UNIVERSITEIT ANTWERPEN

UNIVERSITAIRE INSTELLING ANTWERPEN

DEPARTEMENT GERMAANSE FILOLOGIE

ASPECTS OF A MODULAR THEORY OF LANGUAGE

VOL III.

Proefschrift ter verkrijging van de graad van Doctor in de Letteren en Wijsbegeerte aan de Universitaire Instelling Antwerpen te verdedigen door Luc STEELS

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Wilrijk, 1977

§ 4. EXAMPLES AND EXPERIMENTS

In this chapter we illustrate the concepts, theories and systems proposed in earlier chapters by giving a great number of examples of linguistic description as specified in the linguistic description system formalized in chapter 1.

For each of these examples we will specify the corresponding parsing process to illustrate the process theory as developed in chapter 2. We do this by performing experiments with the parsing system defined by the implementation in chapter 3.

§ 4. EXAMPLES AND EXPERIMENTS

4.0. Introduction

4.1. Linguistic information

4.2. Experiments

4.0. Introduction

To illustrate various aspects of the theory of modular grammar we will now give a number of examples and perform a number of experiments.
As we have stated in our introduction to this whole work, the empirical studies in a modular grammar perspective have only reached the status of examples. That means that the description does not cover even small parts of the language even that some facts are given in the example information which do not necessarily hold for the language in general ! The empirical studies required to construct a reasonable grammar with depending lexicon would probably take several years, in other words another thesis of this sort.

So instead of stressing a broad empirical coverage we will concentrate on giving as much divergent linguistic phenomena as possible while keeping the linguistic data restricted.

As regards the study of an experiment we advise the reader the following sort of action. Before investigating how the system is doing a particular parse, he should first try to perform the parsing process by hand based on the description and data provided. After that the reader can check his results on the basis of the computer output.

4.1. The linguistic information

(a) Conventions

Although data has been gathered for a much broader range of examples we will now given the linguistic data that is needed for the forthcoming experiments only. In this way we hope that the reader can more easily concentrate on the problems themselves.

This information is given in the format as it is stored according to the hashcode specified in the algorithms given earlier.

The conventions of the lexicon, the case frames and the networks have all been specified before. As regards the grammar we use the following notation. For each function we give specifications in the following order:

1. function
2. type
3. subtype
4. function-of-head
5. position
6. taking-objects
7. concord
8. send-through
9. qual/mod characteristic

The grammar is stored under label GRAMMAR, the functional inference tree under label FUNCTREE, the syntactic inference tree under label SYNTREE. The syntactic networks which are left-going under label BEFORE and the right-going ones under label AFTER.

Each time we give the atom by which the information is addressed, and the language (in the 31th column). For languages we use the indicators

E for English
G for German
N for Dutch .

After that comes the linguistic information itself. The endmarker is a star.

When studying a particular experiment the reader should consult the dictionary of linguistic information for the points needed in the experiment. E.g. if a parsing predicate (say p-function-of-head) is computed, one should consult the grammar of the language under discussion and look what is said there about the function-of-head of the function involved in the computation process.

We now give the information itself

linguistic information

(b) data

```
A                                   E
     ((DETERM NIL NIL NIL SING UNDEF ))                                          *

BE                                  E
      ((NONFIN.VERB BE NIL WHAT (XOR (AND FUT (NOT FUT" ))(AND MODAL (NOT
      MODAL" )))(AND MODAL" FUT ))(NONFIN.AUX NIL NIL NIL (XOR (AND FUT (
      NOT FUT" ))(AND MODAL (NOT MODAL" )))(AND (XOR PASS CONTIN )(AND
     MODAL" FUT" ))))                                                           *

OF                                  E
     ((CASESI NIL NIL NIL NIL OF ))                                             *

HE                                  E
     ((PRON.OBJ NAM NIL PERSON (AND SING (AND SUBJ 3PS ))))                     *

DE                                  N
     ((DETERM NIL NIL NIL (AND DEF (NOT (AND SING NEUT )))))                    *

IN                                  E
     ((RELWORD SPEC*PLACE IN LOCATE ))                                          *

TO                                  E
     ((CASESI NIL NIL NIL NIL (AND PREP TO )))                                  *

DO                                  E
      ((VERB DO NIL AGENT ((AND (NOT (AND 3PS SING ))(NOT OBJ ))PRES ))(
      AFF.AUX NIL NIL NIL ((AND (NOT OBJ )(NOT (AND 3PS SING )))(AND PRES
      MODAL )))(QUEST.AUX NIL NIL NIL ((AND (NOT OBJ )(NOT (AND 3PS SING ))
      )(AND (AND PRES MODAL )QUEST )))(NONFIN.VERB DO NIL AGENT (OR FUT
     MODAL )))D PRES MODAL )QUEST )))                                           *

IN                                  N
     ((CASESI NIL NIL NIL NIL LOC ))                                            *

IS                                  E
      ((VERB EQUAL NIL WHAT ((AND 3PS (AND (NOT OBJ )SING ))PRES ))(COPULA
      NIL NIL NIL ((AND 3PS (AND (NOT OBJ )SING ))PRES ))(AFF.AUX NIL NIL
     NIL ((AND 3PS (AND SING (NOT OBJ )))(AND PRES (XOR CONTIN PASS )))))       *

BY                                  E
     ((CASESI NIL NIL NIL NIL (AND PREP BY )))                                  *

LAATSTE                             N
     ((ATT.ADJ P-ORDER LAST OF*WHAT CONC ))                                     *

BEAUTIFUL                           E
     ((ATT.ADJ QUALITY BEAUTY OF*WHAT ))                                        *

READ-P                              E
     ((SELF ACT )(AGENT PERSON )(WHAT THING ))                                  *

READ                                E
      ((NONFIN.VERB READ-P NIL AGENT (AND (AND PERF (NOT PERF" ))(NOT PASS
      ))PERF" )(VERB READ-P NIL AGENT ((NOT (AND 3PS SING ))PAST ))(
      NONFIN.VERB READ-P NIL WHAT (AND PASS (NOT PASS" ))PASS" )(
      NONFIN.VERB READ-P NIL AGENT (XOR (AND MODAL (NOT MODAL" ))(AND FUT (
     NOT FUT" )))(AND FUT" MODAL" )))                                           *

READING                             E
      ((PRED.ADJ READ-P NIL AGENT )(ATT.ADJ READ-P NIL AGENT )(NONFIN.VERB
     READ-P NIL AGENT (AND CONTIN (NOT CONTIN" ))CONTIN" )) )                   *

YEARS                               E
     ((NOM.OBJ SPEC*TIME YEAR WHEN (AND PLURAL 3PS )))                          *
```

