THE APPLICATIVE AFFIX
AND MORPHEME ORDERING IN CHICHEWA

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Abstract

Applicativization is highly productive in a language like Chichewa. The applicative affix augments the a(rgument)-structure of a verb by bringing in an additional semantic role, which is most frequently a benefactive, instrument or locative role. We show in this paper that the structure of the word can be represented in the form of a morphology-syntax interface tree, which makes it possible to refer to not only parts of the word but also the levels of representation that are associated with each morpheme. The a-structure is of particular interest, as this is the structure that the applicative and passive affixes alter. More importantly, these morphemes alter the existing a-structure, one that is the result of the interaction between the verb root and any other a-structure-changing morpheme that precedes in morphological form the morpheme in question. With the interface tree, it is possible to make reference to an intermediate a-structure, one that is associated with a particular morpheme on the tree. Morpheme order can thus be accounted for more straight-forwardly.

1. The Applicative Affix in Chichewa[1]

The applicative affix introduces a non-agentive phrase/clause that is not directly associated with the SUBJ function (contra the causative affix, for instance) (Mchombo 2004). It is an argument-structure-augmenting verbal affix, and most frequently introduces a benefactive, instrument or locative role into the a-structure. In Chichewa, this affix has two allomorphs: *-il-* and *-el-*. Which allomorph is selected and affixed to the verb is constrained by rules of vowel harmony. Consider the following examples:

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[1] I wish to thank the participants of the LFG'07 conference for a number of very useful comments. A special thanks goes to Ron Kaplan for an illuminating discussion of parts of this paper, and to Mary Dalrymple for providing constructive feedback on earlier drafts of the paper.

(1) a. With the underived verb root *-pika* "cook":
         mkango   u-ku-phik-a   nyemba
         lion(3)   3SM-pres-cook-fv   beans(10)[2]
         'The lion cooked beans.'
     b. A-structure: *-phika*   < Ag, Pt >
(2) a. Benefactive role introduced by the applicative affix
         Mkango   u-ku-phik-**il**-a   **ana**   nyemba
         lion(3)   3SM-pres-cook-appl-fv   children(2)   beans(10)
         'The lion cooked the children beans.'
     b. A-structure: *-phik-**il**-a* < Ag, **Ben**, Pt >
(3) a. Instrument role introduced by the applicative affix (Mchombo 2004:87, ex. 48b)
         Kalulu   a-ku-phik-**il**-a   **mkondo** maungu
         hare(1)   1SM-pres-cook-appl-fv   spear(3)   pumpkins(6)
         'The hare is cooking pumpkins with (using) a spear.'
     b. A-structure: *-phik-**il**-a* < Ag, **Instr**, Pt >
(4) a. Locative role introduced by the applicative affix (Mchombo 2004:87, ex. 49b)
         Kalulu   a-ku-phik-**il**-a   **pa   chulu**   maungu
         hare(1)   1SM-pres-cook-appl-fv   on(16) anthill(7) pumpkins(6)
         'The hare is cooking the pumpkins on the anthill.'
     b. A-structure: *-phik-**il**-a* < Ag, Pt, **Loc** >

In (1a), the verb root is in its most basic form, without any a-structure-changing morpheme affixed to it. The verb root *-phika* "cook" is transitive, and subcategorizes for one object. The a-structure of the verb *-phika* is shown in (1b). Examples (2) to (4) show that an extra argument is licensed by the affixation of the applicative morpheme. In each of these cases, with the applicative affix *-il-* attached to the verb root *-phika*, the applied verb form becomes *-phik-il-a*, which subcategorizes for two objects. In (2), a

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[2] Symbols and abbreviations used:
   Acc = accusative case; Appl = applicative affix; Ben = benefactive role; fv = final vowel; fut = future tense; Instr = instrument role; Loc = locative role/locative case; OM = object marker; pres = present tense; Prop = proprietive case; pst = past tense; SM = subject marker; Th = theme role.
   The number in the parentheses after a glossed noun shows the noun class of that noun.

benefactive argument *ana* "children" is introduced. In (3), an instrument argument *mkondo* "spear" is added, while in (4), the additional argument that is licensed is a locative argument *pa chulu* "on anthill".

It is quite often the case that there is more than one a-structure-changing morpheme affixed to the verb root. Besides the applicative affix, other a-structure-changing morphemes include the passive, the causative and the reciprocal affixes. When there is more than one such affix on the verb, it is usually possible to have the morphemes affixed in more than one order. The difference in morpheme order results in a difference in meaning:

(5) *a-na-meny-an-its-a* (Alsina 1999:7, ex. 3)

Alenje	a-na-meny-**an-its**-a	mbuzi
Hunters(2)	2SM-pst-hit-**rcp-caus**-fv	goats(10)

    'The hunters made the goats hit each other.'

(6) *a-na-meny-ets-an-a* (Alsina 1999:7, ex. 4)

Alenje	a-na-meny-**ets-an**-a	mbuzi
Hunters(2)	2SM-pst-hit-**caus-rcp**-fv	goats(10)

    'The hunters made each other hit the goats.'

Since the order of morphemes has such an important role to play in the interpretation of a construction, there must be a way to accurately predict morpheme order and to correctly account for the effects that the morphemes have on the a-structure of the verb. We will first look at one such account proposed in Alsina (1999) and the problems that Alsina's proposal faces in section 2. Section 3 provides an alternative way to account for morpheme order and the corresponding a-structure-altering effects, building on Sadler and Nordlinger's (2004) analysis of case-stacking. Section 4 concludes the paper.

