

Manas mazās māšas jaunā galda stūris ir netīrs.

[subj(s(s(tom(m(my, sg), m(little, \_19756)), m(sister, pers), []), m(new, \_19861), m(table, sg), []), m(corner, sg), []), pred(m(m(be, pres), [])), obj(m(dirty, \_20116)), obj([], []), advl([], []), advl([], []), advl([], [])), co(s(s(tom(m(my, sg), m(little, \_19756)), m(sister, pers), []), m(new, \_19861), m(table, sg), []), m(corner, sg), [], [.]])]

The corner of my little sister's new table is dirty.

Mans ziemas mētelis ir netīrs.

[subj(s(m(my, sg), m(wintcoat, sg), [])), pred(m(m(be, pres), [])), obj(m(dirty, \_22491)), obj([], []), advl([], []), advl([], []), advl([], [])), co(s(m(my, sg), m(wintcoat, sg), [], [.]])]

My winter coat is dirty.

Mans jaunais ziemas mētelis ir netīrs.

[subj(s(tom(m(my, sg), m(new, \_2034)), m(wintcoat, sg), [])), pred(m(m(be, pres), [])), obj(m(dirty, \_2191)), obj([], []), advl([], []), advl([], []), advl([], [])), co(s(tom(m(my, sg), m(new, \_2034)), m(wintcoat, sg), [], [.]])]

My new winter coat is dirty.

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# Swedish applied verbs derived by the prefix *be-*

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## Introduction

This paper examines *be-*prefixation of Swedish verbs and its consequences for the argument structure of the derived verb. The Swedish *be-* will be analyzed as an applicative morpheme which signals an alternation in the grammatical functions of the verb's arguments. The applied verb constructions are especially interesting because they are the result of a complex process which shows the interaction between the morphology and the syntax. To my knowledge the Swedish prefix *be-* has not previously been analyzed as an applicative affix, and this will be shown to be a fruitful analysis of *be-* as well as a theoretically interesting account of applied verb constructions in a Germanic language.

Argument inheritance will be analyzed within the DiSciullo & Williams 1987 morphological theory of word formation, Bierwisch's 1989 lexical theory of derivation, and Baker's 1988a syntactic approach. These theories will be discussed in relation to the topic of *be-*prefixation and the grammatical function changing that typically takes place with applicative verbs. The relationship between the occurrence of the applicative morpheme on a verb and the altered argument structure of the verb is explained by these theories with varying degrees of success. This paper will argue that DiSciullo & Williams cannot deal with complex alternations like the applicatives, and many problems remain unsolved in their framework; Bierwisch's approach clears up most of the problems DiSciullo & Williams have, and yet it still isn't sufficient in analyzing all of the applied verb constructions; while Baker's incorporation theory is suited to this type of phenomenon and does the best job of predicting the function and effect of the Swedish *be-* on the verb's argument structure.

The prefix *be-* entered the Swedish language during the Middle Ages with loan words from Low German (Söderbergh 1967). Although the

prefix only shows partial productivity (cf. Gronemeyer 1994), it does build on native words, and there are some examples of new coinings with *be-*, e.g. *begasa växter* 'gas plants', *bebuskad* 'overgrown with bushes' (Elert 1973). Examples (1)-(3) show a general, descriptive classification of *be-* verbs, based on Söderbergh 1967, Elert 1973, and Jørgensen & Svensson 1986 (*-a* is the infinitival ending).

(1) *Denominal and deadjectival verbs:*

the generic derivation [*be-*[X]<sub>N/A</sub>-*a*]<sub>V</sub> with the meaning 'make into X, become X, or supply with X'; three subgroups can be differentiated:

- i. [*be-A-a*]<sub>V</sub>, e.g. *be-rik<sub>A</sub>-a* 'enrich', *be-fri<sub>A</sub>-a* 'liberate'
- ii. [*be-N-a*]<sub>V</sub>, e.g. *be-krans<sub>N</sub>-a* 'wreath', *be-folk<sub>N</sub>-a* 'populate'
- iii. [*be-N/A-ad*] (adjectival participles); the counterpart verb does not necessarily exist, e.g. *be-ving-ad* 'winged', \**be-ving-a*

(2) *Lexicalizations:*

- i. *be-* has no clear meaning; there is little difference either semantically or formally between V and *be-V*, e.g. *straffa* and *bestraffa* both mean 'to punish'
- ii. *be-V* has no semantic relation to V; it is impossible to express the meaning of *be-V* as a paraphrase of V, e.g. *ställa* – *beställa* 'put – order'
- iii. *beV* – synchronically underived, monomorphemic verbs, e.g. *bedröva* 'distress, greive', which lacks a corresponding base in the same or other word categories
- iv. [*be[V]<sub>intr</sub>*]<sub>tr</sub> (transitivizations); certain simple, intransitive verbs have corresponding transitive verbs derived by *be-*, where the derived V has little relation to the base V, e.g. *gå* 'walk' and *begå* 'commit (suicide, crime, etc.)', *komma* 'come' and *bekomma* 'become, suit'

(3) *Applicatives:*

The prefix *be-* implies a shift in the grammatical functions of the verb's objects; an oblique object becomes direct and vice versa<sup>1</sup>, e.g. *belasta* 'load', *behänga* 'hang', *bekämpa* 'fight', *bestiga* 'climb', *belysa* 'light',

<sup>1</sup>This alternation in the syntactic expression of arguments has been described in Elert 1973, although it is not analyzed as an applied verb construction. Elert also notes that the Swedish prefix *för-* sometimes has the same function, for example, *förneka* 'deny', *förtiga* 'keep secret'.

