

Support Verbs in Disneyworld

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In this paper I want to claim that it is possible to treat clauses with a support verb (*Vsup*) as control into the NP. The paper is divided into four sections. In the first section, I will give some relevant linguistic facts as well as a definition of the support verb construction (SVC). In the second section, I will give some arguments in favour of a control approach to sentences with a support verb. A way to treat support verbs in a unification-based grammar is given in the third section. In the last section, I will devote some words to the translation of SVCs from Dutch into English and the other way around.

The analysis is to be implemented in the MiMo2 (Mickey Mouse 2) translation system. This system, developed at the University of Utrecht, is a unification-based, reversible transfer system. Consult van Noord et al (1990) for an elaborate overview of the system.

1 Support Verb Constructions¹

An SVC is a collocation of a predicative noun (*Npred*) and a support verb. Some examples of what I consider as the standard form of a sentence with an SVC are given in (1) below, where *Na* stands for the first argument (the subject) of the predicative noun, *Nb* for the second argument etc. In the following, I will reserve the name SVC solely to the combination [*Vsup* (*Prep*) *Det Npred*], a sentence containing an SVC will be called an SVCphrase.

- (1) *Na Vsup* (*Prep*) *Det Npred* (*Prepb Nb*) (*Prepc Nc*)

Mitzi made a leap
the stork carried out an attack on Kermit
she gave a demonstration of the sling to the rabbit

These constructions show three main characteristics. The first is that a predicative noun in an SVC has no special meaning. The meaning of the predicative nouns in (1) is the same as the meaning of the predicative nouns in the separate NPs in (2).

- (2) Mitzi's leap
the attack on Kermit
a demonstration by her

In SVCphrases, the subject of the support verb has to be identical to the argument *Na* of the predicative noun. Therefore, the predicative noun cannot have an independent subject². In contrast, the object of an ordinary verb can be an NP that contains an independent subject.

- (3) *? John made Bill's proposal
John heard Bill's proposal

¹ Most material in this section is based on Cattell (1984) and Danlos et al (1989).

² To be more precise, the first sentence in (3) is grammatical as long as *Bill* is not interpreted as the subject of *proposal* but as some sort of modifier.

The third characteristic is that the support verb has little semantic content. The sentences in (4a) have approximately the same meaning as the ones in (4b). It seems that the nouns *bark* and *talk* in (4b) carry the largest part of the meaning of the corresponding verbs in (4a). The support verbs can be viewed as syntactic slot fillers.

- (4)a the dog barked
Mickey talks to Donald
b the dog gave a bark
Mickey has a talk with Donald

A result of this semantic emptiness is that the paraphrase in (5) is possible. Such a paraphrase is not possible with an ordinary verb.

- (5) the appointment that John made with the guru Josh
=
John's appointment with the guru Josh
(6) the appointment that John recorded with the guru Josh
≠
John's appointment with the guru Josh

There are three classes of SVCs: intransitive SVCs, transitive SVCs and SVCs with hybrid nominals. Examples are given in (7).

- (7)a intransitive (no direct object allowed)
the dog gives a bark (* of the cat)
Mitzi made a dash (* of the street)
b transitive
Al Capone made a confession of his crimes to his nanny
Al Capone made his nanny a confession of his crimes
c with hybrid nominals
Jones gave a kiss (* of Smith)
Jones gave a kiss to Smith
Jones gave Smith a kiss

Note the difference between the continuous SVC in the first sentence in (7b) where *made a confession* can be analysed as one constituent and the discontinuous SVC in the second clause where *made* and *a confession* have to be analysed as two constituents. The same distinction can be made in the two last sentences of (7c). The SVCs with hybrid nominals can be considered as a special case of transitive SVCs. Formally, a predicative noun like *kiss* is intransitive (it cannot take an of-object) but, intuitively, the expression *give a kiss* is transitive. Cattell (1984) called these nouns hybrid nominals.

2 SVCs as control into the NP

In the introduction, I claimed that SVCs can be seen as control into the NP. SVCphrases and phrases with an obligatory subject control verb have some interesting properties in common. First of all, they both show the control paradigm. Consider the following set of examples.

