubled.

[29] Actually, Fagerli says that the verb has to be intransitive, but this seems to be incorrect, in the light of cases like *dhaan- **in-*** "make sleep".

[30] And then only in special circumstances: nearly all the examples with double causative extensions reported in the literature have another extension intervening between the two causative affixes. My informant finds that (17b) sounds odd without the comitative extension.

[31] That is, if only one causative head is spelled out, cfr. (10).

[32] There is one exception, though: when the scope is unambiguously causative < comitative, as in the sentence "Together, they taught him", only the order *(i)n* < *(i)d* is possible in Fuuta Tooro Pulaar, the order expected by semantic scope (Paster (2005, 179)). While this fact needs an explanation, the crucial point is that potentially ambiguous cases seem to allow both scope readings in Fuuta Tooro Pulaar as well, independently of the order of the affixes (Paster (2005, 180)). If affix order were determined by semantic scope, there should no such ambiguity. Note that in Adamawa Fulfulde even in this case the

order of the comitative and causative extensions better than the semantic scope approach, which would presumably conclude that the order of these affixes is scope-based in one dialect (Fuuta Tooro Pulaar) and templatic in another (Adamawa Fulfulde)[33].

To conclude this brief discussion of alternative orders of extensions in Pular, Paster (2005) reports that the order of the comitative and instrumental extensions is scope-based in Fuuta Tooro Pulaar. She provides the following examples:

(20) a. *Mi sok-r-id-ii baafe ɗe coktirgal goɗngal*
I lock-Ins-Compl-Past doors Det. key different
'I locked each of the doors with a different key'

b. *Mi sok-d-ir-ii baafe ɗe coktirgal*
I lock-Compl-Ins-Past doors Det. key
'I locked all of the doors with a key' (the same key)

These examples do not seem to be relevant, though, as the *-(i)d-* affix in this case is actually the aspectual completive extension, not the argument-structure changing comitative. If the extension has the comitative meaning, my informant considers only the order Comitative > Instrumental grammatical in Fuuta Jaloo Pular.

Finally, clear evidence in favour of the feature-based MP approach adopted here comes from the reduplicated extensions. Given the assumption that functional projections cannot freely recur, the original MP bans the same affix to occur twice on the same verbal form. But again, a feature-based MP allows this if the two extensions have different meanings. This is indeed the case with the benefactive and instrumental extensions:

(21) a. *Gujjo wujj-an-an-ii Mamadou Abubakar kaalis*
thief steal-Ben-Ben-Past Mamadou aboubacar money
"The thief stole some money for Mamadou from aboubacar"

b. *O art-ir-ir-ii Conakry oto on*
He return-Ins-Ins-Past Conakry car Det.
"He returned from Conakry by car"

Crucially, the reduplicated extensions in (21) are associated with two different types of complements in each case and *cannot* refer to two benefactive or locative complements, respectively. Note that these examples remain unexplained under a semantic scope approach, since there is no semantic reason why a single predicate should not have two different benefactive complements.

In view of the preceding arguments we must therefore conclude that the order of verbal extensions is not determined by scope, since it appears to be more rigid than what a scope based theory would predict. The overall order of argument-introducing

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order of the affixes is *(i)d < (i)n* (Fagerli (1994, 64).

[33] This analysis could perhaps be extended to the variable order between the causative and the instrumental extensions reported by Paster (2005, 182) for Fuuta Tooro Pulaar, even if this would force us to assume that the high causative head is higher than the instrumental head, which is not compatible with the fixed order causative < instrumental reported for all other dialects of the language.

verbal extensions in Pular would then be:

(22) Agentiviser < Comitative < Causative < Instrumental < Benefactive

5. Order of complements

While there is a sizable literature on the order of verbal extension in Pular, not much has been written on the order of the complements introduced by these affixes, with the notable exception of Gottschligg (1992). Grammars of the language report a fixed order of these phrases with respect to the object of the verb, and this is confirmed bu my informant:

(23) a. *Rabiatou def-an-ii Mamadou teewu on*
Rabiatou cook-Ben-Past Mamadou meat Det.
"Rabiatou has cooked the meat for Mamadou"

b. **Rabiatou def-an-ii teewu on Mamadou*

(24) a. *Mi def-ir-ii nyiiri ndin e kuddu*
I cook-Ins-Past rice Det with spoon
"I cooked the rice with a spoon"

b. ?**Mi def-ir-ii e kuddu nyiiri ndin*

As examples (23 - 24) show, the benefactive complement occurs immediately after the verb, before the direct object of the verb, while the instrumental complement follows the object, in its unmarked position. If the order of complements is rigid, given our hypothesis (2) we would then expect it to be the mirror of order of the verbal extensions that introduce them. No exhaustive research has been carried out on the order of all possible combinations of complements introduced by verbal extensions in Pular, but there is at least one case in which the unmarked order of the complements is not the mirror image of the order of the affixes:

(25) a. *Mi def-id-ir-ii e Rabiatou uurere nden*
I cook-Com-Ins-Past with Rabiatou pot Det.
"I cooked together with Rabiatou with a pot"

b. ?**Mi def-id-ir-ii uurere nden e Rabiatou*

It seems therefore that the order of complements in Pular does not confirm the hypothesis in (2): there is no parallelism between the order of the affixes and the order of the complements. I would like to argue, though, that the *underlying* order of the complements is the expected one, more precisely, I will propose that that the surface positions of the complements in (25a) does not correspond to the position where they are merged into the syntactic structure, and that the order of these latter positions does indeed correspond to the mirror order of the corresponding verbal extensions. In order to do this, I will use a syntactic test drawn from Ngonyani's (1996) work on Swahili.

This is an ellipsis test on the possibility of deleting the complements of the verb:

(26) *Mi sood-an-ii Mamadou mango e hay Fatou sood-an-ii*
I buy -Ben-Past Mamadou mango and also Fatou buy-Ben-Past
"I bought Mamadou some mango and also Fatou bought
(Mamadou some mango)"

That the construction in (26) is indeed a case of ellipsis is shown in (27):

(27) *Rabiatou ne'-ii paykoy makko koy*
Rabiatou educate-Past children her Det
e hay Fatou ne'-ii ~~paykoy makko koy~~
and also Fatou educate-Past children her Det
a. "Rabiatou educated her children and Fatou also educated her own children"
b. "Rabiatou educated her children and Fatou also educated them (= Rabiatou's)"

As Ngonyani (2000) observes, the possibility of sloppy reading in (27a) shows that the construction in (26) is indeed a case of ellipsis. Now, the ellipsis test in (26) shows that if the verb has two complements, there is an asymmetry: the complement introduced by the benefactive verbal extension can be deleted only together with the object of the verb, but it cannot be deleted alone:

(28) a. *Mi sood-an-ii Mamadou mango ...* Benefactive > Direct Object
I buy -Ben-Past Mamadou mango
"I bought Mamadou some mango ..."

b. *e Fatou sood-an-ii Abou* ~~mango~~.
and Fatou buy-Ben-Past Abou mango
"and Fatou bought Abou (some mango)"

c. **e Fatou sood-an-ii* ~~*Mamadou*~~ *teewu.*
and Fatou buy-Ben-Past Mamadou meat
"and Fatou bought (Mamadou) meat"

d. *e hay Fatou sood-an-ii* ~~*Mamadou mango*~~
and also Fatou buy-Ben-Past Mamadou mango
"and also Fatou bought (Mamadou some mango)

These data can be accounted for if we assume that the benefactive complement is merged in a higher position than the direct object in the functional structure of the clause, as argued by Ngonyani (1996) for Swahili:

(29) a. *sood*$_i$-*an*$_k$-*ii* [BenefactiveP *Mamadou* t$_k$ [VP t$_i$ *mango*]]

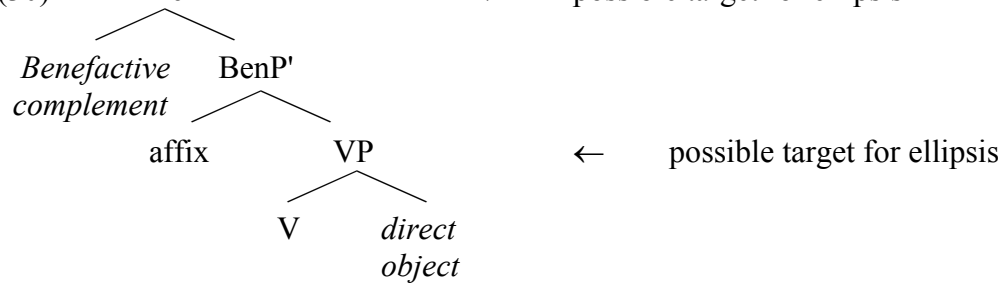
b. *sood*$_i$-*an*$_k$-*ii* [BenefactiveP *Abou* t$_k$ ~~[VP t$_i$ *mango*~~]]