*bestyrka* 'confirm', *behärska* 'control', *besmitta* 'infect', *besegra* 'defeat', *beskriva* 'describe', *bestrida* 'oppose', among many others.

The object of this study is the third group, the applicative or applied verbs. The transitivizations listed in (2) above require some comment, but I shall postpone that discussion until after presenting the applicative construction. Irrespective of the productivity of *be-* in modern Swedish, there is a regular shift in the grammatical functions of the derived verb's arguments, i.e. a rule used in identification and analysis, which will be described in this paper.

Applicative verbs

A typical example of the applicative alternation is shown in (4) from Chichewa (Baker 1988a:9)<sup>2</sup>.

- (4) a. Mbidzi zi-na-perek-a msampha kwa nkhandwe.  
zebras SP-PAST-hand-ASP trap to fox  
Ag Th Goal  
'The zebras handed the trap to the fox.'
- b. Mbidzi zi-na-perek-er-a nkhandwe msampha.  
zebras SP-PAST-hand-APPL-ASP fox trap  
Ag Goal Th  
'The zebras handed the fox the trap.'

In (4), the original direct object (Theme) is demoted to a position as second object, and the originally oblique, indirect object (Goal) is promoted to direct object status. These alternations in the grammatical functions of the thematic roles are signaled on the verb by the applicative affix *-ir/-er-*.

Researchers are not entirely in agreement as to the definition of the applicative alternation. Baker 1988a defines the applicative construction as the result of the grammatical function changes shown in (5).

- (5)  $\left. \begin{array}{l} \text{oblique} \\ \text{indirect object} \\ \text{null} \end{array} \right\} \rightarrow \text{object; object} \rightarrow \text{'2nd object' (or oblique)}$

This description rests on two important assumptions: a) the base V must be transitive, a problem to which I shall later return, and b) the derived V must be ditransitive. This definition would thus restrict the class of applied verbs in Swedish to a small, specific group such as *bestyrka* 'brush' and *bespruta* 'spray'. Although Baker's description in (5) allows for two-place

<sup>2</sup>The abbreviation APPL will be used for applicative.

verbs, it does not allow the derivation of applied verbs from intransitive bases. In fact, his discussion is based only on three-place verbs. I shall call this the restrictive definition in that the base verbs must have a direct object. A less restrictive definition is endorsed by, for example, Spencer 1991 and Shibatani 1990; they define the applicative as an affix on the verb fulfilling the same function as a preposition in an analytic construction, as shown in the following examples from Ainu (Shibatani 1990).

- (6) a. Poro cise ta horari.                      b. Poro cise e-horari.  
       big house in live                        big house APPL-live  
       ‘He lives in a big house.’
- (7) a. A-kor kotan ta sirepa-an.                b. A-kor kotan a-e-sirepa.  
       1sg-have village to arrive            1sg-have village 1sg-APPL-arrive  
       ‘I arrived at my village.’

Alsina & Mchombo 1990 also argue for a less restrictive definition on the basis of Chichewa by showing that the transitivity of the base verb has no effect on the syntactic behavior of the derived verb; that is, the change in grammatical functions is the same for transitive and intransitive verbs.

The optimal solution seems to be not to stipulate that the applicative affix must replace a Prep or that the base verb must be (di)transitive, but to simply say that the applicative affix on the verb replaces an oblique case marker (either Prep or morphological case) in an analytic construction, thus turning an obliquely marked NP into the direct object.<sup>3</sup> If a direct object was present in the base construction, it is demoted to oblique status and marked accordingly with either case or a Prep. This definition allows us to make an important generalization about a regular pattern of grammatical function changing in Swedish. Let us look at some Swedish examples to assure ourselves that these in fact are applied verb constructions and to examine what types exist.

Swedish has three of the four different types of applicatives listed in Baker 1988a, that is Benefactive/Malefactive, Goal/Patient, Instrumental, and Locative.<sup>4</sup> The first two types are commonly referred to as Dative Shift and can be explained by a null applicative affix on the verb, e.g. *Lisa gav*

<sup>3</sup>This analysis is not affected by saying that the applicative affix targets and replaces a Prep; however, it is cross-linguistically more valid to refer to the category of obliquely marked arguments which can include both those with morphological case marking from the verb and those which are constructed with a Prep.

<sup>4</sup>The semantic roles used here are taken from Bily's 1990 discussion of case theory and review of Fillmore's theory of semantic roles (Fillmore 1968).

*brevet till Kalle* ‘L. gave the letter to K.’ and *L. Ø-gav K. brevet* ‘L. gave K. the letter’.

Although Swedish does not have Instrumental applicatives, Locative constructions do exist. When *be-* is prefixed to three-place verbs, the second internal argument is always a Locative or Goal role, which is also typical of these constructions in German (see Wunderlich 1987 for a discussion). Swedish also has a large group of two-place verbs taking required prepositional objects with the thematic roles of Patient, Goal, or Theme.