linguistic information

```
GRAMMAR                                E
      ((VERB ADJUNCT PRED OBJ AFTER AFTER TRUE NIL QUAL )(NONFIN.VERB
      ADJUNCT PRED AUX AFTER AFTER TRUE TRUE QUAL )(AFF.AUX FUNCTW PRED OBJ
      AFTER NIL TRUE NIL NIL )(NONFIN.AUX FUNCTW NIL AUX AFTER NIL TRUE
      TRUE NIL )(NOM.OBJ OBJECT OBJECT NIL NIL AFTER NIL NIL NIL )(ATT.ADJ
      ADJUNCT ADJUNCT NIL NIL NIL NIL NIL UNDET )(ADV.ADJ ADJUNCT NIL
      ADJUNCT BEFORE NIL NIL NIL MOD )(PRED.ADJ ADJUNCT NIL NOM.OBJ AFTER
      AFTER NIL NIL QUAL )(RELWORD ADJUNCT OBJECT (OR VERBAL NOM.OBJ )NIL
      AFTER NIL NIL QUAL )(DETERM FUNCTW NIL NIL NIL NIL TRUE TRUE NIL )(
      CASESI FUNCTW NIL PRON.OBJ BEFORE NIL NIL TRUE NIL )(TITLE FUNCTW NIL
      NIL NIL NIL TRUE NIL NIL )(DEM FUNCTW NIL NIL NIL NIL TRUE TRUE NIL )
      (NUM1 FUNCTW FUNCTW NIL NIL NIL TRUE TRUE NIL )(NUM2 FUNCTW FUNCTW
      NIL NIL NIL TRUE TRUE NIL )(NUM3 FUNCTW FUNCTW NIL NIL NIL TRUE TRUE
      NIL )(QUEST.AUX FUNCTW PRED OBJ BEFORE NIL TRUE NIL NIL )(ADV.VERB
      ADJUNCT PRED OBJ AFTER AFTER TRUE NIL QUAL )(ADV.PART FUNCTW FUNCTW
      NIL NIL NIL TRUE NIL NIL )(COPULA ADJUNCT PRED OBJECT AFTER NIL TRUE
     NIL NIL )(PRON.OBJ OBJECT OBJECT NIL NIL NIL NIL NIL NIL ))                *

TRANSF                                 E
      ((SELF ACT )(AGENT PERSON (ADJUNCT (T1 )NIL ((T1 FIN (AND (NOT PREP )
     (NOT SUBJ ))WHAT ))))(WHAT THING ))                                       *

GRAMMAR                                N
      ((DETERM FUNCTW NIL NIL NIL NIL TRUE NIL NIL )(NOM.OBJ OBJECT OBJECT
      NIL NIL AFTER NIL NIL NIL )(ATT.ADJ ADJUNCT ADJUNCT NIL NIL BEFORE
      TRUE NIL UNDET )(VERB ADJUNCT PRED NOM.OBJ AFTER AFTER TRUE NIL QUAL
      )(OP.ADV ADJUNCT ADJUNCT ADV.ADJ BEFORE NIL NIL NIL MOD )(ADV.ADJ
      ADJUNCT ADJUNCT VERB AFTER NIL NIL NIL MOD )(CASESI FUNCTW NIL NIL
     NIL NIL NIL TRUE NIL ))                                                   *

QUALITY                                E
     ((SELF QUALITY )(OF*WHAT (NOT RESTRICT )))                                *

FRAU"LEIN                              G
      ((NOM.OBJ ENTITY NIL PERSON (AND 3PS (AND NEUT (AND (XOR DEF UNDEF )(
      XOR (AND (XOR SING PLUR )(XOR NOM (XOR DAT ACC )))(AND PLURAL GEN )))
     ))))                                                                      *

GRAMMAR                                G
      ((DETERM FUNCTW NIL NIL NIL NIL TRUE NIL NIL )(ATT.ADJ ADJUNCT
      ADJUNCT NIL NIL BEFORE TRUE NIL UNDET )(VERB ADJUNCT PRED NOM.OBJ
      AFTER AFTER TRUE NIL QUAL )(NOM.OBJ OBJECT OBJECT NIL NIL AFTER NIL
      NIL NIL )(RELWORD ADJUNCT OBJECT NIL NIL AFTER TRUE NIL NIL )(CASESI
     FUNCTW NIL NIL NIL NIL NIL TRUE NIL ))                                    *

P-BEHAVE                               N
      ((SELF ACT )(AGENT ANIMATE (ADJUNCT (B1 )NIL ((B1 FIN (AND (AND TIM
     DEF )(AND CONC (NOT GEN )))WHEN ))))(WHEN TIME ))                         *

NEBEN                                  G
     ((CASESI NIL NIL NIL NIL DIR*PREP ))                                      *

NICE                                   E
     ((ATT.ADJ H-QUALIT NICE AGENT ))                                          *

MUCH                                   E
     ((NUM2 AMOUNT NIL OF*WHAT UNCOUNT MUCH ))                                 *

P-DWELL                                N
      ((SELF STATE )(AGENT ANIMATE (ADJUNCT (W1 )NIL ((W1 FIN LOC PLACE )))
     )(PLACE THING ))                                                          *

HAD                                    E
      ((VERB POSS NIL AGENT ((AND 3PS (AND SING (NOT OBJ )))PAST ))(AFF.AUX
      NIL NIL NIL ((AND 3PS (AND SING (NOT OBJ )))(AND PAST PERF )))(
     NONFIN.VERB POSS NIL AGENT PERF ))                                        *
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P-EAT                                   E
     ((SELF ACT )(AGENT ANIMATE )(WHAT THING ))                                    *

BEEN                                    E
      ((NONFIN.VERB BE NIL WHAT (AND PERF (NOT PERF" ))PERF" )(NONFIN.AUX
     NIL NIL NIL (AND PERF (NOT PERF" ))(AND PERF" (XOR PASS CONTIN ))))           *

NEED                                    E
     ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PRESENT MODAL ))))                      *

NEEDED                                  E
     ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PAST MODAL ))))                         *

THE                                     E
     ((DETERM NIL NIL NIL (NOT RESTRIC )DEF ))                                     *

SHE                                     E
     ((PRON.OBJ NAM NIL PERSON (AND SING (AND SUBJ 3PS ))))                        *

SHEEP                                   E
     ((NOM.OBJ ENTITY SHEEP ANIM (AND COUNT (XOR (AND 3PS SING )PLURAL ))))        *

WEEK                                    N
      ((NOM.OBJ TIME*SEQ NIL PART (AND (XOR DEF UNDEF )(AND (AND 3PS SING )
     (AND (AND TIM MALE )(XOR CONC GEN ))))))                                      *

CLEVER                                  E
     ((ATT.ADJ A-PROP CLEVER OF*WHAT ))                                            *

DOES                                    E
      ((VERB DO NIL AGENT ((AND (NOT (AND 3PS SING ))(NOT OBJ ))PRES ))(
      QUEST.AUX NIL NIL NIL ((AND (AND (NOT OBJ )3PS )SING )(AND PRES QUEST
      )))(AFF.AUX NIL NIL NIL ((AND (AND (NOT OBJ )3PS )SING )(AND PRES
     MODAL ))))                                                                    *

SPEC*PLACE                              E
      ((SELF ACT )(LOCATE (XOR ACT THING )(ADJUNCT (S/1 )NIL ((S/1 FIN (NOT
     SUBJ )WHERE ))))(WHERE PLACE ))                                               *

SPEC*TIME                               E
     ((SELF ACT )(LOCATE THING )(WHEN TIME ))                                      *

PRESENT                                 E
     ((NOM.OBJ GIV NIL WHAT (AND 3PS SING )))                                      *

DOET                                    N
