Specification of Grammar Fragment 1

(by Frank Richter and Manfred Sailer)

1 Coverage

1.1 Examples

Simple finite sentences with complements:

(1) a. Mary walks.

b. Peter likes Mary.

c. She gives it to Mary.

d. It rains.

Simple finite sentences with complements and adjuncts:

(2) a. Mary walks here.

b. Mary walks to Peter.

Finite complement clauses:

(3) Mary says that Peter walks.

Sentences with auxiliaries:

(4) a. Peter will like her.

b. It will rain.

Inverted sentences:

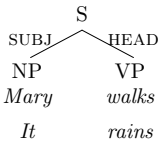
(5) a. Will Peter like her?

b. Will it rain?

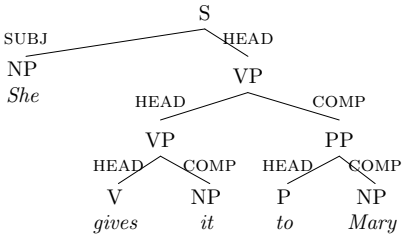
1.2 Sketch of the analyses

(6) a. The structure of the examples in (1):

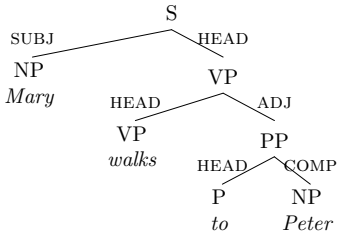
b.



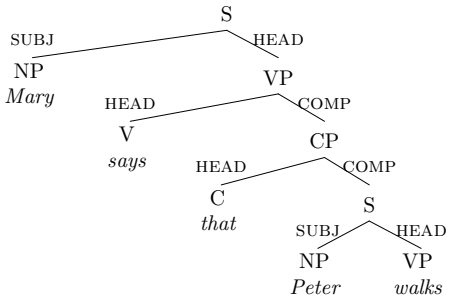
c.



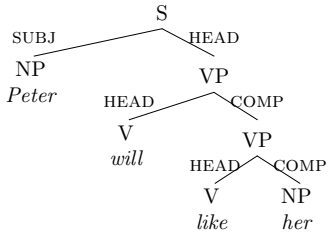
(7) The structure of the examples in (2):



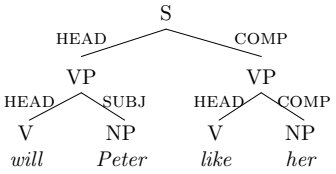
(8) The structure of the example in (3):



(9) The structure of the examples in (4):



(10) The structure of the examples in (5):



2 Signature

```
top
   sign  phon:list(phonstring)  synsem:synsem
      word  arg_st:list(synsem)
      phrase  dtrs:const_struc
   synsem  loc:loc  nonloc:nonloc
   loc  cat:cat cont:cont
   cat  head:head  val:val
   head  pred:boolean mod:synsem_none
      func_verb  vform:vform  marking:marking
         verb  aux:boolean  inv:boolean  marking:unmarked mod:none
         functional  marking:marked
      noun  case:case mod:none
      prep  pform
      adv  mod:synsem
   val  subj:list(synsem)  comps:list(synsem)
   cont
      psoa
      nom_obj index:index
   index  num:num  pers:pers:  gen:gen
      ref
      nonref
         it
         there
   nonloc
   const_struc  hdtr:sign  ndtr:sign
      hs_struc
      hc_struc
      ha_struc
      sai_struc
   list
      elist
      nelist first:top  rest:list
   vform
      fin
      inf
      base
      pas
      psp
   case
      nom
      acc
   pform
      lexical
      non_lexical
```

```
      to
marking
   unmarked
   marked
      that
boolean
   plus
   minus
pers
   first
   second
   third
num
   sg
   pl
gen
   fem
   masc
   neut
synsem_none
   none
   &synsem
psoa
   walk_rel  walker:ref
   like_rel  liker:ref  liked:ref
   say_rel  sayer:ref  said:psoa
   give_rel  giver:ref  gift:ref  given:ref
   rain_rel
   future_rel  soa_arg:psoa
   direction_rel  movement:psoa  goal:ref
   here_rel  located:psoa
phonstring
   peter
   mary
   she
   her
   it
   rain
   rains
   walk
   walks
   walked
   like
   likes
   liked
   say
```