2. Alsina's (1999) Instantiation of the Mirror Principle

It is generally accepted in the literature that morpheme order bears some relation to the order of processes triggered by these morphemes. To capture the relation between morphological changes and the corresponding syntactic effects induced by these morphemes, Baker (1985) proposes the Mirror Principle:

(7) The Mirror Principle (Baker 1985:375)
     Morphological derivations must directly reflect syntactic derivations
     (and vice versa).

In the transformational theory that Baker assumes, this is achieved by
allowing (bound) morphemes to appear under terminal nodes. A syntactic
derivation (ex. movement) picks up the morpheme by moving into the
position on the tree that is occupied by that morpheme. For instance, a
causative derivation involves the movement of the verb root into the position
that is occupied by the causative morpheme, which then attaches to the verb
root to create the verb form V-CAUS. A single movement operation will give
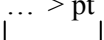rise to a morphological derivation and a syntactic derivation.

   Alsina (1999) suggests how the Mirror Principle can be captured in a
non-transformational theory like LFG. The Mirror Principle is not a result of
a sequence of transformations, but is a consequence of the order of
morphological affixations and the order of their corresponding morpholexical
operations during mapping from a-structure to f-structure. The operation
associated with the morpheme that is closer to the verb root is applied first,
and so the linear order of the morphemes reflects the order of the operations.

   Argument-structure changing morphemes, such as the causative,
applicative, passive and reciprocal morphemes, all have their own lexical
entries, in which the change in argument structure to be effected by this
morpheme is specified. Crucial to Alsina's proposal is the assumption that the
a-structure of the verb root is altered in the way specified in the lexical entry
of the morpheme upon affixation of that morpheme to the verb root in the
lexicon. The Mirror Principle then follows as a consequence of the
"morphological change and the a-structure change associated with the same
morpholexical operation […] tak[ing] place at the same time" (Alsina
1999:24).

   Take the applicative affix for example. The lexical entry of the
applicative morpheme is given as follows:

(8) Lexical entry for the applicative affix (Alsina 1999:26)
     [ir]   ]$_V$__   <   <   θ … θ … > pt >
                                      |_____|

The notation "]$_V$__" means that the item cannot be an independent form and
must attach to the right edge of the verb stem. The a-structure alternation

caused by this affix is such that the "theme is fused with the thematic role introduced" (Alsina 1999:24).

There are, however, some serious problems with Alsina's proposal. First, the notion of "fusion" of thematic roles is never clearly defined. In the case of the applicative affix, it is not at all clear what semantic basis there could be for making the claim that the thematic role introduced, whether it is a benefactive, instrument or locative role, had "fused" with another theme[3] role. Besides, the fusion does not seem to be constrained in any way. Can any two roles just fuse together?[4]

Another even more serious problem with Alsina's mapping analysis concerns cases in which there is more than one a-structure-changing morpheme on the verb. As an illustration, assume that there are two such morphemes on a verb root: V-Aff$_1$-Aff$_2$. Each of these morphemes makes one change to the a-structure. Aff$_1$ makes a change to the a-structure of the verb root, but Aff$_2$ alters the verb root's *modified* a-structure by Aff$_1$. In order to formalize this, there must be a way to talk about not only the "end point" a-structure, but also the intermediate a-structure.

Alsina attempted to do so by postulating that "morphological change and the a-structure change associated with the same morpholexical operation […] take place at the same time" (Alsina 1999:24). While this assumption is valid, his formalization faces a serious problem of creating new and temporary lexical items – the lexical entry of the affix interacts with that of the verb root, intrinsic classifications are assigned to the resulting roles, and the intermediate lexical item serves as the starting point of the morphological and morpholexical operation that follows:

> "The basic assumption is that *the assignment of intrinsic classifications and morphological composition interact in a cyclic manner*: intrinsic classifications apply to the underived a-structure and, successively, after any morphological process which alters its thematic content." (p. 29; author's emphasis in italics)

Each intermediate a-structure is thus accompanied by a partially derived word form, which also exists temporarily.

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[3] In this paper, a theme role and a patient role are treated identically.
[4] The one constraint on the fusion of thematic roles is that, in an applicative operation, 'the role that is fused with the theme […] cannot be the highest thematic role' (Alsina 1999:26).

In the next section, we shall see how it becomes possible to make reference to different parts of word and the level(s) of representation associated with each of them by drawing insights from Sadler and Nordlinger's (2004) representation of morphological structures in the form of morphology-syntax interface trees.

3. An Alternative Proposal
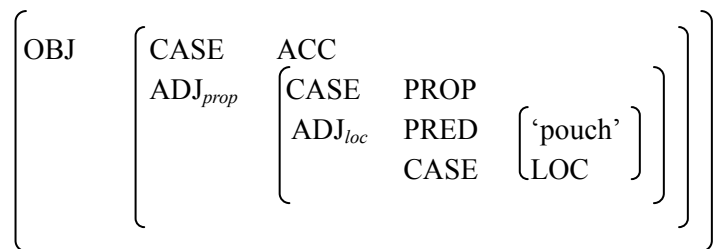### 3.1 Morphology-Syntax Interface Trees
In order to account for case-stacking phenomena in Australian languages, Sadler and Nordlinger (2004) adopt the Principle of Morphological Composition (PMC), originally proposed in Nordlinger (1998). Case-stacking is when more than one case affix is found on a nominal, and each of them contributes functional information to the f-structure that is defined by its following case morpheme. To achieve morphological composition more straight-forwardly, Sadler and Nordlinger (2004) assume that the morphological structure is represented by a flat interface tree between morphology and syntax[5]. The embedding relation between a case affix and its following case affix is represented by assigning the functional equation $\leftarrow_s =$ ($\downarrow$GF) to the nodes dominating the non-initial case affixes:

(9) a. Morphological structure of the nominal *thara-ngka-marta-a* (pouch-LOC-PROP-ACC) represented as a morphology-syntax interface tree (This is a combination of the partial trees in Sadler and Nordlinger 2004:176-177, ex. 33-35.)