     ((VERB P-BEHAVE NIL AGENT (AND (AND (XOR 2PS 3PS )SING )(NOT OBJ ))))        *

VREEMD                                  N
     ((ADV.ADJ PROP STRANGE WHAT ))                                                *

SPEC*PLACE                              N
      ((SELF STATE )(LOCATE THING (ADJUNCT (P1 )NIL ((P1 FIN (NOT OBJ )
     WHERE ))))                                                                    *

EVERY                                   E
     ((NUM2 DISTRI NIL OF*WHAT (AND (NOT UNCOUNT )(NOT PLURAL ))EVERY ))           *
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FREMDES                                 G
     ((ATT.ADJ P-PROP NIL WHAT (AND DEF (AND SING (XOR (AND NEUT (NOT DAT
    ))(AND GEN MALE ))))))                                                  *

SPEC*PLACE                              G
     ((SELF STATE )(LOC*DYN THING (ADJUNCT (P1 )NIL ((P1 FIN ACC WHERE )))
    )(WHERE PLACE ))                                                        *

P-FIGHT                                 E
     ((SELF ACT )(AGENT PERSON ))                                           *

P-FRIGHT                                E
     ((SELF ACT )(AGENT PERSON (ADJUNCT (S/1 FIN )NIL ((S/1 (S/2 FIN )(AND
    (NOT SUBJ )(NOT PREP ))WHO ))))(PATIENT PERSON ))                       *

P-FAM                                   N
     ((SELF STATE )(WHO PERSON (OBJECT (F1 )NIL ((F1 FIN (AND VAN (NOT
    SUBJ ))REL*OF ))))                                                      *

BEFORE                                  E
     ((NOM.OBJ (N1 FIN )(N5 (N4 (N3 (N2 N1 ))(N6 (N2 N1 ))))((N1 (N2 FIN )
     ATT.ADJ )(N2 (N3 FIN )NUM1 )(N3 (N4 FIN )DETERM )(N4 (N5 FIN )CASESI
    )(N6 (N4 FIN )NUM3 )(N2 (N6 FIN )DETERM )(N2 (N4 FIN )NUM2 ))))         *

BEFORE                                  N
     ((NOM.OBJ (N1 )(N3 (N2 N1 ))((N1 N2 ATT.ADJ )(N2 N3 DETERM )(N3 N4
    CASESI ))))                                                             *

BEFORE                                  G
     ((NOM.OBJ (N1 )(N3 (N2 N1 ))((N1 N2 ATT.ADJ )(N2 N3 DETERM )(N3 N4
    CASESI ))))                                                             *

MIGHT                                   E
     ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PAST MODAL ))))                  *

NOGAL                                   N
     ((OP.ADV PROP RATHER WHAT ))                                           *

URGENT                                  E
     ((ATT.ADJ PROP URGENT OF*WHAT ))                                       *

JOHN                                    E
     ((NOM.OBJ NAM JOHN PERSON (AND MALE (AND 3PS SING ))))                 *

BEING                                   E
     ((NONFIN.VERB BE NIL WHAT (AND CONTIN (NOT CONTIN" ))CONTIN" )(
     NONFIN.AUX NIL NIL NIL (AND CONTIN (NOT CONTIN" ))(AND CONTIN" PASS )
    ))                                                                      *

DOING                                   E
     ((NONFIN.VERB DO NIL AGENT CONTIN )(VERB.OBJ DO NIL SELF (AND (XOR (
    AND (NOT OBJ )3PS )OBJ )SING )))                                        *

WRITTEN                                 E
     ((PRED.ADJ WRIT NIL RESULT (NIL PAST ))(NONFIN.VERB WRIT NIL AGENT (
     AND PERF (NOT A-PERF )))(NONFIN.VERB WRIT NIL RESULT PASS )(ATT.ADJ
    WRIT NIL RESULT ))                                                      *

WRIT                                    E
     ((SELF ACT )(AGENT PERSON (ADJUNCT (W/1 FIN )NIL ((W/1 (W/2 FIN )(AND
     OBJ (NOT PREP ))RESULT )))(OBJECT (W/1 FIN )NIL ((W/1 (W/2 FIN )(AND
     OBJ OF )RESULT ))))(RESULT THING (ADJUNCT (W/1 FIN )NIL ((W/1 (W/2
    FIN )(AND BY OBJ )AGENT )))))                                           *

WRITES                                  E
     ((VERB WRIT NIL AGENT ((AND (NOT OBJ )(AND 3PS SING ))PRES )))         *

WRITE                                   E
     ((NONFIN.VERB WRIT NIL AGENT (XOR FUT MODAL ))(VERB WRIT NIL AGENT (
    AND (NOT OBJ )(NOT (AND 3PS SING )))))                                  *

FRIGHTEN                                E
    ((NONFIN.VERB P-FRIGHT NIL AGENT (XOR FUT MODAL )MODAL" ))              *
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P-LIVE                                  E                                   *
     ((SELF ACT )(AGENT PERSON ))

WILL                                    E
      ((VERB WILL-P NIL AGENT ((NOT OBJ )PRES ))(AFF.AUX NIL NIL NIL ((NOT
     OBJ )(AND PRES FUT ))))                                                *

WILLING                                 E
     ((VERB WILL NIL AGENT CONTIN ))                                        *

ALL                                     E
     ((NUM3 AMOUNT NIL OF*WHAT (XOR PLURAL UNCOUNT )ALL ))                  *

WILL-P                                  E
     ((SELF ACT )(AGENT PERSON )(WHAT (NOT PROPERTY )))                     *

SOLDIER                                 E
     ((NOM.OBJ P-FIGHT WAR AGENT (AND 3PS SING )))                          *

NAM                                     E
     ((SELF PROPERTY )(PERSON PERSON )(PLACE PLACE ))                       *

SEMTREE                                 E
     (CONCRETE NONANIMATE (ANIMATE (HUMAN PERSON )NONHUMAN ))               *

SEMTREE                                 G
     (ENTITY (PERSON PLACE )THING )                                         *

SEMTREE                                 N
     (ENTITY TIME (ANIMATE PERSON ANIMAL )(THING PLACE ))                   *

TIME*SEQ                                N
     ((SELF ABSTRACTION )(PART TIME ))                                      *

SOME                                    E
      ((NUM2 NIL NIL NIL PLURAL CERTAIN*NUM )(NUM2 NIL NIL NIL UNCOUNT
      AMOUNT*OF )(NUM2 NIL NIL NIL (AND (NOT UNCOUNT )(NOT PLURAL ))
     A*CERTAIN ))                                                           *

MR.                                     E
     ((TITLE NIL NIL NIL MALE ))                                            *