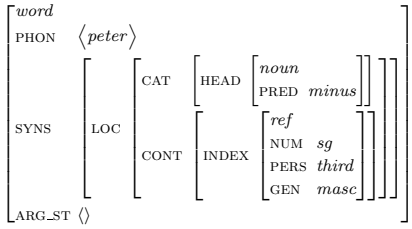


```
says
said
give
gives
given
that
here
to
```

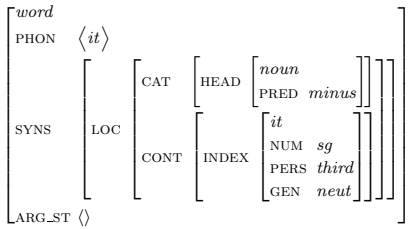
3 Lexical Entries

3.1 Nouns

(11) Lexical entry of the name *Peter*:

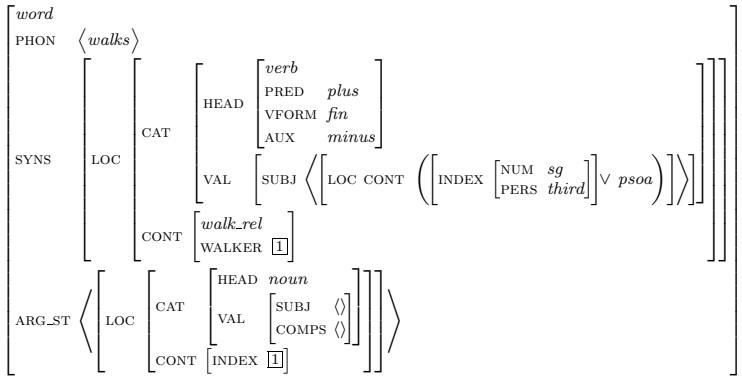


(12) Lexical entry of the (nonreferential) pronoun *it*:

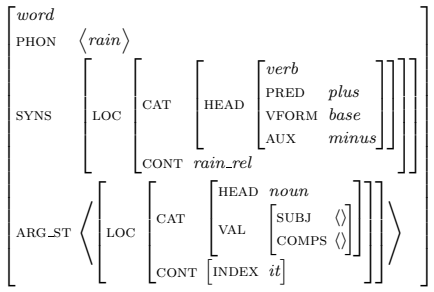


3.2 Verbs

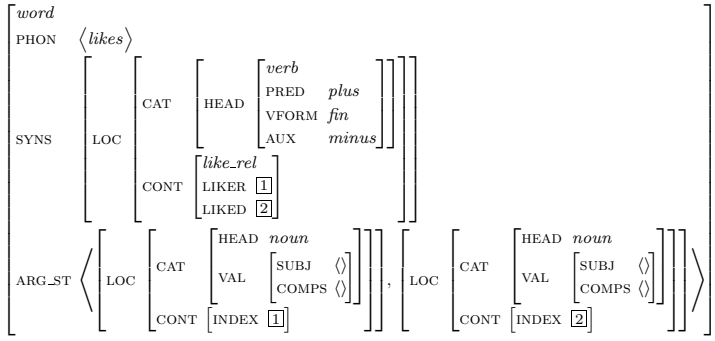
(13) Lexical entry of the verb *walks*:



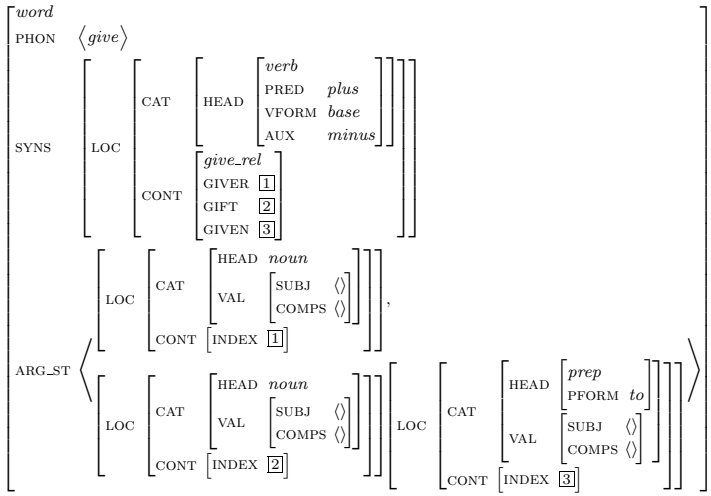
(14) Lexical entry of the verb *rain*:



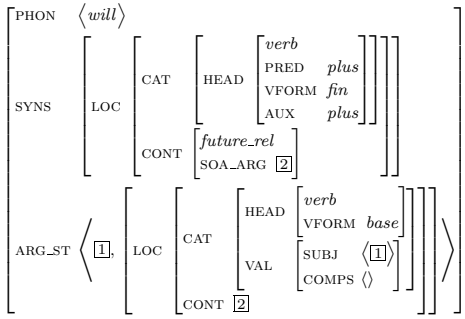
(15) Lexical entry of the verb *likes*:



(16) Lexical entry of the verb *give*:

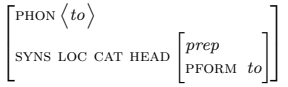


(17) Lexical entry of the future auxiliary verb *will*:

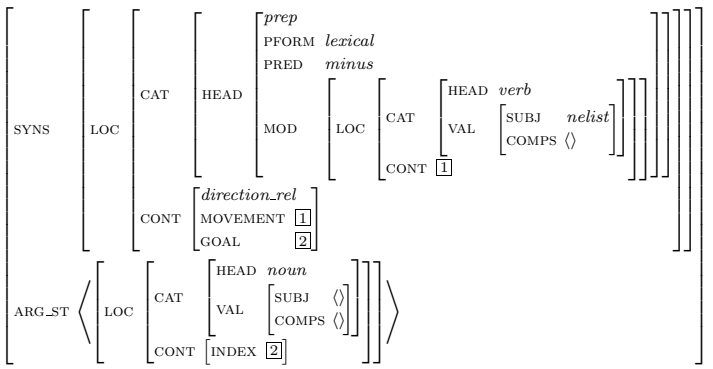


3.3 Prepositions

(18) Lexical entry of the (nonlexical) preposition *to*:

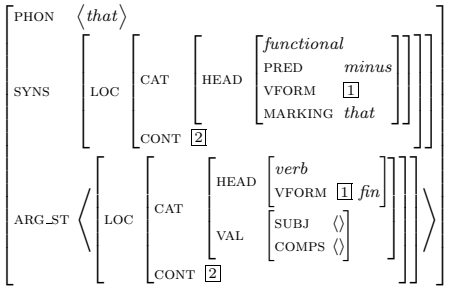


(19) Lexical entry of the (lexical) preposition *to*:



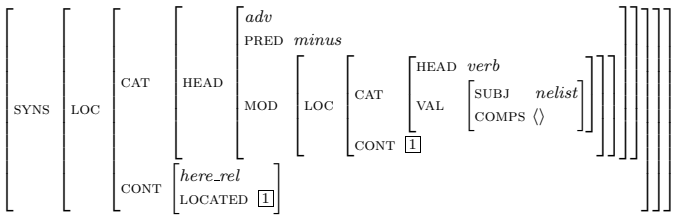
3.4 Complementizer

(20) The lexical entry of *that*:



3.5 Adverb

(21) Lexical entry of *here*:



4 Principles

(22) The Word Principle:

$word \rightarrow (\mathrm{LE}_1 \vee \ldots \vee \mathrm{LE}_n)$

(23) The ID Principle:

$phrase \rightarrow (\mathrm{HSS} \vee \mathrm{HCS} \vee \mathrm{SAIS} \vee \mathrm{HAS})$

(24) The Head-Subject Schema:

$$\begin{bmatrix} \textsc{synsloccatval} \begin{bmatrix} \textsc{subj} & \langle\rangle \\ \textsc{comps} & \langle\rangle \end{bmatrix} \\ \textsc{dtrs} \begin{bmatrix} hs\_struc \\ \textsc{hdtr} \begin{bmatrix} \textsc{synsloccatval} \begin{bmatrix} \textsc{subj} & \langle \boxed{1} \rangle \\ \textsc{comps} & \langle\rangle \end{bmatrix} \end{bmatrix} \\ \textsc{ndtr} \begin{bmatrix} \textsc{syns} & \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(25) The Head-Complement Schema:

$$\begin{bmatrix} \textsc{synsloccatval} \begin{bmatrix} \textsc{subj} & \boxed{1} \\ \textsc{comps} & \boxed{3} \end{bmatrix} \\ \textsc{dtrs} \begin{bmatrix} hc\_struc \\ \textsc{hdtr} \begin{bmatrix} \textsc{synsloccatval} \begin{bmatrix} \textsc{subj} & \boxed{1} \\ \textsc{comps} & \langle \boxed{2} \mid \boxed{3} \rangle \end{bmatrix} \end{bmatrix} \\ \textsc{ndtr} \begin{bmatrix} \textsc{syns} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(26) The Subject-Aux-Inversion Schema:

$$\begin{bmatrix} \textsc{synsloccatval} \begin{bmatrix} \textsc{subj} & \langle\rangle \\ \textsc{comps} & \boxed{2} \end{bmatrix} \\ \textsc{dtrs} \begin{bmatrix} sai\_struc \\ \textsc{hdtr} \begin{bmatrix} word \\ \textsc{synsloccat} \begin{bmatrix} \textsc{head} & [\textsc{inv}\ plus] \\ \textsc{val} & \begin{bmatrix} \textsc{subj} & \langle \boxed{1} \rangle \\ \textsc{comps} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \textsc{ndtr} \begin{bmatrix} \textsc{syns} & \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(27) The Head-Adjunct Schema:

$$\begin{bmatrix} \textsc{synsloccatval} \begin{bmatrix} \textsc{subj} & \boxed{1} \\ \textsc{comps} & \langle\rangle \end{bmatrix} \\ \textsc{dtrs} \begin{bmatrix} ha\_struc \\ \textsc{hdtr} \begin{bmatrix} \textsc{syns} & \boxed{2} \end{bmatrix} \begin{bmatrix} \textsc{loc} \begin{bmatrix} \textsc{cat val} \begin{bmatrix} \textsc{subj} & \boxed{1} \\ \textsc{comps} & \langle\rangle \end{bmatrix} \end{bmatrix} \\ \textsc{ndtr} \begin{bmatrix} \textsc{syns loc cat head mod} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(28) The Constituent Order Principle:

$$phrase \rightarrow \left(\begin{array}{l} \begin{bmatrix} \textsc{phon} & \boxed{1} \\ \textsc{dtrs} & \begin{bmatrix} \textsc{hdtr phon} & \boxed{2} \\ \textsc{ndtr phon} & \boxed{3} \end{bmatrix} \end{bmatrix} \\ \wedge \left(\left[\textsc{dtrs} \ (\ hc\_struc \vee ha\_struc \vee sai\_struc \ ) \right] \rightarrow \mathtt{append}(\boxed{2},\boxed{3},\boxed{1}) \right) \\ \wedge \left(\left[\textsc{dtrs} \ (\ hs\_struc \vee hf\_struc \ ) \right] \rightarrow \mathtt{append}(\boxed{3},\boxed{2},\boxed{1}) \right) \end{array} \right)$$

(29) The Head Feature Principle:

$$phrase \rightarrow \begin{bmatrix} \textsc{synsem loc cat head} & \boxed{1} \\ \textsc{dtrs hdtr} \begin{bmatrix} \textsc{syns loc cat head} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

(30) The Semantics Principle:

$$phrase \rightarrow \left(\begin{bmatrix} \textsc{syns loc cont} & \boxed{1} \\ \textsc{dtrs} \begin{bmatrix} \neg ha\_struc \\ \textsc{hdtr} \begin{bmatrix} \textsc{syns loc cont} & \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \vee \begin{bmatrix} \textsc{syns loc cont} & \boxed{1} \\ \textsc{dtrs} \begin{bmatrix} ha\_struc \\ \textsc{ndtr} \begin{bmatrix} \textsc{syns loc cont} & \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \right)$$

(31) The inv Principle:

$$\begin{bmatrix} \textsc{syns loc cat head} & [\textsc{inv}\ plus] \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{syns loc cat head} & \begin{bmatrix} \textsc{vform} & fin \\ \textsc{aux} & plus \end{bmatrix} \end{bmatrix}$$

(32) The Functional Preposition Principle:

$$\begin{bmatrix} word \\ \textsc{phon}\ nelist \\ \textsc{syns loc cat head} & \begin{bmatrix} prep \\ \textsc{pform}\ non\_lexical \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{syns} & \begin{bmatrix} \textsc{loc} & \begin{bmatrix} \textsc{cat head} & \begin{bmatrix} \textsc{mod} & none \\ \textsc{pred} & minus \end{bmatrix} \\ \textsc{cont} & \boxed{1} \end{bmatrix} \end{bmatrix} \\ \textsc{arg\_st} & \left\langle \begin{bmatrix} \textsc{loc} & \begin{bmatrix} \textsc{cat val} & \begin{bmatrix} \textsc{subj} & \langle\rangle \\ \textsc{comps} & \langle\rangle \end{bmatrix} \\ \textsc{cont} & \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