- (8)a Snow White made a proposal
b Snow White tried to propose a truce
c Snow White listened to a proposal

In (8a) and (8b) one knows who is proposing, in (8c) one does not. It can be argued that in the first two sentences *Snow White* controls the subject of *proposal* to *propose*. In both cases, the subject of the verb is equal to the subject of the unsaturated complement.

A second resemblance is that an obligatory subject control verb does not allow an independent subject in the infinitive clause.

- (9) *Lieutenant Uhuru tried (for) Captain Kirk to come
Lieutenant Uhuru tried to come

Also, an obligatory subject control verb (Vcont) can appear in a structure that is much alike the structure of the SVCphrases in (1). In (10), the argument Na is also the subject of the control verb.

- (10) Na Vcont (Prep) Det Npred (Prepb Nb) (Prepc Nc)
the tramp tried an attack on the lady
Archimedes neglected the maintenance of his bathtub

Intuitively, to treat support verbs as some sort of control verbs does justice to the shared properties mentioned above³. But there are more arguments in favour. An important observation is that there is a close similarity between phrases of the structures [*Na Vsup (Prep) Npred Prepb Nb (Prepc Nc)*] and [*Na Npred Prepb Nb (Prepc Nc)*].

- (11) Na Vsup (Prep) Npred Prepb Nb (Prepc Nc)
Scrooge made a request for money to the authorities
Newton made a suggestion (*of a plan) to Einstein
Plato drank a toast to Aristotle

- (12) Na Npred Prepb Nb (Prepc Nc)
Scrooge's request for money to the authorities
Newton's suggestion (*of a plan) to Einstein
Plato's toast to Aristotle

In both cases the number of arguments and the form of Prepb and Prepc are the same. It seems that an SVC like *made a request* imposes the same restrictions on the arguments as a single Npred like *request*. The Npred is the main predicative element in an SVCphrase. With a control approach, the NP-object of the support verb is treated in the same way as an ordinary NP with a predicative head. Not to use this similarity is to miss a generalisation.

One last reason to regard SVCphrases as control into the NP will be discussed in the next section when the abstract predicate *Vsup* is introduced. The arguments in this section (and the one discussed later) are presented in more detail in Crookston (1988) and Verhagen (1990).

3 SVCs in a unification-based grammar

It is now time to describe SVCs in a unification-based grammar. For explanatory reasons, I use a somewhat simplified version of the MiMo2 grammar. This grammar uses feature structures and rules to combine feature structures. Since the proposed treatment of SVCphrases is similar to the analysis of subject control, I will start giving some ideas of how MiMo2 handles subject control. To parse

³ Of course, there are plain differences as well. A control verb can take an infinitive clause, a support verb cannot. Furthermore, a control verb has semantic content. Therefore, the paraphrase in (5) is not possible with control verbs:

the attack that the Scarecrow tried on the Wizzard of Oz
≠
the Scarecrow's attack on the Wizzard of Oz