SAND                                    E
     ((NOM.OBJ ENTITY NIL WHAT (AND (AND 3PS SING )UNCOUNT )))              *

MANY                                    E
     ((NUM2 AMOUNT MANY OF*WHAT (AND PLURAL (NOT UNCOUNT ))))               *

CAN                                     E
     ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PRES MODAL ))))                  *

SENT                                    E
      ((NONFIN.VERB SEN NIL WHAT PASS PASS" )(NONFIN.VERB SEN NIL AGENT
     PERF PERF" ))                                                          *

SEN                                     E
      ((SELF ACT )(AGENT PERSON )(ADDRESS (OR PERSON PLACE ))(WHEN TIME )(
      WHAT THING (ADJUNCT (S/1 FIN )(S/4 S/3 S/2 S/1 )((S/1 (S/2 FIN )(AND
      BY OBJ )AGENT )(S/2 (S/3 FIN )(AND TO (OR OBJ LOC ))ADDRESS )(S/3 FIN
     TIM TIME ))))))                                                        *
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```
SINCERITY                              E
     ((NOM.OBJ QUALITY SINCERE OF*WHAT (AND 3PS SING )))                    *

KIND                                   N
      ((NOM.OBJ P-FAM NIL WHO (AND (AND SING 3PS )(AND NEUT (XOR DEF UNDEF
     )))))                                                                  *

VAN                                    N
     ((CASES1 NIL NIL NIL NIL VAN ))                                        *

JAN                                    N
     ((NOM.OBJ P-FAM NIL WHO (AND (AND SING 3PS )(XOR DEF UNDEF ))))        *

PENSIONIERTE                           G
      ((ATT.ADJ P-PROP NIL WHAT (XOR (AND PLURAL (AND (XOR NOM ACC )(NOT
      DEF )))(AND SING (XOR (AND FEM (XOR ACC NOM ))(AND DEF (XOR (AND NEUT
     ACC )(AND (AND DEF NOM )(XOR MALE NEUT ))))))))))                      *

EINE                                   G
     ((DETERM NIL NIL NIL (AND (XOR ACC NOM )(AND SING FEM ))))             *

JONES                                  E
      ((NOM.OBJ NAM JONES PERSON (AND (XOR MALE FEMALE )(AND SING (XOR (AND
     SUBJ 3PS )OBJ ))))))                                                   *

DONE                                   E
     ((NONFIN.VERB DO NIL AGENT PERF )(NONFIN.VERB DO NIL WHAT PASS ))       *

WOHNEND                                N
     ((ATT.ADJ P-DWELL NIL AGENT (AND SING NEUT )))                         *

KANONE                                 G
      ((NOM.OBJ ENTITY NIL THING (AND (AND 3PS SING )(AND FEM (AND (XOR DEF
     UNDEF )(XOR (XOR NOM GEN )(XOR DAT ACC ))))))))                        *

FUNCTREE                               E
      (PATHS (DET DETERM DEM )(ADJUNCT (VERBAL ADV.VERB NONFIN.VERB VERB )
      ATT.ADJ RELWORD PRED.ADJ ADV.ADJ )(OBJECT (OBJ NOM.OBJ PRON.OBJ )
      RELWORD )(NUM NUM1 NUM2 NUM3 )(VERBAL NONFIN.AUX (AUX AFF.AUX
     QUEST.AUX )(NONAUX NONFIN.VERB VERB )))                                *

FUNCTREE                               G
     (ADJUNCT VERB )                                                        *

EIN                                    G
      ((DETERM NIL NIL NIL (AND SING (XOR (AND MALE NOM )(AND NEUT (XOR NOM
     ACC ))))))                                                             *

GENERAL                                G
      ((NOM.OBJ ENTITY NIL PERSON (AND (AND 3PS SING )(AND MALE (AND (XOR
     DEF UNDEF )(XOR NOM (XOR DAT ACC ))))))                                *

FUNCTREE                               N
     (FUNCTION (OBJECT NOM.OBJ )(ADJUNCT ATT.ADJ VERB ))                    *
```

```
P-ORDER                                    N
     ((SELF ABSTR )(OF*WHAT ENTITY ))                                          *

THOSE                                      E
     ((DEM NIL NIL NIL PLUR DEF ))                                             *

SHOULD                                     E
      ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PAST MODAL )))(QUEST.AUX NIL
     NIL NIL ((NOT OBJ )(AND (AND PAST MODAL )QUEST )))))                      *

AMOUNT                                     E
     ((SELF PROPERTY )(OF*WHAT (NOT RESTRICT )))                               *

KNOCKS                                     E
      ((VERB ACT KNOCK AGENT ((AND (NOT OBJ )(AND SING 3PS ))PRES ))(
      ADV.VERB TRANSF DESTROY AGENT ((AND (NOT OBJ )(AND SING 3PS ))(AND
     PRES DOWN ))))                                                            *

DOOR                                       E
     ((NOM.OBJ ENTITY DOOR WHAT (AND SING 3PS )))                              *

GOOD                                       E
     ((ATT.ADJ QUALITY GOOD OF*WHAT ))                                         *

PROP                                       E
     ((SELF PROPERTY )(OF*WHAT (OR PROPERTY THING )))                          *

PROP                                       N
     ((SELF PROP )(WHAT (OR PROP ACT )))                                       *

STONE                                      E
     ((NOM.OBJ ENTITY STONE WHAT (AND SING 3PS )))                             *

TWO                                        E
     ((NUM1 AMOUNT NIL OF*WHAT PLURAL TWO ))                                   *

A-PROP                                     E
     ((SELF PROPERTY )(OF*WHAT (NOT ACT )))                                    *

P-PROP                                     G
     ((SELF PROP )(WHAT ENTITY ))                                              *

P-PLACE                                    G
      ((SELF ACT )(AGENT PERSON (ADJUNCT (P1 )NIL ((P1 (P2 )ACC WHAT )(P2
     FIN (AND ACC DIR*PREP )ENDPOINT ))))                                      *

P-PROP                                     E
     ((SELF PROP )(WHAT ENTITY ))                                              *

P-PLACE                                    E
      ((SELF ACT )(AGENT PERSON (ADJUNCT (P1 )NIL ((P1 FIN ACC WHAT ))))(
     WHAT ENTITY ))                                                            *

PARIS                                      E