- (8) a. De bygger hus på området.                b. De bebygger området med hus.  
       ‘They build houses on the area.’        ‘They APPL-build the area with houses.’
- (9) a. Polisen sköt på tjuven.                    b. Polisen besköt tjuven.  
       ‘The police shot at the robber.’        ‘The police APPL-shot the robber.’
- (10) a. Lampan lyser bra.                         b. Lampan belyser rummet.  
       ‘The lamp lights well.’                    ‘The lamp APPL-lights the room.’

The schematic argument structure of the Swedish examples is shown in (11) and (12) where each argument is connected to a thematic role and external arguments are excluded.

	<i>Base Verb</i>		<i>Applicative Verb</i>
(11) a.	V (PP[NP]) Th/Loc/Goal	b.	<i>be-V</i> NP Th/Loc/Goal
(12) a.	V NP <sub>1</sub> (PP[NP <sub>2</sub> ]) Th      Loc/Goal	b.	<i>be-V</i> NP <sub>2</sub> (PP[NP <sub>1</sub> ]) Loc/Goal      Th

For both types of verbs, the prefix targets the NP within an oblique, here PP, and turns it into the required direct object. For the three-place verbs, the former direct object is demoted to oblique status and marked by *med* ‘with’ (8). Although this preposition normally indicates Instrumental or Conjunction, it can absolutely not be interpreted as such in this and similar examples. Thus the transitivity of the base verb has no bearing on whether the derived V should be called an applicative or not.

Let's return to the distinction between the transitivity *be-* and the applicative, which is important as the applicative has traditionally been called a transitivization (cf. Söderbergh 1967). As shown in (2) above, *be-* derives certain transitive verbs by introducing an internal argument to an intransitive (i.e. unaccusative) verb's  $\theta$ -grid, e.g. *begå* and *bestämma*. These

derived verbs have no semantic relation to the base verbs and must therefore be lexicalizations rather than synchronically derived verbs. An example of the applicative alternation which has incorrectly been called a transitivity is *bo* 'live' – *bebo*. Admittedly, *bo* does not take a direct object. But the fact that it may not occur without an expressed Locative  $\theta$ -role suggests that it is subcategorized for an obligatory internal  $\theta$ -role; consider *Jag bor \*(i Lund)* 'I live \*(in Lund)'. The PP *i Lund* is so closely related to the verb that it may suitably be called a complement. At some level, *bo* is 'transitive', more correctly, two-place. Thus I conclude that *bebo*, a genuinely transitive verb taking a direct object, is applicative in that the prefix *be-* has replaced an oblique case marker with the base verb.

The preceding discussion as well as (11)-(12) implies that transitivity is not the determining factor for which verbs can derive applicatives. Rather, it is the verbs' subcategorization frame; the base verb must be subcategorized for at least one internal  $\theta$ -role. Transitivity is an unfortunate and particularly ill-suited concept in this context; however, it is so basic to our understanding of syntax, that there is no avoiding it. I follow Baker's argument that the prepositional objects (complements) to the applied verbs-to-be are assigned a  $\theta$ -role in the lexicon<sup>5</sup> by the base verbs' argument structure. However, we must be careful: not just any PP can be considered an argument. For instance, an example like *stryka katten på ryggen* 'pet the cat on the back' may not derive *\*bestryka ryggen med katten*. 'pet the back with the cat'.<sup>6</sup> This can be compared with *stryka färg på väggen* 'brush paint on the wall' and *bestryka väggen med färg* 'brush the wall with paint'. The PP *på ryggen* is a Locative adjunct rather than a verb complement and is thus not in a  $\theta$ -marked position. In the well-formed example, paint is being applied to the wall, whereas the cat is not being applied to the back.

To summarize, the base verbs must be subcategorized for an internal  $\theta$ -role. Its surface syntactic expression, oblique or direct, is of less importance. Thus the prepositional objects concerned here are seen as complements in  $\theta$ -marked positions rather than adjuncts, which carry their own  $\theta$ -marker. As we shall soon see, there is also semantic motivation for this.

Although it is beyond the scope of this paper, some mention should be made of the semantics of the applied verb constructions. There is a small

<sup>5</sup>Baker formulates his proposal in terms of D-structure, which I interpret here to mean the lexicon.

<sup>6</sup>Thanks to Lars-Åke Henningson for pointing out this example.

but perceivable semantic or functional change in the applied verbs. The applicative affix shifts the semantic focus away from the Agent and/or direct  $\theta$ -role and emphasizes the lowest  $\theta$ -role, the derived direct object. The derived object is interpreted as more effected by the verb in the applicative construction, which corresponds to its becoming the direct object, i.e. it is interpreted as the verb's closest, most internal argument. This may explain the ease with which applicatives are used in the passive, in either verbal or participial form, e.g. *huset är bebott* 'the house is lived in'. Here, the lowest  $\theta$ -role is placed in the most prominent position (i.e. it is topicalized) as grammatical subject to the passivized applied verb. Some *be-*verbs are in fact only found in the passive form; for example, *julgranen var behängd med grannlåt* 'the Christmas tree was hung with tinsel' and *jag blev bestulen på min plånbok* 'I was robbed of my wallet', whereas the verbs *behänga* and *bestjåla* are not in common usage. This semantic shift is further evidence that applicatives can only be derived from verbs which are subcategorized for an internal argument and that the prepositional objects are in fact  $\theta$ -marked by the verb.