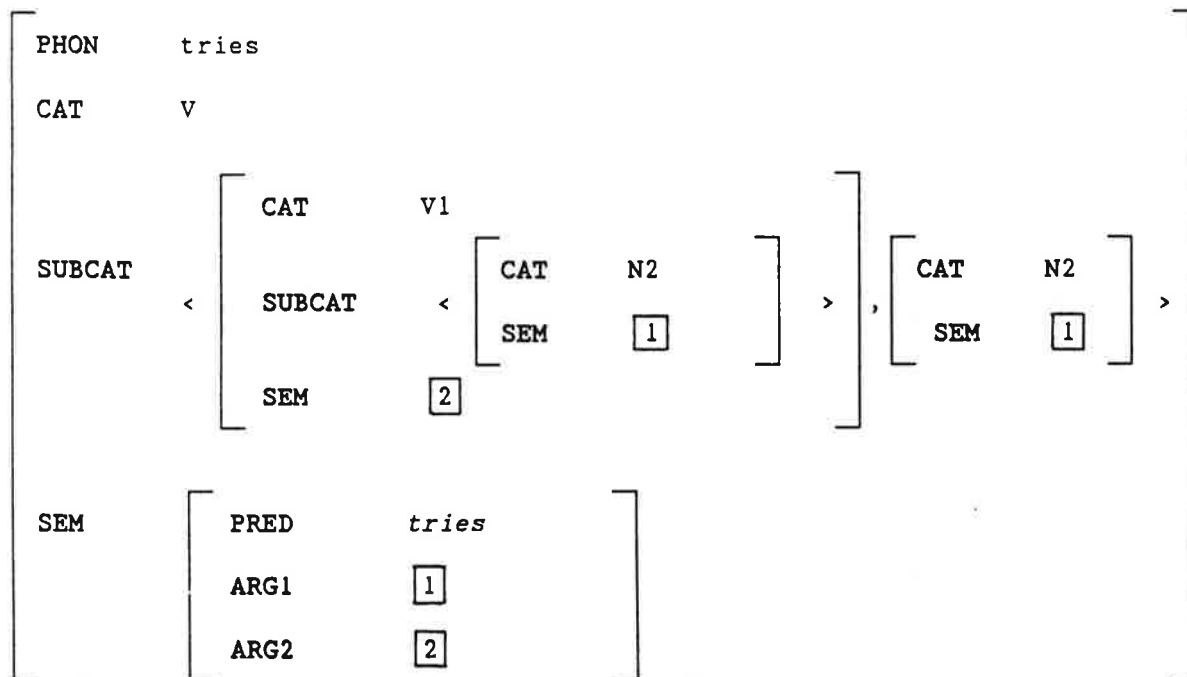
Nevertheless, the similarities are striking enough to propose a control-like treatment of SVCphrases.

a sentence like *Eeyore tries to sleep*, the grammar uses the rules in (13) and the lexical entry for *tries* in (14).

(13) Subject Rule: $V2 \rightarrow \text{Subject}, V1$

Subject Control Rule: $V1 \rightarrow V1, V1[\text{SUBCAT}\langle [] \rangle]$

(14) Feature structure of *tries*



The notation $\text{SUBCAT}\langle [] \rangle$ in (7) stands for a subcategorisation list with one element. The object of a control verb is an unsaturated verbal node. The lexical entry of the control verb *to try* specifies that the semantics of the last element of its subcategorisation list (the subject) is equal to the semantics of the missing argument of the unsaturated verbal complement. By application of the rules and a variant of the HPSG's Subcategorisation Principle⁴ the feature structure on the next page can be obtained. Especially the re-entrance of the subject of the control verb is noteworthy.

⁴ See Pollard and Sag, 1987, p12. The MiMo2 grammar is loosely based on HPSG. One of the differences is that the Subcategorisation Principle is not formulated as a principle but as an extension to all the rules where subcategorisation is relevant. Another principle that is formulated that way is the Semantics Principle, which states that the semantics of the mother is equal to the semantics of the head daughter.