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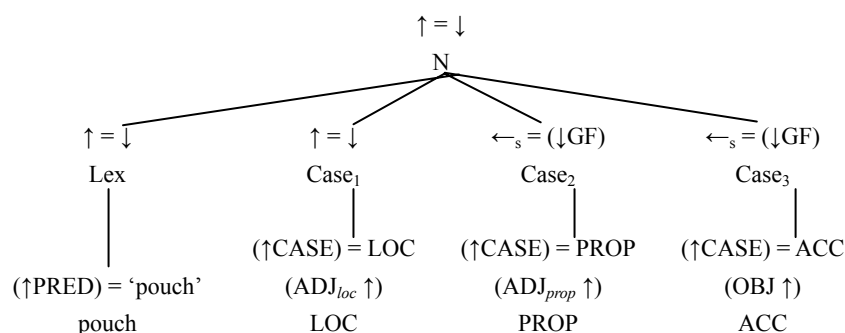
[5] Doug Arnold, Ron Kaplan and Louisa Sadler all pointed out that such an interface tree does not have to be flat in nature. The possibility of having a more hierarchical tree to represent the morphological structure of the verb, and therefore different functional annotations on the nodes, will be explored in future work.

b. F-structure for the nominal *thara-ngka-marta-a* (pouch-LOC-PROP-ACC) (Sadler and Nordlinger 2004:163, ex. 5)

$$
\begin{bmatrix}
\text{OBJ} & \begin{bmatrix}
\text{CASE} & \text{ACC} \\
\text{ADJ}_{prop} & \begin{bmatrix}
\text{CASE} & \text{PROP} \\
\text{ADJ}_{loc} & \begin{bmatrix} \text{PRED} & \text{'pouch'} \\ \text{CASE} & \text{LOC} \end{bmatrix}
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

The functional annotation $\leftarrow_s = (\downarrow\text{GF})^6$ says "the f-structure defined by my sister to the left is a GF in my f-structure". Take, for instance, the nodes Case_1 and Case_2. As part of the lexical information specified by the case value LOC, some GF labelled ADJ_{loc} is required to exist at some level of the f-structure. The annotation on its sister node to the right, Case_2, indicates where this GF has to be – it has to be in the f-structure associated with that node, namely the f-structure called ADJ_{prop}. This gives the desired f-structure embedding, with the ADJ_{loc} function inside the ADJ_{prop} function.

3.2 The Proposal

The case-stacking phenomenon is similar to the morpheme ordering problem at hand in three respects: (i) there may be more than one affix on the stem; (ii) the order of affixes is significant; and (iii) any specification or change to a particular structure takes places sequentially. While Alsina (1999:24) assumes that "morphological change and the a-structure change associated with the same morpholexical operation […] take place at the same time", we assume that morphological composition motivates a-structure alternations.

3.2.1 The facts

We will, once again, work with the applicative affix and show how Sadler and Nordlinger's analysis can be extended to account for the order of the a-structure-changing morphemes in Chichewa. In order to show that the

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[6] The arrow $\leftarrow_s$ refers to the immediately preceding sister node. Following Sadler and Norlinger (2004), this symbol is contrasted with the $\leftarrow$ symbol (without the subscript s) that is found in off-path constraints (Sadler and Norlinger 2004:176).

order of the morphemes has an important role to play, a passive affix is also included on the verb root, together with the applicative affix. With two affixes, two morpheme orders are possible, but only one is acceptable. Consider the following examples:

(10) a. Example from (Alsina 1999:9, ex. (8b))
          Mtsogoleri a-na-tumiz-**il-idw**-a   zipatso (ndi ana)
          leader(1)   1.sg-pst-send-**appl-pass**-fv fruit(8) by   children(2)
          'The leader was sent fruit (by the children).'
      b. Example from (Alsina 1999:9, ex. (8b))
          *Mtsogoleri a-na-tumiz-**idw-il**-a   zipatso (ndi ana)
          leader(1)   1.sg-pst-send-**pass-appl**-fv fruit(8) by children(2)
          'The leader was sent fruit (by the children).'

Examples (10a) and (10b) have the same word order, but (10b) is ungrammatical while (10a) is grammatical. The only difference between the two examples lies in the order of the a-structure-changing morphemes on the verb root. In (10b), the passive morpheme precedes the applicative affix on the verb, whereas in (10a), the applicative affix precedes the passive morpheme.