This concludes the general discussion of the applied verb alternation, which has been defined as a grammatical function change, where the applicative affix replaces an oblique case marker. Swedish has two types of constructions derived in *be-*, those with two-place verbs and three-place verbs. The surface transitivity of the base verb does not however affect the behavior of the applied verb. The applicative alternation may only affect  $\theta$ -marked arguments of the verb, which also supports the view that oblique arguments may be considered complements in these cases. Semantically, the applicative affix shifts sentence focus to the lowest  $\theta$ -role which becomes more effected. The rest of this paper will focus on how *be-*prefixation is treated by three different theories of word formation – the morphological approach, the lexical approach, and the syntactic approach.

### The morphological approach

Some of the main representatives of an independent morphological component are DiSciullo & Williams 1987 (henceforth DSW) who argue that word formation (among other morphological processes) follows different rules from the rest of grammar. Theta-role assignment is performed in the VP by lexical head feature percolation as suggested by Lieber 1980. They introduce the use of functional composition, a concept borrowed from categorial grammar (cf. Reichl 1982), and apply it to word

formation. Affixes are thus functors with their own entries in the lexicon, where they are specified as being bound morphemes. Since they are independent entities in the lexicon, they have argument structures and features like any other lexical entry. A functor, in other words an affix, combines with a base, a verb in this case, by functional composition, and the  $\theta$ -roles of the base verb as well as the functor are automatically assumed by the derived verb. Argument inheritance becomes the natural consequence of functional composition.

DSW's discussion of applicative constructions (DSW 1987:43) is based on the following example from Chi-Mwi:ni (taken from Marantz 1984).

- (13) a. Hamadi  $\emptyset$ -sh-pish-ile cha:kuja  
Hamadi SP-OP-cook-T/A food  
'Hamadi cooked the food'
- b. Hamadi  $\emptyset$ -wa-pik-il-ile wa:na cha:kuja  
Hamadi SP-OP-cook-APPL-T/A children food  
'Hamadi cooked food for the children'

DSW explain the appearance of a new direct object *wa:na* by saying that the function of the applied affix is to introduce a *new accusative argument*. On the whole, DSW's description of functors is quite vague. It is clear that the prefix *be-* has its own separate entry in the lexicon where its  $\theta$ -role is given along with its c-selection, i.e. specifications for the  $\theta$ -structure of the roots it joins with. One can further deduce from their discussion that functors can essentially introduce or suppress  $\theta$ -roles. But it is entirely unclear how changes in the expression of grammatical function should be considered the result of functional composition. *Be-*'s lexical entry should look like (14) according to DSW. However, as Swedish does not have examples of null becoming an object, which this entry is tailored to, this functor will clearly never derive a correct structure.

- (14) *be-* f(X)  
acc

Let's look at how some examples of the Swedish applicative are derived within DSW's theory. Examples (15-16) show the alternation between an oblique and a direct object for a two-place verb.

- (15) a. *bo* 'to live'  
(Ag, Loc)  
obl
- (16) a. *be-bo*  
\*((Ag, Loc)X)  
obl acc
- b. (Ag, Loc)
- b. Elefanter bor på slätten.  
Ag<sub>i</sub> (Ag<sub>i</sub>, Loc<sub>j</sub>) Loc<sub>j</sub>  
'Elephants live on the plain.'
- c. Elefanter *be-bor* slätten.  
Ag<sub>i</sub> (Ag<sub>i</sub>, Loc<sub>j</sub>) Loc<sub>j</sub>  
'Elephants APPL-live the plain.'

Example (15) shows the base verb construction. (16a) shows the result of functionally composing (14) with (15), while (16b-c) show what the applied verb construction actually looks like. The external argument is inherited from the base verb *bo* which also dictates head features since it is the rightmost constituent with features for word category and an external argument, following Williams' 1981 Right Hand Head Rule. In DSW's terms, the applicative prefix *be-* should functionally compose with a verb, introduce an accusative argument, and yield a verb with one more  $\theta$ -role. But no new argument/ $\theta$ -role is introduced either in the Swedish examples or those from Ainu or Chichewa cited earlier. What should really happen in this derivation is that the two argument positions must fuse so that the accusative feature is taken over by the NP in the oblique argument, thereby deleting the oblique feature and the extra argument without a case feature. Unfortunately, DSW's framework is not well enough developed to accommodate such an alternation.

Examples (17-18) show the derivation on a three-place verb, where an oblique becomes a direct object, and the direct object becomes oblique.

- (17) a. *bygga* 'build'  
(Ag, Th, Loc)  
obl
- (18) a. *be-bygga*  
\*((Ag, Th, Loc)X)  
obl acc
- b. ((Ag, Loc, (Th))  
acc obl
- b. De bygger hus på ett område. c. De *be-bygger* ett område (med hus).  
Ag<sub>i</sub> (Ag<sub>i</sub>, Th<sub>j</sub>, Loc<sub>k</sub>) Th<sub>j</sub> Loc<sub>k</sub> Ag<sub>i</sub> (Ag<sub>i</sub>, Loc<sub>k</sub>, (Th<sub>j</sub>)) Loc<sub>k</sub> (Th<sub>j</sub>)  
'They build houses on an area.' 'They APPL-build an area with houses.'