(15) Feature structure of *Eeyore tries to sleep*

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| <table border="0" style="width: 100%;"> <tr> <td style="padding: 2px 10px 2px 10px;">PHON</td> <td style="padding: 2px 10px 2px 10px;">Eeyore tries to sleep</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">CAT</td> <td style="padding: 2px 10px 2px 10px;">V2</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">SUBCAT</td> <td style="padding: 2px 10px 2px 10px;"><></td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">SEM</td> <td style="padding: 2px 10px 2px 10px;"> <table border="0" style="width: 100%;"> <tr> <td style="padding: 2px 10px 2px 10px;">[PRED</td> <td style="padding: 2px 10px 2px 10px;">tries</td> <td style="padding: 2px 10px 2px 10px;">]</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">[ARG1.PRED</td> <td style="padding: 2px 10px 2px 10px;">Eeyore</td> <td style="padding: 2px 10px 2px 10px;">[1</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">[ARG2.PRED</td> <td style="padding: 2px 10px 2px 10px;">sleep</td> <td style="padding: 2px 10px 2px 10px;">]</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">[ARG2.ARG1.PRED</td> <td style="padding: 2px 10px 2px 10px;">[1</td> <td style="padding: 2px 10px 2px 10px;">]</td> </tr> </table> </td> </tr> </table> | PHON | Eeyore tries to sleep | CAT | V2 | SUBCAT | <> | SEM | <table border="0" style="width: 100%;"> <tr> <td style="padding: 2px 10px 2px 10px;">[PRED</td> <td style="padding: 2px 10px 2px 10px;">tries</td> <td style="padding: 2px 10px 2px 10px;">]</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">[ARG1.PRED</td> <td style="padding: 2px 10px 2px 10px;">Eeyore</td> <td style="padding: 2px 10px 2px 10px;">[1</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">[ARG2.PRED</td> <td style="padding: 2px 10px 2px 10px;">sleep</td> <td style="padding: 2px 10px 2px 10px;">]</td> </tr> <tr> <td style="padding: 2px 10px 2px 10px;">[ARG2.ARG1.PRED</td> <td style="padding: 2px 10px 2px 10px;">[1</td> <td style="padding: 2px 10px 2px 10px;">]</td> </tr> </table> | [PRED | tries |] | [ARG1.PRED | Eeyore | [1 | [ARG2.PRED | sleep |] | [ARG2.ARG1.PRED | [1 |] |
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| [PRED | tries |] | | | | | | | | | | | | | | | | | | |
| [ARG1.PRED | Eeyore | [1 | | | | | | | | | | | | | | | | | | |
| [ARG2.PRED | sleep |] | | | | | | | | | | | | | | | | | | |
| [ARG2.ARG1.PRED | [1 |] | | | | | | | | | | | | | | | | | | |

3.1 Intransitive and Continuous SVCs

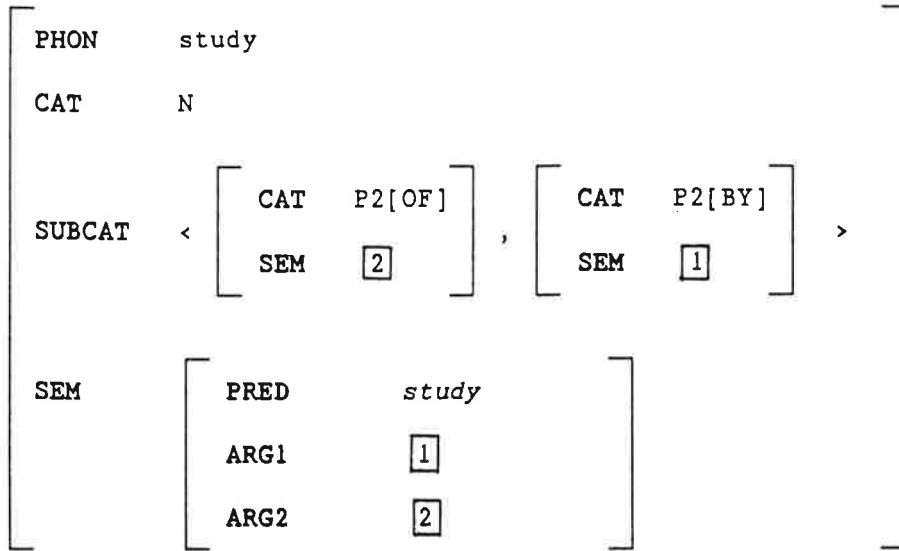
Let's now try to arrive at the control approach to support verbs⁵. What we need is (i) a lexical entry for the predicative noun, (ii) a lexical entry for support verbs, and (iii) a rule to account for the SVC. This rule shows a remarkable similarity to the rule in (13) as can be observed in (16). The lexical entries for the predicative noun and the support verb are given in (17) and (18) on the next page.