3.2.2 The Analysis – An Interface Tree for -*tumiz-il-idw*- (send-pass-appl)
     Assuming the Mirror Principle is at work, the grammaticality of (10a) and the ungrammaticality of (10b) lead to the conclusion that the applicative operation must take place before the passive operation (for a benefactive applied argument). For ease of discussion, we will focus on the following morphological fragments of the two verbs:

(11) a.   -tumiz-il-idw-   send-appl-pass
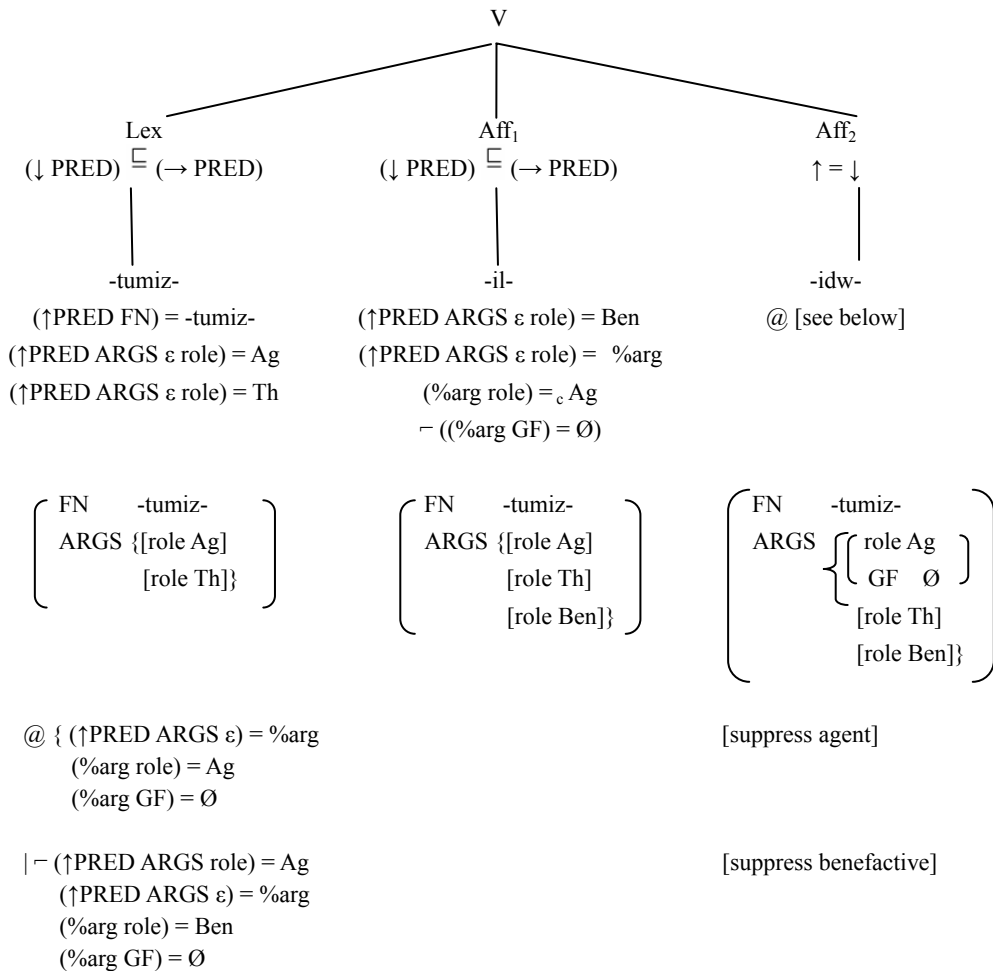   b. *-tumiz-idw-il-   send-pass-appl

Let us take these morphological fragments and assign a morphological representation to each of them in the form of a partial interface tree. To obtain this interface tree, we need the annotation principle in (12):

(12) Annotation principle:

If there is/are a-structure-changing affix(es) on the verb, annotate the last a-structure-changing affix with $\uparrow = \downarrow$. Annotate the verb root and any other a-structure-changing affix with the subsumption equation $(\downarrow \text{PRED}) \sqsubseteq (\rightarrow \text{PRED})$.

The interface tree for (10a) is shown in (13):

(13) Interface tree for the well-formed verb form -tumiz-il-idw- (send-appl-pass)