The derived argument structure in (18a) is incorrect and can be compared with the correct construction in (18b). This derivation suffers from the same problems as the previous example. In addition, the ordering of the internal  $\theta$ -roles must be switched and case markers inserted and deleted. Now DSW might say that the oblique arguments, the PPs, are something for the syntax to deal with and thus not a problem for the

morphology. But they cannot neglect the fact that the NPs and their thematic roles remain the same while switching syntactic functions.

There are several serious problems with the DSW analysis of applied verbs. When only considering the one example in (13), their suggestion would seem to hold, aside from the question of what happens to the original accusative argument, i.e. would there be two accusatives? But as discussed above, the basic function of the applicative affix is not simply to introduce an accusative argument, but rather to alter their grammatical expression by replacing an oblique case marker. Unfortunately, there is no mention of whether *wa:na* can be expressed in an oblique case (presumably it can be). Interestingly, Marantz does not address this alternation either. Their suggestion could be salvaged if there were some way to merge the prefix's accusative argument with the existing oblique argument resulting in a fusion of the oblique's semantic role and the accusative case feature. Within their present theory this would be impossible. Linear ordering among the objects for the three-place verbs is also a problem, but could presumably be dealt with in the syntax in relation to structural case. The (non)occurrence of the case marking prepositions is a related issue which isn't dealt with, although it can be written off as falling outside of the morphology.

DSW's solution is very ad hoc; it explains this one example and is otherwise unsatisfactory, since the general applicative phenomenon shows a wide range of constructions other than that in (13). They have omitted the most important part of the problem in the analysis and based their argument on an incorrect interpretation of the applicative construction. The gravity of the mistake indicates an incomplete analysis in a rather sketchy theory.

It is quite unsettling when a theory is formulated in terms of  $\theta$ -roles, and then suddenly an accusative argument is introduced as part of the derivation in order to deal with the applied verb construction. DSW are confronted with serious difficulties because they have glossed over the problems and analyzed them incompletely. Applicative constructions are the result of complex interplay between morphological marking and syntactic functions, and they make reference to units outside of the morphology proper. Applicatives are not the result of the introduction or suppression a  $\theta$ -role and cannot be described without accounting for the alternating grammatical functions of the verb's arguments. DSW cannot account for alternations of this sort; their theory is rather sketchy and programmatic, offering only vague formulations of further applications. Thus I conclude that this framework may be rejected as insufficient to analyze applicative constructions

where syntactic units play a crucial role and where complex grammatical function changing takes place.

### The lexical approach

Bierwisch 1989 approaches the question of derivation and argument inheritance from a lexical standpoint, i.e. word formation takes place in the lexicon. This framework is built up on well defined formal tools, specifically lambda conversion, for the performing of derivations, which makes this theory less sketchy than DSW but also less accessible. While DSW make use of the one concept of functional composition, Bierwisch depends upon the whole range of machinery and theory from categorial grammar. Each entry in Bierwisch's lexicon consists of four types of information: phonological form (PF), grammatical form (GF), argument structure (AS), and semantic form (SF):

(19) /sova/; [-N,+V];  $\lambda_x \lambda_e$  [e INST[x SLEEP]]  
 PF GF AS SF

(20) /arbeta/; [-N,+V]; ( $\lambda_y$ )  $\lambda_x \lambda_e$  [e INST[x WORK (ON y)]]  
 [på]

$\theta$ -roles, represented by lambda operators, can be either internal or external. Internal  $\theta$ -roles are normally optional as in (20).  $\theta$ -roles for oblique arguments (expressed by PPs) as well as adjuncts can be represented in this formalism. The verb in (20) can for instance take an optional internal  $\theta$ -role introduced by a preposition which is indicated underneath the appropriate lambda operator. The operators are listed in AS in the order in which they are inserted, that is, first the internal arguments, next the external argument, and finally the instantiating  $\lambda_e$ . The variables in SF are bound by the lambda operators in AS. Affixes have their own specific type of lexical entry defined by the key-theta-role, i.e. they look for a specific lexical category as their argument.

The applicative construction in German (with the same prefix *be-*, 21), has been analyzed within this framework by Olsen 1993, and this paper will extend her analysis to Swedish examples.

(21)  
 a. Er hängt Bilder an die Wand.      b. Er behängt die Wand mit Bildern.  
 'He is hanging pictures on the wall.'      'He is APPL-hanging the wall with pictures.'  
 Ag                    Theme            Goal                    Ag                    Goal            Theme

A comparable Swedish example is that in (22), where the formal lexical entries are also shown.

- (22) /spruta/; [+V, -N];  $\lambda z \lambda y \lambda x \lambda e$  [e INST [x SPRAY y]]: [e CAUSE  
[på] [BECOME [y  $\subseteq$  LOC z]]]  
Hon sprutar vatten på blommorna.  
'She sprays water on the flowers.'

- (23) \*/bespruta/; [+V, -N];  $\lambda y \lambda z \lambda x \lambda e$  [e INST [x SPRAY y]]: [e CAUSE  
[med] [BECOME [y  $\subseteq$  LOC z]]]  
Hon besprutar blommorna med vatten.