(16) SVC Rule: $V1 \rightarrow V1, N2[\text{Subcat}[\langle \rangle]]$

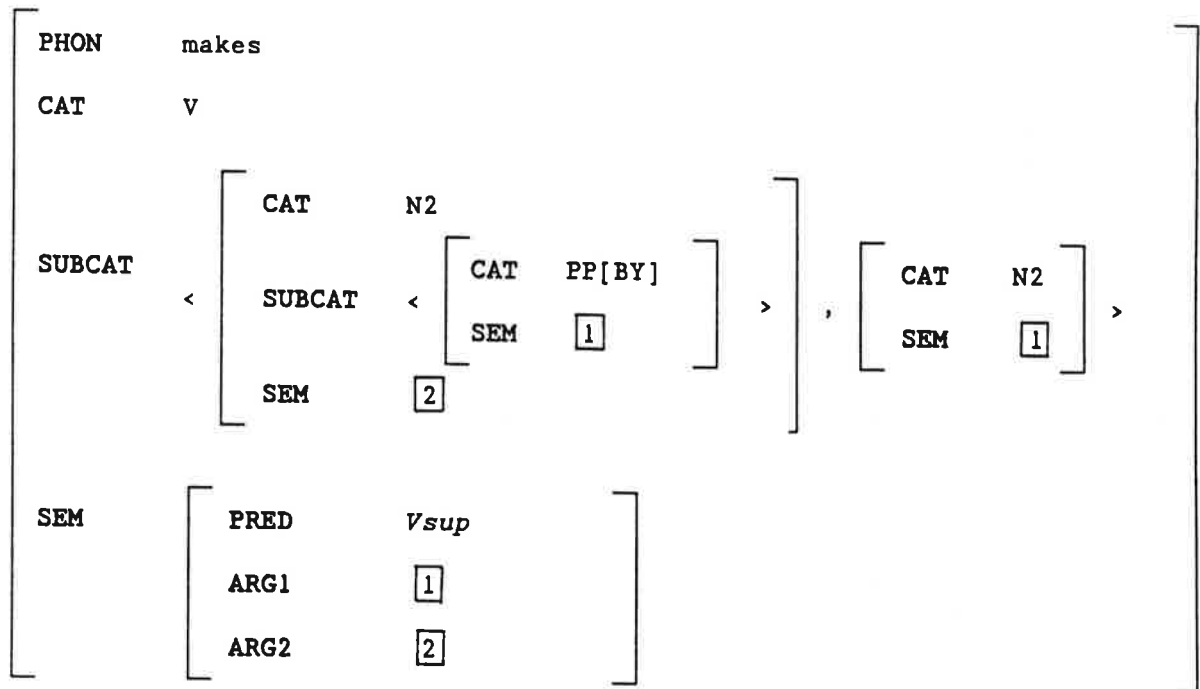
The feature structure in (17) is the structure of just one of the possible lexical entries of *study*, in this case the variant that appears in an NP like *the study of strange sounds by Philip Glass*. More important is the lexical entry of the support verb *make*. In this entry it is stated that the support verb *makes* subcategorises for a subject and an unsaturated nominal object. The semantic content of that object is the same as the semantic content of second argument of the support verb. Also, the semantic content of the subject of the unsaturated object is equal to the semantic content of the subject (the first argument) of the support verb. Notice, by the way, that the predicate name of a support verb is the abstract value *Vsup*. This reflects that the support verb has little semantic content and also makes it easy to recognise an SVCphrase by its semantics. A last remark concerning the feature structure in (18) is that all verbs that can act as a support verb receive this same structure (except for the phonology of course).

⁵ Jayaseelan (1988) describes a promising alternative to the control approach. Jayaseelan uses compositional theta-marking to account for the distribution of SVCs.