c. **sood*$_i$-*an*$_k$-*ii* ~~[BenefactiveP *Mamadou* t$_k$~~ [VP t$_i$ *teewu*]]

d. *soodi-an*$_k$-*ii* ~~[BenefactiveP *Mamadou* t$_k$ [VP t$_i$ *mango*]]~~

In (29b) the VP, which contains the direct object, has been deleted, and the benefactive complement occupies a higher position. In (29c), on the contrary, the lower direct object is spelled out, while the higher benefactive complement is deleted. In this case deletion has not targeted a node of the structure, leading to ungrammaticality. Finally, in (29d) both the benefactive complement and the direct object are deleted, and the result is grammatical[34]. The relevant nodes that can be grammatically deleted are shown in (30):

(30)



The reader is referred to Ngonyani (2000) for a fuller discussion of this test and its validity for Bantu languages. Granted that this test successfully probes the underlying positions of complements in Pular, let us apply it to other complements introduced by verbal extensions. As expected, the same asymmetry shown in (28) between the benefactive complement and the object of the verb holds for other complements as well:

(31) a. *Mamadou def-in-ii-lan nyiiri ndin...* Causative > Direct Object
Mamadou cook-Caus-Past-me rice Det.
"Mamadou made me cook the rice ..."

b. *e Aboubacar def-in-ii-mo ~~nyiiri ndin~~.*
and Aboubacar cook-Caus-Past-him rice Det.
"and Aboubacar made him cook (the rice)"

c. **e Aboubacar def-in-ii-~~lan~~ teewu on*
and Aboubacar cook-Caus-Past-me meat Det.
"and Aboubacar made (me) cook the meat"

d. *e hay Aboubacar def-in-ii-~~lan nyiir ndin~~*
and also Aboubacar cook-Caus-Past-me rice Det.
"and also Aboubacar made cook (me the rice)"

[34]Note that this analysis implies that the verb has moved out of the VP. Since the verb in Pular carries TMA morphology, this seems correct.

(32) a. *Mi def-id-ii mango e Rabiatou ...* Comitative > Direct Object
I cook-Com-Past mango with Rabiatou
"I cooked mango with Rabiatou ..."

b. *e o def-id-ii ~~mango~~ e Fatou*
and he cook-Com-Past mango with Fatou
"and he cooked (mango) with Fatou"

c. **e o def-id-ii nyiiri ~~e Rabiatou~~*
and he cook-Com-Past rice with Rabiatou
"and he cooked rice (with Rabiatou)"

d. *e hay o def-id-ii ~~mango e Rabiatou~~*
and also he cook-Com-Past mango with Rabiatou
"and he also cooked (mango with Rabiatou)"

(33) a. *Mi def-ir-ii nyiiri ndin e kuddu ...* Instrumental >Direct Object
I cook-Ins-Past rice Det with spoon
"I cooked the rice with a spoon ..."

b. *e o def-ir-ii ~~nyiiri ndin~~ e ndihal*
and he cook-Ins-Past rice Det with water
"and he cooked (the rice) with water"

c. **e o def-ir-ii fonnye ~~e kuddu~~*
and he cook-Ins-Past with spoon fonio
"and he cooked fonio (with a spoon)"

d. *e hay o def-ir-ii ~~nyiiri ndin e kuddu~~*
and also he cook-Ins-Past rice Det. with spoon
"and he also cooked (the rice with a spoon)"

Note that the asymmetry between the complement and the direct object of the verb holds even if the complement follows the direct object, as in examples (32 – 33). More importantly, there seems to be an asymmetry between two complements as well:

(34) a. *Mamadou goll-in-d-ii-lan e Fatou...* Causative > Comitative
Mamadou work-Caus-Com-Past-me with Fatou
"Mamadou made me work with Fatou"

b. *e Aboubacar goll-in-d-ii-~~lan~~ e Rabiatou*
and Aboubacar work-Caus-Com-Past-me with Rabiatou
"and Aboubacar made (me) work with Rabiatou"

c. ?**e Aboubacar goll-in-d-ii-mo ~~e Fatou~~*[35]
and Aboubacar work-Caus-Com-Past-him with Fatou
"and Aboubacar made him work (with Fatou)"

[35]The sentence is grammatical without the comitative extension on the verb.

d. *e hay Aboubacar goll-in-d-ii-~~lan e Fatou~~*
and also Aboubacar work-Caus-Com-Past
"and also Aboubacar made work (me with Fatou)"