The formalism in (22) has been taken from Olsen, and (23) shows the desired argument structure for the applicative. However, (23) can't be derived directly. As Olsen has noted (personal comm.), a formal operation on the  $\theta$ -grid to switch AS (as shown in 23) is excluded because the verb's SF may not change. But if the lambda operators don't switch places, then the order among the arguments is syntactically incorrect. In the correct applied construction the  $\lambda y$ , or formerly oblique argument, should come directly after the verb from which it now gets structural case. In order to derive the applicative, the derivation must change the linear ordering between internal operators and delete and insert the prepositions *på* and *med* respectively. The solution to these problems will depend on what the functor's lexical entry looks like.

Olsen proposes that the verbal, applicative prefix suppresses an internal  $\theta$ -role  $\lambda y$  when prefixed to a three-place verb. In German both the Theme and Goal roles are obligatory with the base verb, but only the Goal (the derived direct object) is necessary with the derived verb. This suggestion rests upon a restrictive definition of applied verb constructions where applied verbs can only be derived from three-place verbs, which seems to fit the German data, but turns out to be problematic for the Swedish constructions. Olsen's suggestion for the lexical entry for *be-* is shown in (24).

- (24) /be/; [ $\alpha$ N,  $\beta$ V];  $\lambda P \lambda z \lambda x \lambda e$  [P z y x e]  
[+V, -N]

The *be-* prefix forms a  $\lambda P$  (Prefix) template which looks for a lexically marked verb as its argument. This is the lock-and-key model which joins an affix with a stem and accounts for c-selection. The applied verb would be formed by composing the functor in (24) with a lexical entry like (22). Functional composition, i.e. internal lambda conversion, yields the entry in

(25). The suppressed  $\lambda y$  is no longer available in AS as an argument position.

- (25) /bespruta/; [+V, -N];  $\lambda z \lambda x \lambda e$  [ [e INST [x SPRAY y]]: [e CAUSE  
[BECOME [y  $\subseteq$  LOC z]] ] ]  
Hon besprutar blommorna (med vatten)<sub>adjunct</sub>  
'She APPL-sprays the flowers (with water).'

Although the Theme is no longer part of the AS of the applied verb, it is still present in SF and can be targeted by an adjunct with its own  $\theta$ -assigner. Olsen's analysis predicts that the  $\theta$ -assigner for the delinked Theme is always the semantically empty *med* 'with' in Swedish (*mit* in German) which functions as a default case marker. The applied verb in (25) thus has only one internal argument, and an adjunct can be included to express the suppressed  $\lambda y$  Theme. The PP *med vatten* is optional in Swedish, supporting but not confirming the idea that it becomes an adjunct. One minor point remains to be clarified within this analysis, that is, the alternation between the PP oblique object and the derived direct object, i.e. how is the preposition *på* deleted in *spruta vatten på blommorna*. Otherwise, the three-place applied verbs are explained satisfactorily, assuming that *med vatten* becomes an adjunct.

Let's now consider the two-place applied verbs. (26) shows the base verb construction, and (27) the result of composing this with (24). For comparison, the desired argument structure is given in (28).

- (26) /tvivla/; [+V, -N];  $\lambda y \lambda x \lambda e$  [e INST [x DOUBT y]]  
[på]  
Vi tvivlar på analysens sanningshalt.  
'We doubt the veracity of the analysis.'

- (27) \*/betvivla/; [+V, -N];  $\lambda x \lambda e$  [e INST [x DOUBT y]]

- (28) /betvivla/; [+V, -N];  $\lambda y \lambda x \lambda e$  [e INST [x DOUBT y]]  
Vi betvivlar analysens sanningshalt.  
'We APPL-doubt the veracity of the analysis.'

The derived entry in (27) is clearly incorrect. The base verb's internal role is not suppressed or made optional; it simply becomes a direct object. In order to derive the two-place verbs, an entirely different entry for *be-* must be assumed, but it is unclear what this entry would look like. In addition, there is little motivation outside of the theory to assume another lexical entry for *be-* since arguments to the two- and three-place verbs

undergo the same syntactic changes. Olsen's proposal would be saved by not considering the two-place constructions to be applicatives, but this has already been rejected for principled reasons.

In conclusion, Olsen's analysis derives the correct argument structure for the three-place predicates but fails to predict the alternation in the two-place verbs. In addition, no account is offered of the alternation between a preposition in the analytic construction and a prefix in the synthetic. Bierwisch's lexical framework, and in particular Olsen's analysis, does solve many of the problems that DSW had, but it only offers a partial solution to the applicative *be-* in Swedish.

### The syntactic approach

The final approach to be discussed is Baker's 1988a incorporation theory, which clears up the problems that the other theories have when dealing with applied verb constructions. Although Baker doesn't consider the Germanic prefix *be-* (the only applicative construction in Germanic which he mentions is the Dative Shift), this prefix can still be analyzed within his framework, because the morphological affixation to the verb signals that its arguments have undergone grammatical function changing (a syntactic phenomenon). Many of Baker's underlying definitions and assumptions have already been discussed in the Introduction, and some (but not others) have even been assumed as the basis for this analysis. This theory of preposition incorporation is formulated in terms of the Government and Binding (GB) theory of syntax (Chomsky 1981) and is subject to all its rules and constraints, which are too numerous to explore here.