(17) Feature structure of the Npred *study*

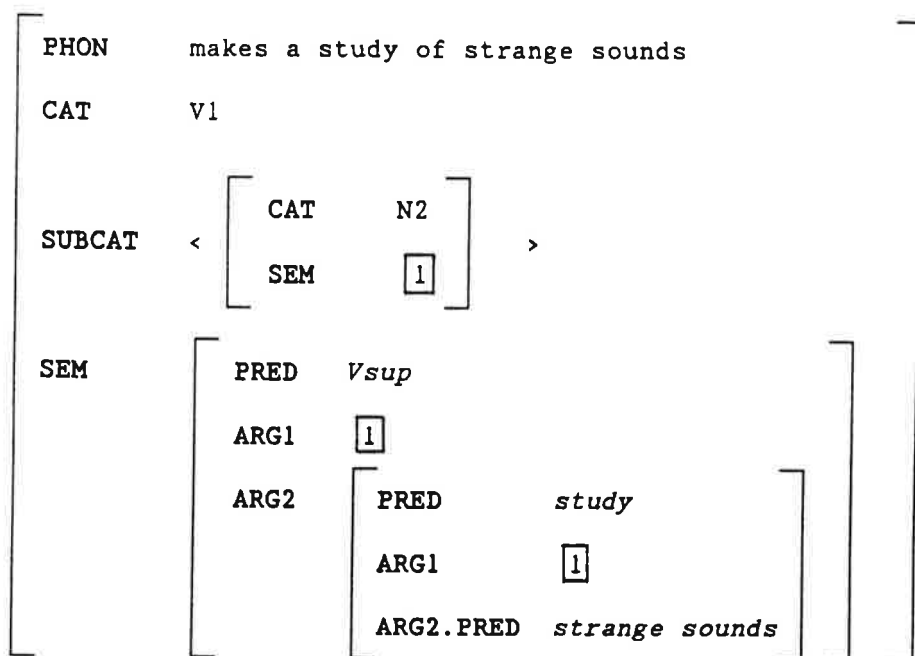


(18) Feature structure of the Vsup *makes*



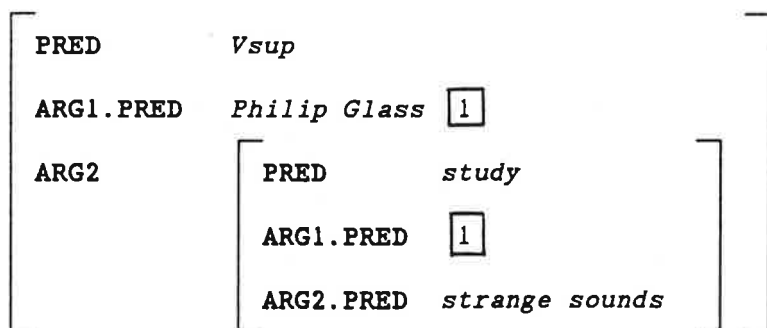
Suppose now that the SVC Rule combines the support verb *makes* with the unsaturated NP *a study of strange sounds*. The following structure is then produced.

(19) Feature structure of the verb phrase *makes a study of strange sounds*



The feature structure of the unsaturated complement *study of strange sounds* has unified with the first member of the subcategorisation list of *makes*. With the Subject Rule we can combine this structure with the feature structure of an N2 subject. The result is the feature structure of the whole SVCphrase of which the semantic content is given in (20).

(20) Semantics of the whole SVCphrase



In the previous section, I promised a last argument for the control treatment. With the analysis described above it is possible to view the predicative noun as the main predicative element of the sentence and the support verb as the head. This opens the possibility to make a distinction between modification of the whole sentence and modification of the predicative noun. And it can be important to make such a distinction since not every appropriate modifier of a predicative noun is an appropriate modifier of an SVCphrase.

(21) Alternative feature structure for the semantics of the whole SVCphrase

| | |
|-----------|-----------------------|
| PRED | <i>study</i> |
| ARG1.PRED | <i>Philip Glass</i> |
| ARG2.PRED | <i>strange sounds</i> |

An analysis that uses the predicative noun as the head of the sentence, as exemplified in (21), cannot make the distinction. This could give rise to unforeseen translation problems.

3.2 Discontinuous SVCs

The intransitive SVCs and the continuous SVCs can be handled in the way described so far. The string *an offer to the judge* in (22a) can be analysed as a single NP with an empty argument place, i.e. the string is of the same kind as (22c), the only difference is the absence of the subject argument. As a result, the NP in (22a) can be built with the same rules as the NP in (22c). For the string *the judge an offer* in (22b) no such analysis is available.

- (22)a Piglet made an offer to the judge
- b Piglet made the judge an offer
- c an offer to the judge by Piglet

The solution to this problem is to accept two sorts of control into the NP. In (23a) the support verb subcategorises for a single object: the unsaturated complement. By contrast, in (23b) and (23c), the support verb subcategorises for two objects, the second of the two being the unsaturated complement.