(35) a *Fatou loot-id-ir-ii oto on e Rabiatou saabunde* Instrumental > Comitative
Fatou wash-Com-Ins-Past car Det. with Rabiatou soap
"Fatou washed the card with Rabiatou with soap ..."

b. *e Abou loot-id-ir-ii ~~oto on e Rabiatou~~fittirgol*
and Abou wash-Com-Ins-Past car Det. with Rabiatou brush
"and Abou washed with a brush (the car, with Rabiatou)"

c. ??*e Abou loot-id-ir-ii ~~oto on~~e Mamadou ~~saabunde~~*
and Abou wash-Com-Ins-Past car Det. with Mamdou soap
"and Abou washed with Mamadou (the car, with soap)"

d. *e hay Abou loot-id-ir-ii ~~oto on e Rabiatou saabunde~~*
Fatou wash-Com-Ins-Past car Det. with Rabiatou soap
"and also Abou washed (the car, with Rabiatou, with soap)"

(36) a. *Mi def-id-an-ii Abubakar e Rabiatou ...* Benefactive>Comitative
I cook-Com-Ben-Past Abubakar with Rabiatou ...
"I cooked with Rabiatou for Aboubakar ..."

b. *e o def-id-an-ii Mamadou ~~e Rabiatou~~*
and he cook-Com-Ben-Past Mamadou with Rabiatou
"and he cooked for Mamadou (with Rabiatou)"

c **e o def-id-an-ii ~~Abubakar~~ e Fatou*
and he cook-Com-Ben-Past for Aboubakar with Fatou
"... and he cooked (for Abubakar) with Fatou"

d. *e hay o def-id-an-ii ~~Abubakar~~ ~~e Rabiatou~~*
and he cook-Com-Ben-Past Abubakar with Rabiatou
"and he also cooked (for Abubakar with Rabiatou)"

(37) a. *Mi def-ir-an-ii Abou kuddu on ...* Benefactive>Instrumental
I cook-Ins-Ben-Past Abou spoon Det.
"I cooked for Abou with the spoon ..."

b. *e o def-ir-an-ii Rabiatou ~~kuddu on~~*.
and he cook-Ins-Ben-Past Rabiatou spoon Det.
"and he cooked for Rabiatou (with the spoon)"

c. **e o def-ir-an-ii ~~Abou~~ uurere nden*
and he cook-Ins-Ben-Past pot Det.
"and he cooked (for Abou) with the pot"

d. *e hay o def-ir-an-ii ~~Abou kuddu on~~*.
and also he cook-Ins-Ben-Past Abou
"and he also cooked (for Abou with the spoon)"

While the judgments are sometimes not so crisp as in examples (28) and (31 – 33)[36], there seems to be a clear asymmetry in the grammaticality of the deletion of the complements introduced by verbal extensions. Benefactives, for instance, can never be deleted in isolation, while a different complement occurring together with a benefactive can (36 –37)[37]. This is unexpected under a theory in which these complements are adverbial modifiers adjoined to the VP. Since adjunction is free and unordered, it should be possible to delete any of the complements in a sentence, contrary to fact. While more research is definitely needed, on the basis of the preliminary results in (34 – 37) it is possible to establish an overall order of the complements in Pular, namely:

(38) Causative < Benefactive < Instrumental < Comitative

This order matches the one established for verbal extensions, and thus show clear evidence in favour of (2).

6. Conclusions

The idea behind this study is that the question "how are syntax and morphology connected?" can be answered (at least in part) by looking at which *features* are visible on both affixes and phrases. Since even strong lexicalist approaches like Di Sciullo and Williams' (1987) have to concede that some lexical features are made visible to syntax, we have then to make specific hypothesis on how syntax can access these features. The hypothesis adopted in this paper is that the connection takes place because features project their own functional projections, and all lexical items carrying that feature must be merged in that projection. This hypothesis has already been successfully applied to TMA modifications by Cinque (1999, 2006) and Schweikert (2005) and I tried to show in this study that argument structure changing affixes are also amenable to be analyzed in this way. I would like to underline that while the high number of functional projections that goes along with this hypothesis may look like a heavy enrichment of the theory, the conceptual tools being used are actually quite few: features and projections are an inevitable part of any theory of phrase structure, and also the minimalist program assumes that lexical items have to check their features in the corresponding projections. The question is then to find which features are syntactically relevant. If the analysis of argument structure changing affixes proposed in this study is correct, thematic relationships are represented in syntax as features. This hypothesis represents a rather dramatic depart from current assumptions about theta-roles, that would rather place them outside syntax proper, but the precise correspondence between the order of verbal

[36]In particular, several pairs of sentences containing both an instrumental and comitative complement, but no direct object (as opposed to example (35)) were judged equally good when either complement was deleted.