Baker's basic hypothesis is that the general transformation Move  $\alpha$ , where  $\alpha$  is a lexical head, may act on lexical categories, leading to the incorporation of one lexical head by another and forming a complex lexical head. Syntactic rules are applied to word level categories on the theory that certain types of derivations, e.g. possessor raising, noun incorporation, applicatives, passives, antipassives, causatives, etc., are really syntactic phenomena and thus best described in the syntax. The derivation of complex lexical heads is governed by syntactic principles, such as head raising, the Projection Principle, and the  $\theta$ -criterion. Baker's theory of preposition incorporation is based on the analysis of head raising in African languages where the preposition leaves its complement and incorporates into the verb, thus creating an applicative verb.

Before looking at concrete examples of Baker's analysis, it will be helpful to review the issues that must be dealt with in the GB theory of grammar, and how Baker tackles them. First and foremost, the derivation of words in the syntax must be justified. Baker postulates the Uniformity of Theta Assignment Hypothesis (UTAH, Baker, 1988a:46) which says that "identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure". UTAH assumes a theta hierarchy where Agent < Experiencer < Theme < Goal/Source/Location. The Theme must be base generated in a linearly more prominent position than the Goal. Applied verbs must be derived in the syntax because the Goal/Loc role is placed higher than the Theme at S-structure (Spell Out), in other words it appears before the Theme, in violation of UTAH, and without its original prepositional marker. Only a syntactic analysis allows for the violation of the Theta-Hierarchy in the derived construction.

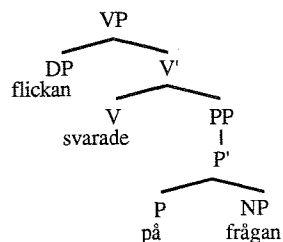
Second, it is necessary to determine which elements may incorporate others. Since this is a theory of word formation at the lexical level, it is postulated that only lexical heads may incorporate other elements just as only lexical heads may be incorporated. To restrict the positions to which a head may move, Travis 1984 formulated the Head Movement Constraint (HMC), which says that heads may only move to positions that govern them, traces must be c-commanded by the moved element, and no barriers may be crossed during movement. This means that the V may incorporate from complement positions, while the external argument may not be incorporated.

Third, a theory of incorporation must provide a means of government for the incorporated element's complement. Baker's Government Transparency Corollary (GTC) comes in here to say that the derived applied verb governs everything previously governed by the incorporated element. This accounts for case assignment to the stranded prepositional complement, which receives the verb's structural case as a direct object adjacent to V.

Let's look at some examples similar to those which caused trouble for the other two theories. (29) and (30) show the derivation from the two-place verb *svara* 'answer'. V\* indicates that the V has incorporated the preposition.

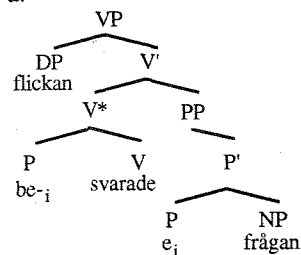


(29) a.



b. Flickan svarade på frågan.  
 'The girl answered the question.'  
 Ag Th

(30) a.

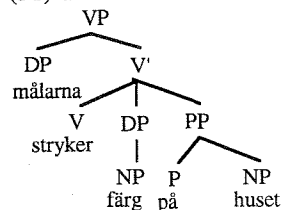


b. Flickan be<sub>i</sub>-svarade e<sub>i</sub> frågan.  
 'The girl APPL-answered the question.'  
 Ag Th

(29) shows the base construction, and (30) the applied verb after incorporation. Coindexing indicates the effects of Move  $\alpha$ . As predicted by the HMC, P will only be allowed to be incorporated by a head which properly governs it, and so long as no barriers are crossed during movement. Since the PP is in an argument position to V, there will be no barriers to movement; at the same time V c-commands P, so incorporation is allowed. The GTC predicts that the V will govern the complement of P, which is thus read as the direct object. A trace is left in the P position (30) and is governed by the applicative affix in accordance with the Empty Category Principle. The preposition *på* in (29) is incorporated into V, thus altering the grammatical function of the argument, which goes from being an oblique to a direct object. This change is signaled on the verb by the occurrence of *be-*.

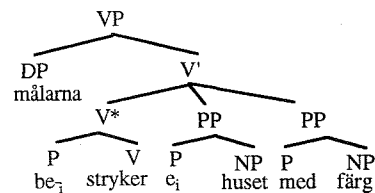
The theory of preposition incorporation deals with the three-place verbs just as easily as the two-place. In (31) and (32) *be-* changes the whole argument structure of the three-place verb *stryka* 'brush'.

(31) a.



b. Målarna stryker färg på huset.  
 'The painters brush paint onto the house.'  
 Ag Th Goal

(32) a.



b. Målarna bestryker huset med färg.  
 'The painters brush the house with paint.'  
 Ag Goal Th

Example (31) shows the base construction, and (32) the applied verb. First, the preposition *på* is raised out of the PP by head raising and incorporated into the verb. The derived object is then required to appear adjacent to its head V, which properly governs it, in order to receive structural case at S-structure (Baker 1988b), which is exactly what the GTC predicts. The verb's structural case is used up on the derived object, so another way must be found to assign case to the stranded Theme.

Theoretically, the Theme could still bear inherent/lexical case which was assigned in the lexicon, and this possibility is utilized in languages where the basic object becomes a 'second object' rather than an oblique. But in Swedish, the preposition *med* must be inserted to case-mark the delinked Theme. Baker's definition of the applicative construction leaves open the option for the basic object to be expressed as an oblique, and one example of this is given (Baker 1988a:248). However, he does not address the actual occurrence of an oblique case marker in his theory of preposition incorporation. I shall adopt Olsen's 1993 suggestion that the semantically empty *med* is inserted as a type of formal case marker which clears up the problem without violating Baker's theory.