- (23)a Winnie the Pooh makes [an offer to Cinderella]
- b Winnie the Pooh makes [Cinderella] [an offer]
- c the spiderwoman gave [the praying mantis] [a kiss]

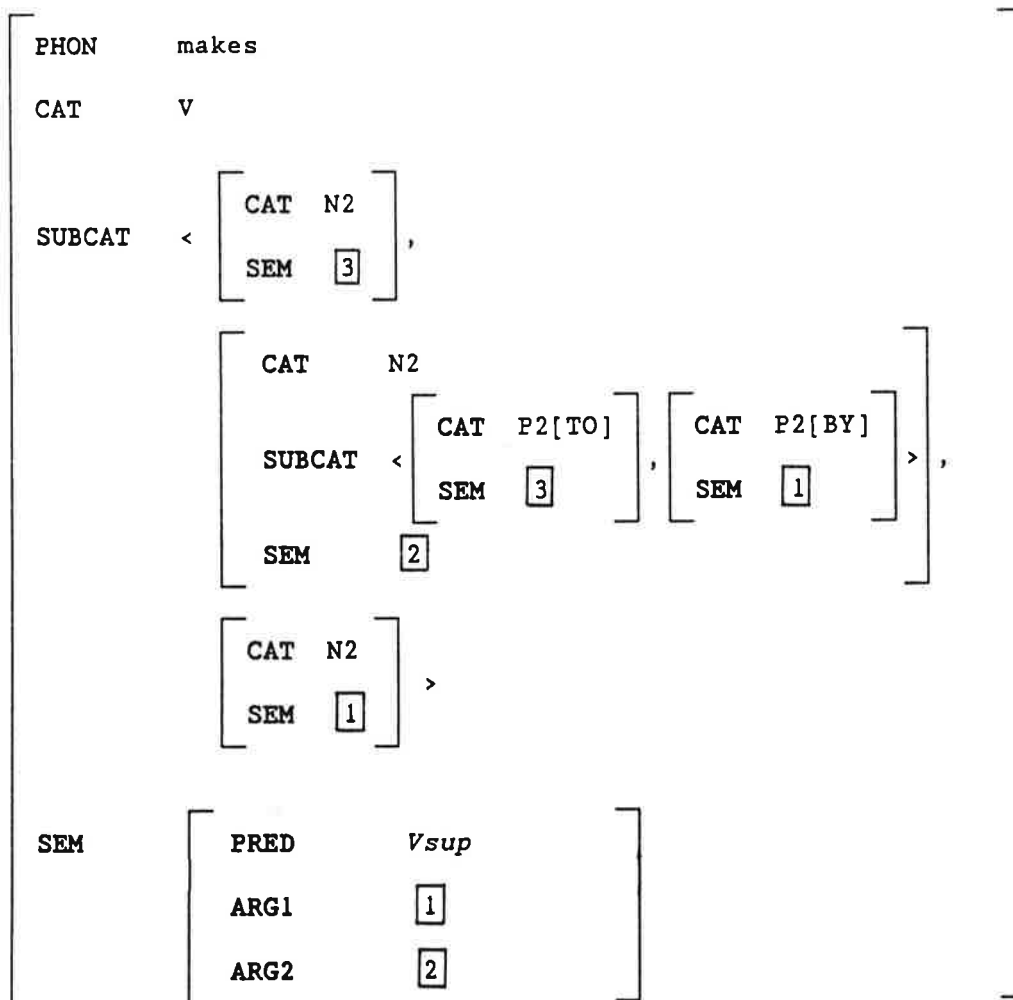
The difference is that this unsaturated complement lacks two grammatical roles. The first is the subject of the predicative noun which is realised as the subject of the support verb. The second is the indirect object of the predicative noun which appears as the indirect object of the support verb. In this construction, the support verb serves as a kind of "double control verb". An advantage of this analysis is that we can use the same NP-rules for the noun phrases in (23a), (23b) and (23c).

For this second sort of control into the NP, another lexical entry for the support verb *make* has to be added. This lexical entry is given in (25) on the next page. Furthermore, a new rule is needed in which an unsaturated complement appears that lacks two grammatical roles.