     ((NOM.OBJ NAM NIL PLACE (AND SING (XOR (AND SUBJ 3PS )OBJ ))))            *

VERY                                       E
     ((ADV.ADJ PROP VERY OF*WHAT ))                                            *

HER                                        E
     ((PRON.OBJ NAM NIL PERSON (AND SING (AND OBJ 3PS ))))                     *
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```
DER                                   G
     ((DETERM NIL NIL NIL (XOR (AND PLUR GEN )(AND SING (XOR (AND MALE NOM
    )(AND FEM (XOR GEN DAT ))))))) *

GIRLS                                 E
     ((NOM.OBJ ENTITY YOUNG*FEMALE WHO (AND PLURAL 3PS ))) *

GIRL                                  E
     ((NOM.OBJ ENTITY NIL WHO (AND SING 3PS ))) *

HAS                                   E
      ((VERB POSS NIL AGENT ((AND SING (NOT OBJ ))PRES ))(AFF.AUX NIL NIL
     NIL ((AND SING (NOT OBJ ))(AND PRES PERF ))))' *

WAS                                   E
      ((VERB BE NIL WHAT ((AND 3PS (AND SING (NOT OBJ )))PAST ))(AFF.AUX
      NIL NIL NIL ((AND 3PS (AND SING (NOT OBJ )))(AND PAST (XOR CONTIN
     PASS ))))) *


YESTERDAY                             E
     ((NOM OBJ SPEC*TIME YESTERDAY WHEN (AND SING (XOR (AND SUBJ 3PS )OBJ
     ))))                                                              *

DISTRI                                E
     ((SELF SPECIFIER )(OF*WHAT (NOT RESTRICT ))) *

AMSTERDAM                             N
     ((NOM.OBJ SPEC*PLACE ADAM WHERE (AND (AND 3PS SING )NEUT ))) *

POSS                                  E
     ((SELF STATE )(AGENT PERSON )(WHAT (NOT RESTRICT ))) *

MUST                                  E
     ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PRES MODAL )))) *

EATS                                  E
     ((VERB P*EAT NIL AGENT ((AND (NOT OBJ )(AND SING 3PS ))PRES ))) *

ACT                                   E
     ((SELF ACT )(AGENT PERSON )) *

LETTER                                E
     ((NOM.OBJ WRIT NIL RESULT (AND SING (XOR (AND SUBJ 3PS )OBJ )))) *

AFTER                                 E
     ((ADV.VERB (V1 )NIL ((V1 V2 OBJECT )(V2 FIN ADV.PART )))) *

HET                                   N
     ((DETERM NIL NIL NIL (AND NEUT (AND SING DEF )))) *

SETZTE                                G
     ((VERB P*PLACE NIL AGENT SING (AND DYN PAST ))) *
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```
AFTER                                   G
     NIL                                                                    *

AFTER                                   N
     (NIL )                                                                 *

ALTE                                    G
      ((ATT.ADJ P-PROP NIL WHAT (XOR (AND PLURAL (AND (XOR NOM ACC )(NOT
      DEF )))(AND SING (XOR (AND FEM (XOR ACC NOM ))(AND DEF (XOR (AND NEUT
     ACC )(AND (AND DEF NOM )(XOR MALE NEUT )))))))))                       *

ENTITY                                  E
     ((SELF ENTITY )(WHO PERSON )(WHAT THING )(ANIM ANIMATE ))              *

ENTITY                                  G
     ((SELF ENT )(PERSON PERSON )(THING THING ))                            *

ARTICLES                                E
     ((NOM.OBJ WRIT NIL RESULT (AND PLUR (XOR (AND 3PS SUBJ )OBJ ))))      *

AUTHOR                                  E
     ((NOM.OBJ WRIT NIL AGENT (AND SING (XOR (AND SUBJ 3PS )OBJ ))))       *

WOULD                                   E
      ((VERB WILL NIL AGENT ((NOT OBJ )PRES ))(AFF.AUX NIL NIL NIL ((NOT
     OBJ )(AND PAST FUT ))))                                                *

COULD                                   E
     ((AFF.AUX NIL NIL NIL ((NOT OBJ )(AND PAST MODAL ))))                  *

EQUAL                                   E
     ((SELF PROPERTY )(WHAT (NOT RESTIRC ))(AND*WHAT (NOT RESTRIC )))       *

HAVE                                    E
      ((NONFIN.VERB POSS NIL AGENT (XOR (AND FUT (NOT FUT" ))(AND MODAL (
      NOT MODAL" ))(AND FUT"MODAL" ))(NONFIN.AUX NIL NIL NIL (XOR (AND FUT
      (NOT FUT" ))(AND MODAL (NOT MODAL" )))(AND PERF (AND FUT" MODAL" )))(
      VERB POSS NIL AGENT ((AND (NOT (AND 3PS SING ))(NOT SUBJ ))PRES ))(
     AFF.AUX NIL NIL NIL ((AND (NOT (AND 3PS SING ))(NOT SUBJ ))PERF )))    *

HAVING                                  E
      ((NONFIN.VERB POSS NIL AGENT CONTIN )(VERB.OBJ POSS NIL SELF (AND (
      XOR (AND (NOT OBJ )3PS )OBJ )SING ))(NONFIN.AUX NIL NIL NIL CONTIN
     PERF ))                                                                *

GIVES                                   E
     ((VERB GIV NIL AGENT (AND (NOT OBJ )(AND 3PS SING ))))                 *

GIVE                                    E
      ((NONFIN.VERB GIV NIL AGENT (XOR FUT MODAL ))(VERB GIV NIL AGENT (AND
     (NOT (AND 3PS SING ))(NOT OBJ ))))                                     *

GIV                                     E
      ((SELF ACT )(AGENT PERSON (ADJUNCT (G1 )NIL ((G1 (G2 FIN )(AND (NOT
      SUBJ )(NOT PREP ))WHAT )(G1 (G3 )(AND (NOT PREP )(NOT SUBJ ))
      ADDRESSEE )(G2 FIN (AND TO (NOT SUBJ ))ADDRESSEE )(G3 FIN (AND (NOT
      PREP )(NOT SUBJ ))WHAT ))))(WHAT THING (ADJUNCT (G1 FIN )NIL ((G1 (G2
      FIN )(AND TO (NOT SUBJ ))ADDRESSEE )(G1 (FIN G3 )(AND BY (NOT SUBJ ))
      AGENT )(G3 FIN (AND TO (NOT SUBJ ))ADDRESSEE )(G2 FIN (AND BY (NOT
      SUBJ ))AGENT ))))(ADDRESSEE PERSON (ADJUNCT (G1 )NIL ((G1 (FIN G2 )(
      AND (NOT PREP )(NOT SUBJ ))WHAT )(G2 FIN (AND BY (NOT SUBJ ))AGENT ))
     )))                                                                    *

GIVER                                   E
     ((NOM.OBJ GIV NIL AGENT (AND 3PS SING )))                              *

GIVEN                                   E
      ((PRED.ADJ GIV NIL WHAT )(NONFIN.VERB GIV NIL WHAT (AND (NOT PASS" )
      PASS )PASS" )(NONFIN.VERB GIV NIL ADDRESSEE (AND PASS (NOT PASS" ))
     PASS" )(NONFIN.VERB GIV NIL AGENT (AND (NOT PERF" )PERF )PERF" ))))    *

LIVING                                  E
     ((NONFIN.VERB P-LIVE NIL AGENT (AND CONTIN (NOT CONTIN" ))CONTIN" ))   *
```