This analysis is well borne out empirically and predicts the derivation of applied verbs without resorting to ad hoc or construction specific solutions. It works with the existing arguments and  $\theta$ -roles rather than positing new ones or suppressing existing ones. Consequently, it easily explains why the applied construction has the same number of arguments/ $\theta$ -roles as the base verb. Word order doesn't present a problem either since the correct order among internal arguments is the consequence of incorporation and case assignment. A result of incorporation is that the preposition is no longer realized, and the delinked Theme can be case-marked by inserting *med*. Baker's incorporation theory offers the most complete account of the Swedish data including both two- and three-place verbs. Therefore the *be-* verbs can be simply derived in the syntax, by syntactic rules.

## Conclusions

The applicative construction is the result of a derived verb taking over the function of an oblique case marker in the base construction. The resulting grammatical function changes of the arguments are indicated on the verb itself by the applicative affix. Thus a full description of this alternation will account for this interaction between the syntax and the morphology.

This paper has distinguished an applicative prefix *be-* from the many other occurrences of the same prefix in Swedish and demonstrated that this *be-* alters the verb's argument structure by turning an oblique complement into a direct object and, when the base V is three-place, demoting the original object to oblique status, marked with the default *med*. The applicative alternation may only occur on verbs that are subcategorized for at least one internal  $\theta$ -role, which may be expressed syntactically as either a PP or a direct object. For the three-place verbs, both internal arguments must be  $\theta$ -marked by the verb. A semantic motivation for this is that the applicative affix shifts focal emphasis (similarly to voice changes) to the lowest  $\theta$ -role which becomes the derived direct object.

In trying to account for the Swedish data, this paper has examined three of the currently competing approaches to word-formation: DSW's morphological theory, Bierwisch's lexical framework, and Baker's syntactic proposal. The first approach was faced with serious difficulties in deriving both two- and three-place applied verbs and in explaining the alternations that occur in grammatical functions. Specifically, DSW couldn't derive the correct number of arguments or the proper word order and couldn't explain case assignment and the occurrence and/or deletion of the prepositions. DSW suffer most of all from the fact that their theory is rather vague and programmatic. Bierwisch's theory offers a more comprehensive explanation of the grammatical function changes and better defined tools for derivations. The lexical framework is capable of assigning case to all NPs and can also derive the right word order by assuming the proper entry for *be-*. But the analysis breaks down when analyzing the two-place verbs, where an oblique  $\lambda y$  is not suppressed, but simply changes its grammatical function to that of direct object.

When dealt with in the syntax, the applicative alternation is described simply and completely. Clearly some reference to syntactic rules is necessary in these derivations, and Baker's incorporation theory does just that. The syntactic approach covers all of the problems that arose for the other theories, i.e. the number of arguments, word order, and case assignment; no arguments are left out of the applicative construction, and no extras are introduced. Only Baker's syntactic theory of preposition incorporation can derive applicatives from both two- and three-place verbs with the same ease. Aside from the empirical advantages of the syntactic approach, there are general theoretical reasons to prefer a syntactic approach to certain types of word formation. It is clearly preferable to

find general principles that explain a wider range of phenomena, rather than positing numerous rules for specific constructions. This means that the rules become more generally applicable, resulting in a simpler, more comprehensive description of language.

To conclude, applied verb constructions are of general interest to linguistic theory as they expose the intricate interaction between the syntax and the morphology. This analysis of the Swedish applicative sheds light on three competing theories of word formation as well as on applicative constructions in a Germanic language. This study could be expanded in various ways; in particular, the semantics should be better examined as the relation between syntax and semantics promises to be of importance in the attempt to integrate various components in a more inclusive and comprehensive theory of grammar.

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# Giving language a hand: gesture as a cue based communicative strategy

Marianne Gullberg

## Introduction

All accounts of communicative behaviour in general, and communicative strategies in particular, mention gesture<sup>1</sup> in relation to language acquisition (cf. Faerch & Kasper 1983 for an overview). However, few attempts have been made to investigate how spoken language and spontaneous gesture combine to determine discourse referents. Referential gesture and referential discourse will be of particular interest, since communicative strategies in second language discourse often involve labelling problems.

This paper will focus on two issues:

1) Within a cognitive account of communicative strategies, gesture will be seen to be part of conceptual or analysis-based strategies, in that relational features in the referents are exploited;

2) It will be argued that communication strategies can be seen in terms of cue manipulation in the same sense as sentence processing has been analysed in terms of competing cues. Strategic behaviour, and indeed the process of referring in general, are seen in terms of cues, combining or competing to determine discourse referents. Gesture can then be regarded as being such a cue at the discourse level, and as a cue-based communicative strategy, in that gesture functions by exploiting physically based cues which can be recognised as being part of the referent. The question of iconicity and motivation vs. the arbitrary qualities of gesture as a strategic cue will be addressed in connection with this.

## Comprehension and production

### *Cues and cue-based comprehension*

Sentence processing or understanding can be seen in terms of associations between form and meaning with different weights assigned to each one. A

<sup>1</sup>Gesture is narrowly defined throughout this paper as any movement of the arms and/or hands.