(24) SVC Rule 2: $V1 \rightarrow V1, N2, N2[\text{SUBCAT} \langle [], [] \rangle]$

With this rule, a ternary branching tree is adopted for the analysis of the string *makes Cinderella an offer*.

(25) A second lexical entry for the *Vsup makes*



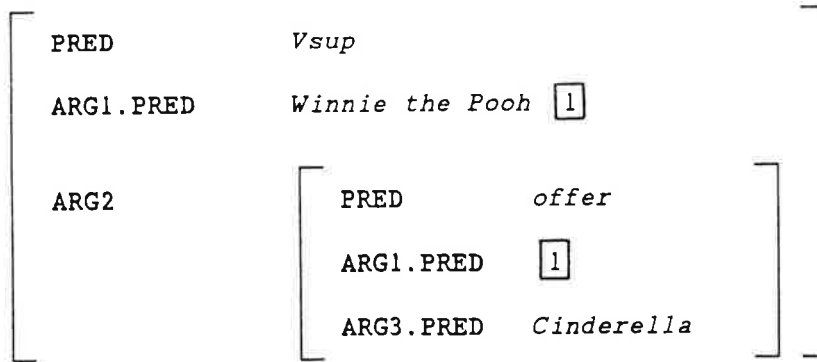
Now, using this new machinery, we can construct a feature structure for the SVCphrases in (23b) and (23c)⁶. The semantic part of such a feature structure is shown in (26) on the next page. It is important to note that the feature structures of both the continuous and discontinuous SVCphrases receive a similar semantic structure in which:

- a. the predicate name is the abstract value *Vsup*,
- b. the predicate has two arguments,
- c. the second argument is a complex structure headed by the predicative noun, and
- d. the first argument of the support verb is equal to the first argument of the predicative noun.

Such a uniform semantic structure assigned to all kinds of SVCphrases will make the transfer relatively simple.

⁶ It should be noted that a slight alteration of the Subcategorisation Principle is needed because it has to refer to the first two members of the subcategorisation list. In the MiMo2 grammar this is no problem since the principle is formulated as an extension to each individual rule.

(26) Semantics of *Winnie the Pooh makes Cinderella an offer*, a phrase with a discontinuous SVC



4 Translation

A literal translation of an SVC is not possible because the particular form of the support verb is lexically determined by the predicative noun. The literal translation of *made* into Dutch is *maakte*, but in the SVCphrase below, *made* has to be translated into *deed*, which is the Dutch counterpart of *did*.

- (27)a the cat made an attempt to catch the shark
 b de kat deed een poging de haai te vangen

In the analysis presented here, this is not a translation problem however. The starting point for the transfer in the MiMo2 system is the semantic content of a feature structure. Recall that the predicate name of a support verb was the abstract value *Vsup*. This entails that the choice of the phonological form of the support verb is made in the monolingual component of the system.

In both Dutch and English SVCphrases, the same number of arguments is present. Therefore, it is possible to translate the sentences in (28) into the sentences in (29) in a compositional way.

- (28) Goofy does a somersault
 Cinderella gives an imitation of a Spitfire
- (29) Goofy maakt een salto
 Assepoester geeft een imitatie van een Spitfire

Translating these SVCs amounts in a relatively simple transfer of the feature structure of the semantic content of a phrase in the source language into a feature structure of the semantic content of a phrase in the target language.

Problems arise if an SVC in one language cannot be translated into an SVC in the other language. There is no Dutch SVC *een nies geven* ("to give a sneeze"). Therefore, *to give a sneeze* in (30a) has to be translated into the ordinary verb *niesen* in (30c).

- (30)a Dirk gently gives a sneeze
 b *Dirk Gently geeft een nies
 c Dirk Gently niest ("Dirk Gently sneezes")

This case raises some severe translation problems. There are problems for example when the predicative noun is modified in some way as in (31).

- (31) Cinderella gave a loud sneeze
Cinderella gave a sneeze that shook all the prinses

Especially the second case is delicate, even human translators cannot find a satisfactory translation. These cases remain an unsolved problem.

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