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                                    V
           ┌────────────────────────┼────────────────────────┐
          Lex                      Aff₁                      Aff₂
(↓ PRED) ⊑ (→ PRED)      (↓ PRED) ⊑ (→ PRED)              ↑ = ↓
           │                        │                        │
        -tumiz-                    -il-                    -idw-
```

Lex, -tumiz-:
(↑PRED FN) = -tumiz-
(↑PRED ARGS ε role) = Ag
(↑PRED ARGS ε role) = Th

Aff₁, -il-:
(↑PRED ARGS ε role) = Ben
(↑PRED ARGS ε role) = %arg
(%arg role) =$_c$ Ag
⌐ ((%arg GF) = Ø)

Aff₂, -idw-:
@ [see below]

$$\begin{bmatrix} \text{FN} & \text{-tumiz-} \\ \text{ARGS} & \{[\text{role Ag}] \\ & [\text{role Th}]\} \end{bmatrix}$$

$$\begin{bmatrix} \text{FN} & \text{-tumiz-} \\ \text{ARGS} & \{[\text{role Ag}] \\ & [\text{role Th}] \\ & [\text{role Ben}]\} \end{bmatrix}$$

$$\begin{bmatrix} \text{FN} & \text{-tumiz-} \\ \text{ARGS} & \left\{ \begin{bmatrix} \text{role Ag} \\ \text{GF} \quad \text{Ø} \end{bmatrix} \right. \\ & [\text{role Th}] \\ & [\text{role Ben}]\} \end{bmatrix}$$

@ { (↑PRED ARGS ε) = %arg   [suppress agent]
    (%arg role) = Ag
    (%arg GF) = Ø

| ⌐ (↑PRED ARGS role) = Ag   [suppress benefactive]
    (↑PRED ARGS ε) = %arg
    (%arg role) = Ben
    (%arg GF) = Ø

| ⊢ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben }   [suppress recipient/
    (↑PRED ARGS ε) = %arg   experiencer]
    (%arg role) = Rpt/Exp
    (%arg GF) = Ø

| ⊢ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben | [suppress instrument]
    (↑PRED ARGS role) = Rpt/Exp }
    (↑PRED ARGS ε) = %arg
    (%arg role) = Instr
    (%arg GF) = Ø

| ⊢ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben | [suppress theme]
    (↑PRED ARGS role) = Rpt/Exp | (↑PRED ARGS role) = Instr }
    (↑PRED ARGS ε) = %arg
    (%arg role) = Th
    (%arg GF) = Ø }

This interface tree has three nodes. The first one dominates the verb root, which is labelled Lex. The second one dominates the applicative affix and the last one dominates the passive affix. The tree shows the linear order of the morphemes on the verb, and therefore the order of any morpholexical process that each may be associated with.

The node labelled Lex is annotated with the equation $(\downarrow \text{PRED}) \sqsubseteq (\rightarrow \text{PRED})$. The f-structure of Lex subsumes that of its right-sister node, which is Aff_1. Subsumption is necessary because the f-structure of the following node may contain more information than the f-structure of the current node (i.e. an additional semantic role licensed by an applicative affix). Besides, an equality equation cannot be assigned to this node because ultimately, the a-structure of the mother node V will be altered by the morpholexical operations triggered by the applicative and passive suffixes, and this f-structure should not be identical with that of the Lex node. Subsumption is defined as "a relation that holds between two f-structures f and g if g is compatible with but perhaps has more structure than f".[7]

The lexical entry of the verb *-tumiz-* "send" shows the number of arguments subcategorized by the verb and its semantic roles. It states that in its set of arguments in the PRED, there is an agent role, and there is a theme role.

Consider the lexical entry of the applicative affix:

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[7] See Dalrymple (2001:161) for a formal definition of subsumption.

(14) Lexical entry of the applicative affix (benefactive)[8]

    $-il_{Ben}-$ Aff   ($\uparrow$PRED ARGS ε role) = Ben
                           ($\uparrow$PRED ARGS ε role) = %arg
                           (%arg role) $=_c$ Ag
                           $\vdash$ [(%arg GF) = Ø]

The lexical entry in (14) states that the morpheme $-il_{Ben}-$ is an affix, and that in the set of arguments of its PRED, there must be a benefactive role. Since ($\uparrow$PRED ARGS ε role) = BEN is a defining constraint, it has the effect of introducing an additional role to the existing a-structure. This, of course, is licensed by the applicative affix.

The equations (($\uparrow$PRED ARGS ε role) = %arg), ((%arg role) $=_c$ Ag) and ($\vdash$ ((%arg GF) = Ø)) together ensure that in the existing a-structure, there must be an agent role and that this agent role must be one that is not suppressed. These constraints capture the observation in Alsina (1999) that the applied argument cannot bear the most prominent semantic role. Ensuring that there is an agent role is sufficient for this affix, as the only more prominent semantic role on the thematic hierarchy than the benefactive role is the agent role.[9]

The relative prominence of semantic roles is also important in the formulation of the lexical entry for the passive affix, which is shown below:

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[8] We assume that each type of applied argument is licensed by a different applicative affix, each of which has its own lexical entry, although in form all of them are the same. Support for this comes from Kinyarwanda, another Bantu language, in which there are different forms of applicative affixes. The form of the applicative affix is related to the role of the applied argument - benefactive: -ir/-er; instrument: -ish/-esh; and locative: -ho/-mo (Simango 1995:8).