linguistic information

```
DOWN                                    E
     ((ADV.PART NIL NIL NIL DOWN ))                                          *

SIX                                     E
     ((NUM1 AMOUNT NIL OF*WHAT PLURAL SIX ))                                 *

MAY                                     E
      ((AFF.AUX MAY NIL NIL ((AND 3PS (AND (NOT OBJ )SING ))(AND MODAL
     POSSIB ))))AY NIL NIL ((AND 3PS (AND (NOT OBJ )SING ))                  *

BOY                                     E
     ((NOM.OBJ ENTITY YOUNG*MALE PERSON (AND 3PS SING )))                    *
```

4.2. The experiments

introduction

In this introduction we discuss the conventions followed for the output during the language process.

(a) Output from the main program

The system starts as follows:

```
WELCOME TO THE PARSING SYSTEM

SPECIFY THE LANGUAGE
INPUT LANGUAGE :E
GIVE INPUT SENTENCE
```

After that a number of sentences can be given.

The main program computes for each word the initial particles, then it sends these particles to the parser control routine. The output given to comment on these actions is:

```
WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.IT. MERGING
```

(here starts the computation)

When all particles have been processed, the system prints 'FUNCTIONAL AND CASE STRUCTURES' and gives the structures if any. Else there is an output message 'NO STRUCTURE FOR GIVEN INPUT'.

The system makes also the necessary preparations to compute the semantic structures and stores them on an external storage device (this was necessary due to lack of memory),so that a separate program is able to compute the semantic structures.

The main program gives then an indications on the number of cells left in the memory (the memory limitations are the main problem of the current implementation) and is then ready to consume the next input sentence.

```
MEMORY CELLS LEFT:1288
GIVE INPUT SENTENCE
```

(b) Output from the general control of the parser (CONTR)

For each new particle that is taken from the pushdown store the system prints:
(X) (where X is the alphabetic order)
**** TRY TO EXPAND CONFIGURATION
----------(then the configuration is given)-------

For each particle bordering on this one the system prints:
* BY COMBINING IT WITH CONFIGURATION OF WORD NR. x (where x is the number of the word)
Then we number for each hypothesis, for each configuration (then the configuration is given) . The linguistic processor starts investigating the particles first from left to right and then from right to left. From right to left words are numbered according to the moment they occur in the structure.