(33) The mod Principle:

$$\begin{bmatrix} phrase \\ \textsc{dtrs}\ \neg ha\_struc \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{dtrs ndtr} & \begin{bmatrix} \textsc{syns loc cat head} & [\textsc{mod}\ none] \end{bmatrix} \end{bmatrix}$$

(34) The Argument Realization Principle:

a. $$\begin{bmatrix} word \\ \textsc{syns loc cat head} & [\textsc{pred}\ plus] \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{syns loc cat val} & \begin{bmatrix} \textsc{subj} & \langle \boxed{1} \rangle \\ \textsc{comps} & \boxed{2} \end{bmatrix} \\ \textsc{arg\_st} & \langle \boxed{1} \mid \boxed{2} \rangle \end{bmatrix}$$

b. $$\begin{bmatrix} word \\ \textsc{syns loc cat head} & [\textsc{pred}\ minus] \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{syns} & \begin{bmatrix} \textsc{loc cat val} & \begin{bmatrix} \textsc{subj} & \langle\rangle \\ \textsc{comps} & \boxed{1} \end{bmatrix} \end{bmatrix} \\ \textsc{arg\_st} & \boxed{1} \end{bmatrix}$$

(35) The Structural Case Principle:

a. For finite structures:

$$\exists\boxed{1}\left(\left[\begin{array}{l}\textit{phrase}\\ \textsc{dtrs}\ \left[\begin{array}{l}\textsc{hdtr}\ \left[\textsc{syns loc cat}\ \left[\begin{array}{ll}\textsc{head} & \left[\textsc{vform}\ \textit{fin}\right]\\ \textsc{val} & \left[\textsc{subj}\ \left\langle\boxed{1}\right\rangle\right]\end{array}\right]\right]\\ \textsc{ndtr}\ \left[\textsc{syns}\ \boxed{1}\left[\textsc{loc cat head}\ \textit{noun}\right]\right]\end{array}\right]\end{array}\right]\right)$$
$$\rightarrow\left[\textsc{dtrs ndtr}\ \left[\textsc{syns loc cat head case}\ \textit{nom}\right]\right]$$

b. All other cases:

$$\left[\begin{array}{l}\textit{phrase}\\ \textsc{dtrs}\ \left[\begin{array}{l}\textit{hc\_struc}\\ \textsc{ndtr}\ \left[\textsc{syns loc cat head}\ \textit{noun}\right]\end{array}\right]\end{array}\right]\rightarrow\left[\textsc{dtrs ndtr}\ \left[\textsc{syns loc cat head case}\ \textit{acc}\right]\right]$$

5 Relations

(36) The relation `member`:

$$\forall\boxed{1}\,\forall\boxed{2}\left(\texttt{member}(\boxed{1},\boxed{2})\leftrightarrow\left(\begin{array}{l}\left(\boxed{2}\left[\textsc{first}\ \boxed{1}\right]\right)\\ \vee\\ \exists\boxed{3}\left(\boxed{2}\left[\textsc{rest}\ \boxed{3}\right]\wedge\texttt{member}(\boxed{1},\boxed{3})\right)\end{array}\right)\right)$$

(37) The relation `append`:

$$\forall\boxed{1}\,\forall\boxed{2}\,\forall\boxed{3}\left(\texttt{append}(\boxed{1},\boxed{2},\boxed{3})\leftrightarrow\left(\begin{array}{l}\left(\boxed{1}\left[\textit{elist}\right]\wedge\boxed{2}=\boxed{3}\right)\\ \vee\\ \exists\boxed{4}\,\exists\boxed{5}\,\exists\boxed{6}\left(\begin{array}{l}\boxed{1}\left[\begin{array}{ll}\textsc{first} & \boxed{4}\\ \textsc{rest} & \boxed{5}\end{array}\right]\wedge\ \boxed{3}\left[\begin{array}{ll}\textsc{first} & \boxed{4}\\ \textsc{rest} & \boxed{6}\end{array}\right]\\ \wedge\ \texttt{append}(\boxed{5},\boxed{2},\boxed{6})\end{array}\right)\end{array}\right)\right)$$