[9] Lexical entry for the instrumental applicative affix:
    $-il_{Instr}-$ Aff   ($\uparrow$PRED ARGS ε role) = Instr
                           ($\uparrow$PRED ARGS ε) = %arg
                         (%arg role) $=_c$ { Ag | Ben | Rpt/Exp}
                         $\vdash$ [(%arg GF) = Ø]

Lexical entry for the locative applicative affix:
    $-il_{Loc}-$ Aff   ($\uparrow$PRED ARGS ε role) = Loc
                          ($\uparrow$PRED ARGS ε) = %arg
                        (%arg role) $=_c$ { Ag | Ben | Rpt/Exp | Instr }
                      $\vdash$[(%arg GF) = Ø]

(15) Lexical entry of the passive affix

    -idw-   Aff   { (↑PRED ARGS ε) = %arg
                        (%arg role) = Ag
                        (%arg GF) = Ø

                | ⌐ (↑PRED ARGS role) = Ag
                   (↑PRED ARGS ε) = %arg
                   (%arg role) = Ben
                   (%arg GF) = Ø

                | ⌐ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben }
                    (↑PRED ARGS ε) = %arg
                   (%arg role) = Rpt/Exp
                   (%arg GF) = Ø

                | ⌐ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben |
                    (↑PRED ARGS role) = Rpt/Exp }
                   (↑PRED ARGS ε) = %arg
                   (%arg role) = Instr
                   (%arg GF) = Ø

                | ⌐ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben |
                    (↑PRED ARGS role) = Rpt/Exp |
                    (↑PRED ARGS role) = Instr }
                   (↑PRED ARGS ε) = %arg
                   (%arg role) = Th
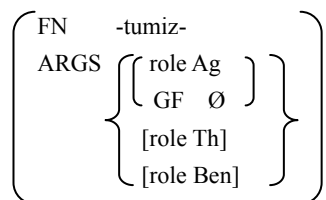   (%arg GF) = Ø }

The lexical entry in (15) shows that the passive morpheme *-idw-* is an affix. Passivization involves the suppression of the highest semantic role. Here, the lexical entry of the passive affix ensures that the highest semantic role links to a null grammatical function. This highest role will no longer be available for linking. Moreover, passivization does not suppress the highest semantic role at any point in time, but it suppresses the highest semantic role at a particular point in the altering a-structure. There has to be a way to make reference to both the existing a-structure and the thematic hierarchy at the point of passivization. The constraint in the lexical entry in (15) does exactly this. The thematic hierarchy is built into the disjuncts. The constraint will always start by suppressing the agent, the highest semantic role on the thematic hierarchy, if there is an agent in the existing a-structure. If there is no agent, the next highest semantic role, the benefactive role, will be suppressed. The same logic applies for the other roles on the thematic hierarchy. As a summary:

(16) To suppress the highest thematic role in an existing a-structure,
   i.   suppress agent.
   ii.   If an agent does not exist, suppress benefactive.
   iii.   If an agent and a benefactive do not exist, suppress recipient/experiencer.
   iv.   If an agent and a benefactive and a recipient/experiencer do not exist, suppress instrument.
   v.   If an agent and a benefactive and a recipient/experiencer and an instrument do not exist, suppress theme.

The last semantic role that can possibly be suppressed is a theme role. If the highest semantic role is a locative role, this means this is also the only role in the a-structure. Suppressing it will give an a-structure with no semantic roles in it. Besides, if it is the only role, it should be linked to the SUBJ function even without passivization, and there seems to be no reason for passivization to apply.

Let us revisit the interface tree in (13) and explain how the f-structure of the root V comes about. At the node Lex, the verb root *-tumiz-* "send", in its most basic form, subcategorizes for two arguments, an agent and a theme. This information comes from the lexical entry of the verb. The annotation $(\downarrow \text{PRED}) \sqsubseteq (\rightarrow \text{PRED})$ on Lex passes the f-structure information of the PRED of Lex to the f-structure of PRED in its right-sister node, which is Aff_1. In Aff_1, there is an applicative affix, the lexical entry of which says that (i) the affix *-il*$_\text{Ben}$- licenses an extra benefactive role in the a-structure; and (ii) this applied role must not be the highest thematic role and that there must be an agent role, which is higher than the benefactive on the thematic hierarchy, in the a-structure. A modified f-structure results, which, according to the functional annotation on Aff_1 $(\downarrow \text{PRED}) \sqsubseteq (\rightarrow \text{PRED})$, is passed to the f-structure of the PRED in its right-sister node, Aff_2. A passive affix is in Aff_2, and the lexical entry of the passive affix ensures that (i) a change to the a-structure of PRED will be brought about by the *-idw-* passive affix; and (ii) the most prominent semantic role in the a-structure of PRED is suppressed, meaning it is linked to a null GF. The a-structure of PRED, shown in (17), will have all the necessary a-structure modifications made to it after the sequential application of the applicative and passive operations on the verb root:

(17)

$$
\begin{bmatrix}
\text{FN} & \text{-tumiz-} \\
\text{ARGS} & \begin{Bmatrix} \begin{bmatrix} \text{role Ag} \\ \text{GF} \quad \emptyset \end{bmatrix} \\ [\text{role Th}] \\ [\text{role Ben}] \end{Bmatrix}
\end{bmatrix}
$$

It is this a-structure that will be passed up to the root V according to the functional annotation $\uparrow = \downarrow$ on Aff$_2$. The semantic roles will be linked to grammatical functions. The mapping is shown below:

(18)

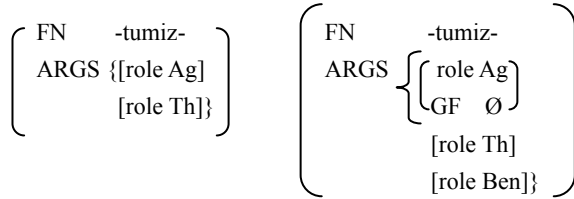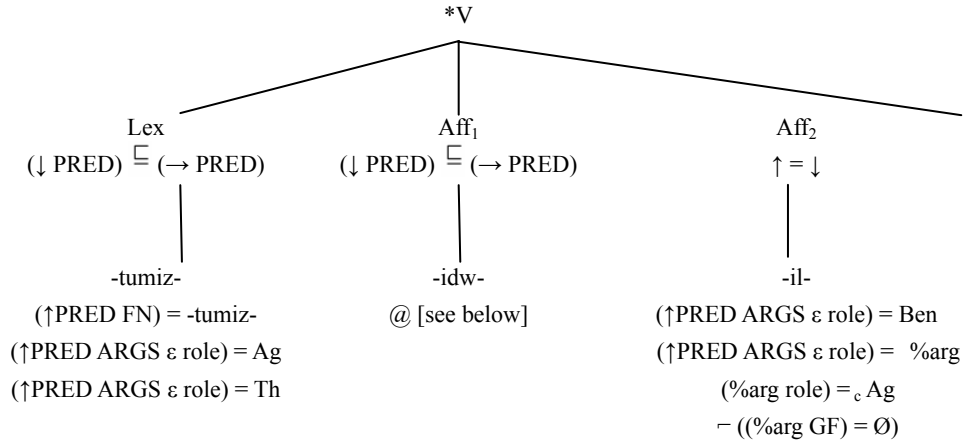| *-tumiz-il-idw-*	<	Ag	Ben	Th	>
		$\emptyset$			
AOP[10]			[-r]	[+o]	
Defaults			[-r]		
			S/O	O	
Well-Formedness Conditions			S	O	

This accounts for the grammatical function realization in (10a).

3.2.3 Accouting for *-tumiz-idw-il-* (send-pass-appl)

The ungrammaticality of (10b), with the partial verb form *-tumiz-idw-il-* (send-pass-appl), can be easily accounted for. Here is the interface tree for (10b):

---

[10] AOP stands for 'Asymmetric Object Parameter'. The AOP states that only one role can be intrinsically classified unrestricted [-r] (Bresnan and Moshi 1990:172). The AOP holds in Chichewa (Alsina and Mchombo 1989; Bresnan and Moshi 1990), thus, the theme role must be classified [+o] but not [-r] as the benefactive role has been classified [-r].

(19) Interface tree for the ill-formed verb form *-*tumiz-idw-il-*
(send-pass-appl)

$$*V$$

Lex   Aff$_1$ Aff$_2$
$(\downarrow$ PRED$) \sqsubseteq (\rightarrow$ PRED$)$ $(\downarrow$ PRED$) \sqsubseteq (\rightarrow$ PRED$)$ $\uparrow = \downarrow$

-tumiz-   -idw-   -il-
$(\uparrow$PRED FN$) = $ -tumiz-   @ [see below] $(\uparrow$PRED ARGS ε role$) = $ Ben
$(\uparrow$PRED ARGS ε role$) = $ Ag $(\uparrow$PRED ARGS ε role$) = $ %arg
$(\uparrow$PRED ARGS ε role$) = $ Th   (%arg role$) =_c$ Ag
                                                             $\dashv$ ((%arg GF$) = \emptyset$)

$$\begin{bmatrix} \text{FN} & \text{-tumiz-} \\ \text{ARGS} & \{[\text{role Ag]} \\ & [\text{role Th]}\} \end{bmatrix}$$ $$\begin{bmatrix} \text{FN} & \text{-tumiz-} \\ \text{ARGS} & \left\{\begin{bmatrix} \text{role Ag} \\ \text{GF} \quad \emptyset \end{bmatrix}\right. \\ & [\text{role Th]} \\ & [\text{role Ben]}\} \end{bmatrix}$$

@ { $(\uparrow$PRED ARGS $\varepsilon) = $ %arg
    (%arg role$) = $ Ag
    (%arg GF$) = \emptyset$

$| \dashv$ $(\uparrow$PRED ARGS role$) = $ Ag
    $(\uparrow$PRED ARGS $\varepsilon) = $ %arg
    (%arg role$) = $ Ben
    (%arg GF$) = \emptyset$

$| \dashv$ { $(\uparrow$PRED ARGS role$) = $ Ag | $(\uparrow$PRED ARGS role$) = $ Ben }
    $(\uparrow$PRED ARGS $\varepsilon) = $ %arg
    (%arg role$) = $ Rpt/Exp
    (%arg GF$) = \emptyset$

$| \dashv$ { $(\uparrow$PRED ARGS role$) = $ Ag | $(\uparrow$PRED ARGS role$) = $ Ben |
      $(\uparrow$PRED ARGS role$) = $ Rpt/Exp }
    $(\uparrow$PRED ARGS $\varepsilon) = $ %arg
    (%arg role$) = $ Instr
    (%arg GF$) = \emptyset$

| ⊢ { (↑PRED ARGS role) = Ag | (↑PRED ARGS role) = Ben |
    (↑PRED ARGS role) = Rpt/Exp | (↑PRED ARGS role) = Instr }
   (↑PRED ARGS ε) = %arg
   (%arg role) = Th
   (%arg GF) = Ø }

The passive affix *-idw-* is under Aff_1, which immediately precedes the applicative affix in Aff_2. This order is a reflection of the passive operation being applied before the applicative operation. The a-structure information is passed from Lex to Aff_1. At Aff_1, the passive affix suppresses the highest semantic role such that it is linked to a null GF. This information is in turn passed on to the following morpheme Aff_2, where applicativization takes place. As specified by the lexical entry of the applicative affix, an additional benefactive role is introduced into the a-structure. The last two constraints for the applicative affix, however, cannot be satisfied. In the current a-structure, there is no agent role which is not at the same time linked to a null GF. The a-structure becomes ill-formed, and hence the ungrammaticality of (10b).

The verb form is morphologically licensed, i.e. in principle the verb can be derived. But this verb form does not have a well-formed a-structure, as not all constraints imposed by the applicative affix can be satisfied. The verb form, even if it could be formed at m-structure, cannot receive any grammatical function realization. As a result, a constructed example like (13b), even with nominals in the ordinary GF positions (c/f (10a)), is ungrammatical.

3.3 Advantages over Alsina's (1999) Treatment of Morpheme Ordering

The present analysis has a number of advantages over Alsina's treatment of morpheme ordering. These include: (i) the possibility of referring to intermediate, changing a-structures with the help of a morphology-syntax interface tree, without creating temporary, unwanted word forms; and (ii) a- to f-structure mapping will only take place once, from the "completed" a-structure after all the relevant morpholexical processes have taken place. We shall look at each of these in more detail.

In the present approach, the internal structure of the word formed via applicativization and passivization is represented in the form of an interface tree between morphology and syntax. It is here that any relevant morpholexical operation is represented. The word is parsed into its component stem and affixes, and an a-structure change can be thought of as