Example:

```
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP4 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G3 )NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HER (INP3 PRON,OBJ NIL
NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

(c) Output from the linguistic processor (LR)

The linguistic processor gives in principle a message when a parsing predicate has been successful and one if it has failed. Sometimes more information is provided about the actual computation process of a linguistic predicate.

The following messages are issued:

SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
if the function-of-head/position or the taking-objects/object-position rule has been successful.

SUCCESSFUL TRANSITION FROM xxx
TO THE NEW STATE(S) xxx
If it was possible to perform a transition in a syntactic network.

MATCH THE FOLLOWING FEATURE COMPLEXES:
xxx (features of the subordinate)
xxx (features of the head)
RESULTING DOMAIN:
xxx (domain successful for match)

INVESTIGATE THE FOLLOWING SEM. FEATURES:
xxx (features of the subordinate)
xxx (features of the head)
SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN
xxx (domain if match was successful)

CONSULT CASE FRAMES WITH SYNT.FEATURES
xxx (features of the subordinate)
SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
RESULTING TRIPLES (FEATURES - STATE - CASE)
xxx (output from the NETW subroutine if successful transition)

MATCH THE FOLLOWING FEATURES
xxx (features of the subordinate)
WITH FEATURES OF RESP. CASES
xxx (case)
xxx (features of case)
SEM FEATURES MATCH SUCCESSFUL (if successful match)
and this for as many cases as came out of the NETW subroutine.

When all tests have been successful:
ALL TESTS SUCCESSFUL NEW CONFIGURATION
----------(the resulting configuration(s) after the merging process)

The following messages are issued when a parsing predicate returns false.

+ WRONG HEAD OR NO TRANSITION IN SYNT NET
order and / or relations environment tests false

+ SYNTACTIC FEATURES MATCH UNSUCCESSFUL
after syntactic features match of adjuncts/functionword

+ SEMANTIC FEATURES MATCH UNSUCCESSFUL
after semantic feature match of adjuncts or objects

+ MISSING CASE OR FUNCTION IN SEMANTIC NETWORK
semantic network does not contain the information necessary to compute the surface network

+ NO TRANSITION IN SEM. NETW.
if it is not possible to perform a transition in the semantic network

We now start with the experiments themselves.

EXPERIMENT 1. function-of-head/order

Problem:

The function of the head of a given relation is determined by the grammatical relation of the subordinate. Also the mutual order of head and subordinate is determined by the grammatical relation between subordinate and head.

Solution:

The introduction of rules which specify both types of information.

Experimental setting:

We will give the following input :

1. very urgent (normal application of function-of-head/order)
2. John writes (idem)
3. urgent very (is rejected due to wrong order)
4. beautiful urgent (is rejected due to wrong function-of-head)

Results:

1. IN:
(VERY URGENT)

```
WORD NR :  1   VERY
.I. INITIAL PARTICLES :
(NIL VERY (INP1 ADV,ADJ NIL NIL NIL MOD ))

WORD NR :  2   URGENT
.I. INITIAL PARTICLES :
(NIL URGENT (INP2 ATT,ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL URGENT (INP2 ATT,ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL VERY (INP1 ADV,ADJ NIL NIL NIL MOD ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (OR PROPERTY THING )
       ((PROPERTY ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PROPERTY ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL URGENT (INP2 ATT,ADJ NIL NIL NIL UNDET )(VERY (INP1
ADV,ADJ NIL NIL NIL MOD )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : VERY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(ATT,ADJ (URGENT (ADV,ADJ VERY )))
(CASESTRUCTURE (VERY (OF*WHAT URGENT )))
```

2. IN:
(JOHN WRITES)

```
WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   WRITES
.I. INITIAL PARTICLES :
(NIL WRITES (INP2 VERB NIL NIL ((PRES ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITES (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : JOHN
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      (AND (NOT OBJ )(AND 3PS SING ))
      ((MALE 3PS SING ))
      RESULTING DOMAIN:
      ((MALE 3PS SING ))
      INVESTIGATE THE FOLLOWING SEM.FEATURES:
      PERSON
      ((PERSON ))
      SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
      ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (PRED WRITES (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (WRITES (NOM.OBJ JOHN )))
(CASESTRUCTURE (WRITES (AGENT JOHN )))
```

3. IN:
(URGENT VERY)

```
WORD NR :  1   URGENT
.I. INITIAL PARTICLES :
(NIL URGENT (INP1 ATT.ADJ NIL NIL NIL UNDET ))

WORD NR :  2   VERY
.I. INITIAL PARTICLES :
(NIL VERY (INP2 ADV.ADJ NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL VERY (INP2 ADV.ADJ NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL URGENT (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : URGENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

4. IN:
(BEAUTIFUL URGENT)

```
WORD NR :  1   BEAUTIFUL
•I• INITIAL PARTICLES :
(NIL BEAUTIFUL (INP1 ATT.ADJ NIL NIL NIL UNDET ))

WORD NR :  2   URGENT
•I• INITIAL PARTICLES :
(NIL URGENT (INP2 ATT.ADJ NIL NIL NIL UNDET ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL URGENT (INP2 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BEAUTIFUL (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : BEAUTIFUL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 2. taking-objects/position

Problem:

Whether a word can be the head of an object depends on the function this word is having itself. Moreover the position where the objects will come depends on the function of the head.

Solution:

Two rules in the grammar which specify both types of knowledge were introduced.

Experimental setting:

We will give the following input to the parsing system:

1. John writes a letter (normal application of taking-objects/ object-position)
2. A letter written by John (idem)
3. A letter by John written (wrong order of object)
4. A by John written letter (taking-objects is false).

Experimental results:

```
IN:
(JOHN WRITES A LETTER )

WORD NR :  1   JOHN
•I• INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   WRITES
•I• INITIAL PARTICLES :
(NIL WRITES (INP2 VERB NIL NIL ((PRES ))QUAL ))
•1]• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITES (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS.
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (NOT OBJ )(AND 3PS SING ))
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((PERSON ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED WRITES (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   A
.I. INITIAL PARTICLES :
(NIL A (INP3 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP3 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED WRITES (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : WRITES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   LETTER
.I. INITIAL PARTICLES :
((N1 )LETTER (INP4 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )LETTER (INP4 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL A (INP3 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 N6 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        SING
        ((SING OBJ )(SING SUBJ 3PS ))
        RESULTING DOMAIN:
        ((SING OBJ )(SING SUBJ 3PS ))
        NEW FEATURE COMPLEX:
        ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 N6 )LETTER (INP4 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : A
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 N6 )LETTER (INP4 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED WRITES (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : WRITES
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS !
      CONSULT CASE FRAMES WITH SYNT FEATURES :
      ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
      SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
      RESULTING TRIPLES (FEATURES * STATE * CASE)
      ((((UNDEF SING OBJ ))(W/2 FIN )RESULT ))
      MATCH THE FOLLOWING SEMANTIC FEATURES
      ((THING ))
      WITH FEATURES OF RESP. CASES
      RESULT
      THING
      SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL WRITES (INP2 VERB NIL (W/2 FIN )((PRES ))QUAL )(JOHN (
INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(LETTER (
INP4 NOM.OBJ NIL NIL ((UNDEF SING OBJ ))((THING ))RESULT )(A (INP3
DETERM NIL NIL NIL NIL )NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (WRITES (NOM.OBJ JOHN )(NOM.OBJ (LETTER (DETERM A )))))
(CASESTRUCTURE (WRITES (AGENT JOHN )(RESULT LETTER )))