[37]Note that this cannot be due to the the fact that the other complement is a DP, as in the case of the instrumental complement in (37), since the comitative complement in (36) is a PP, and it still blocks deletion of the benefactive complement (36c).

extensions and the (underlying) order of their complements in Pular shows that this hypothesis might be correct. If so, future research will have to locate these theta-related projections in the overall hierarchy of functional projections.

References

Arnott David (1970) *The nominal and verbal systems of Fula,* Oxford, Clarendon Press.

Baker, Mark. (1985) "The Mirror Principle and morphosyntactic explanation", *Linguistic Inquiry* 16: pp. 373-415

Baker, Mark. (1988) *Incorporation*, Chicago, Chicago University Press.

Baker, Mark (2002) "Building and merging, not checking: the nonexistence of (Aux)-SVO languages", *Linguistic Inquiry* 33: 321-328.

Breedveld, Johanna (1995) *Form and Meaning in Fulfulde: a Morphophonological Study of Maasinankoore*, Ph.D Thesis, University of Leiden.

Bresnan, Joan & Sam Mchombo (1995) "The lexical integrity principle: evidence from Bantu", *Natural Language and Linguistic Theory*, 13: pp. 181-254.

Damonte, Federico (2004) *The Thematic Field: the syntax of valency-enhancing morphology*, Ph.D Thesis, University of Padua.

Cinque, Guglielmo (1999) *Adverbs and Functional Heads*, Oxford, Oxford University Press.

(2006) *Restructuring and Functional heads. The Cartography of Syntactic Structure, Vol. 4*, Oxford, Oxford University Press.

Diallo, Abdourahmane (2000), *Grammaire descriptive du pular du Fuuta Jaloo (Guinée)*, Frankfurt, Peter Lang.

Di Sciullo, Anna Maria & Edwin Williams (1987) *On the definition of word*, Cambridge (Mass.), The MIT Press.

Fagerli, Ole (1993) *Verbal Derivations in Fulfulde*, Cand. Philol. Thesis, University of Trondheim.

Gottschligg, Peter (1992) *Verbale Valenz und Kasus im Ful*, Vienna, VWGÖ.

Hyman, Larry (2002) "Suffix Ordering in Bantu: A Morphocentric Approach", Yearbook of Morphology, pp.

Julien, Marit (2002) *Syntactic heads and word formation*, Oxford, Oxford University Press.

Kayne, Richard (1994) *The Antisymmetry of Syntax*, Cambridge (Mass.) The MIT Press.

Kratzer, Angelika (1996) "Severing the External Argument from its Verb", in J. Rooryck & L. Zaring (eds.), *Phrase Structure and the Lexicon*, Dordrecht, Kluwer, pp. 109 - 137.

McIntosh, Mary (1984) *Fulfulde Syntax and Verbal Morphology*, Boston, Routledge and Kegan Paul.

Myers, Scott P. (1987), *Tone and the Structure of Words in Shona*, Ph.D. Dissertation, The University Of Massachusetts, Amherst.

Ngonyani, Deogratias (1996) *The Morphosyntax of Applicatives*, Ph.D. Thesis, University of California Los Angeles.

Ngonyani, Deogratias (2000) "The constituent structure of Kindendeule applicatives", in Vicky Carstens and Frederick Parkinson (eds.), *Advances in African Linguistics*, Trenton, Africa World Press.

Paster, Mary (2005) "Pulaar verbal extensions and phonologically driven affix order", in Geert Booij and Jaap van marle (eds), *Yearbook of Morphology 2005*, pp. 155 – 199.

Rice, Keren (2000) *Morpheme Order and Semantic Scope: Word Formation in the Athapaskan Verb*, Cambridge, Cambridge University Press.

Schweikert, Walter (2005) *The Order of Prepositional Phrases in the Structure of the Clause*, Amsterdam, Benjamins.

Sow, Âlfa Ibrâhîm (1966) Remarques sur les Infixes de Derivations dans le Fulfulde du Foûta Djalon (Guinée) , The Journal of West African Languages, Vol. III, n. 1, 13-21.

de Wolf, Paul P. (1986) "Verbal extensions in Noŋaare Fulani: causative, dative, celerative, distantive and simulative", *Afrika und Übersee*, 70, pp. 61 – 72.