taking place right there and then – "at the level of the information lexically associated with the affixes and not at the level of the derived word" (Sadler and Nordlinger 2004:171). Each relevant affix causes a change in a-structure in a particular way. This alternation targets the a-structure associated with the preceding morpheme(s). That the order of morpholexical operations is reflected by the order of morphemes is captured.

In this approach and unlike in Alsina's proposal, we do not assume that intermediate morphological forms are created after each affixation of a morpheme. Alsina (1999:34) explicitly states that a new lexical item is created upon the affixation of an a-structure-changing morpheme, and that yet another such morpheme can be attached to this new lexical item. Intermediate morphological forms seem unnecessary and unmotivated, other than for the need in Alsina's analysis to keep track of the order of morphemes and therefore the order of morpholexical operations. It also seems that such forms cannot be avoided – if a new a-structure is assumed to be associated with some word form, new intermediate lexical items are bound to appear.

No intermediate lexical items are created in the present analysis. By representing a fully derived lexical item as a morphology-syntax interface tree, it is possible to refer to intermediate a-structures without assuming intermediate word forms. The interface tree makes it possible to make reference to a particular level of representation (a-structure in this case) associated with a particular morpheme.

Once all the alternations to a-structure are completed, a- to f-structure mapping is performed. Only the arguments of well-formed a-structures will have GF realizations at f-structure. Ill-formed a-structures simply cannot serve as the input for a- to f-structure mapping. That the a- to f-structure mapping principles will only be applied once and that no intermediate lexical items are assumed make that present analysis a more elegant one.

4. Conclusions

Applicativization is highly productive in a language like Chichewa. The applicative affix augments the a-structure of a verb by bringing in an additional semantic role, which is most frequently a benefactive, instrument or locative role. It is not uncommon to find cases where there is more than one a-structure changing morpheme on the verb. In this paper, we have looked at one such verb form – a verb root is affixed with an applicative affix and a passive affix.

We have also shown in this paper that the structure of the word, with the verb root, applicative affix and passive suffix, can be represented in the form of a morphology-syntax interface tree, which makes it possible to refer to not only parts of the word but also the levels of representation that are associated with each morpheme. We were particularly interested in the a-structure, as this is the structure that the applicative and passive affixes alter. More importantly, these morphemes alter the existing a-structure, one that is the result of the interaction between the verb root and any other a-structure-changing morpheme that precedes in morphological form the morpheme in question. With the interface tree, it is possible to make reference to an intermediate a-structure, one that is associated with a particular morpheme on the tree, without having to assume intermediate lexical items as in Alsina's analysis.

References

Alsina, Alex. 1999. Where's the Mirror Principle? *The Linguistic Review*, 16(1):1-42.

Alsina, Alex and Sam A. Mchombo. 1989. Object asymmetries in the Chichewa applicative construction. Ms. Department of Linguistics, Stanford University, Stanford, CA. and the University of California, Berkeley.

Alsina, Alex and Sam A. Mchombo. 1990. The syntax of applicatives in Chichewa: problems for a theta-theoretic asymmetry. *Natural Language and Linguistic Theory*, 8(4): 493-506.

Alsina, Alex and Sam A. Mchombo. 1993. Object asymmetries and the applicative construction in Chichewa. In *Theoretical Aspects of Bantu Grammar*, ed. Sam A. Mchombo. Stanford, CA.: CSLI Publications.

Baker, Mark. 1985. The Mirror Principle and morphosyntactic explanation. *Linguistic Inquiry*, 16: 373-416.

Bresnan, Joan. 2001. *Lexical Functional Syntax*. Oxford: Blackwell.

Bresnan, Joan and Lioba Moshi. 1990. Object asymmetries in comparative Bantu syntax. *Linguistic Inquiry*, 21: 147-185.

Bresnan, Joan and Jonni Kanerva. 1989. Locative inversion in Chichewa: a case study of factorization in grammar. *Linguistic Inquiry*, 20(1): 1-50.

Dalrymple, Mary. 2001. *Syntax and Semantics Vol. 34, Lexical Functional Grammar*. San Diego, CA.: Academic Press.

Falk, Yehuda. 2001. *Lexical-Functional Grammar: an introduction to parallel constraint-based syntax*. Stanford, CA.: CSLI Publications.

Mchombo, Sam A. 2004. *The Syntax of Chichewa*. Cambridge: Cambridge University Press.

Nordlinger, Rachel. 1998. *Constructive Case: Evidence from Australian Languages*. Stanford, CA.: CSLI Publications.

Sadler, Louisa and Rachel Nordlinger. 2004. Relating morphology to syntax. *Projecting Morphology*. Stanford, CA.: CSLI Publications.