IN:
(A LETTER WRITTEN BY JOHN )

WORD NR :  1   A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))

WORD NR :  2   LETTER
.I. INITIAL PARTICLES :
((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : A
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  3   WRITTEN
.I. INITIAL PARTICLES :
(NIL WRITTEN (INP3 PRED.ADJ NIL NIL ((PAST ))QUAL ))
(NIL WRITTEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL WRITTEN (INP6 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WRITTEN (INP4 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : LETTER
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : LETTER
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WRITTEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : LETTER
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WRITTEN (INP3 PRED.ADJ NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : LETTER
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        THING
        ((THING ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )
(WRITTEN (INP3 PRED.ADJ NIL NIL ((PAST ))QUAL )))
```

```
WORD NR :  4   BY
.I. INITIAL PARTICLES :
(NIL BY (INP7 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BY (INP7 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF SING
SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )(
WRITTEN (INP3 PRED.ADJ NIL NIL ((PAST ))QUAL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : WRITTEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : LETTER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (NIL WRITTEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : WRITTEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : WRITTEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 4. FOR HYPOTHESIS : INP6
   4. 1. CONFIGURATION :
   (NIL WRITTEN (INP6 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : WRITTEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   JOHN
.I. INITIAL PARTICLES :
((N1 )JOHN (INP8 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )JOHN (INP8 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR,  4
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL BY (INP7 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N5 )
       NEW FEATURE COMPLEX:
       ((BY SING OBJ )(BY SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 )JOHN (INP8 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ
3PS ))((PERSON ))NIL )(BY (INP7 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N5 )JOHN (INP6 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP7 CASES] NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF SING
SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )(
WRITTEN (INP3 PRED.ADJ NIL NIL ((PAST ))QUAL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : WRITTEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((BY SING OBJ )(BY SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((BY SING OBJ ))(W/2 FIN )AGENT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       AGENT
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )
(WRITTEN (INP3 PRED.ADJ NIL (W/2 FIN )((PAST ))QUAL )(JOHN (INP6
NUM.OBJ NIL NIL ((BY SING OBJ ))((PERSON ))AGENT )(BY (INP7 CASES]
NIL NIL NIL NIL )NIL ))))
       1. 1. 2. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (NIL WRITTEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : WRITTEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((BY SING OBJ )(BY SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((BY SING OBJ ))(W/2 FIN )RESULT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       RESULT
       THING
       NO SEM FEATURES MATCH
       + SEMANTIC FEATURES MATCH UNSUCCESSFUL
```

```
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : WRITTEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((BY SING OBJ )(BY SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((BY SING OBJ ))(W/2 FIN )AGENT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       AGENT
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL WRITTEN (INP5 NONFIN.VERB NIL (W/2 FIN )NIL QUAL )(JOHN (
INP8 NOM.OBJ NIL NIL ((BY SING OBJ ))((PERSON ))AGENT )(BY (INP7
CASESI NIL NIL NIL NIL )NIL )))
 4. FOR HYPOTHESIS : INP6
   4. 1. CONFIGURATION :
   (NIL WRITTEN (INP6 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : WRITTEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP5 NONFIN.VERB NIL (W/2 FIN )NIL QUAL )(JOHN (
INP8 NOM.OBJ NIL NIL ((BY SING OBJ ))((PERSON ))AGENT )(BY (INP7
CASESI NIL NIL NIL NIL )NIL )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (LETTER (DETERM A )(PPED.ADJ (WRITTEN (NOM.OBJ (JOHN (CASESI
BY ))))))))
(CASESTRUCTURE (WRITTEN (RESULT LETTER )(AGENT JOHN )))
```

```
IN:
(A LETTER BY JOHN WRITTEN )

WORD NR :  1   A
•I• INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))

WORD NR :  2   LETTER
•I• INITIAL PARTICLES :
((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

WORD NR :  3   BY
•I• INITIAL PARTICLES :
(NIL BY (INP3 CASES NIL NIL NIL NIL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BY (INP3 CASES NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  4   JOHN
.I. INITIAL PARTICLES :
((N1 )JOHN (INP4 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )JOHN (INP4 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR,  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL BY (INP3 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N5 )
       NEW FEATURE COMPLEX:
       ((BY SING OBJ )(BY SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 )JOHN (INP4 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ
3PS ))((PERSON ))NIL )(BY (INP3 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N5 )JOHN (INP4 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP3 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK


WORD NR :  5   WRITTEN
.I. INITIAL PARTICLES :
(NIL WRITTEN (INP5 PRED.ADJ NIL NIL ((PAST ))QUAL ))
(NIL WRITTEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL WRITTEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL WRITTEN (INP8 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP8 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP4 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP3 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       - WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  4
 1. FOR HYPOTHESIS : INP4
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```
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP4 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP3 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP4 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP3 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP5 PREC.ADJ NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP4 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP3 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       THING
       ((PERSON ))
       ((PROPERTY ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT

IN:
(A BY JOHN WRITTEN LETTER )

WORD NR :  1   A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))

WORD NR :  2   BY
.I. INITIAL PARTICLES :
(NIL BY (INP2 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BY (INP2 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  3   JOHN
.I. INITIAL PARTICLES :
((N1 )JOHN (INP3 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )JOHN (INP3 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL BY (INP2 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N5 )
       NEW FEATURE COMPLEX:
       ((BY SING OBJ )(BY SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ
3PS ))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   WRITTEN
.I. INITIAL PARTICLES :
(NIL WRITTEN (INP4 PRED.ADJ NIL NIL ((PAST ))QUAL ))
(NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL WRITTEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL WRITTEN (INP7 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP7 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP4 PRED.ADJ NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       THING
       ((PERSON ))
       ((PROPERTY ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL


WORD NR :  5   LETTER
.I. INITIAL PARTICLES :
((N1 )LETTER (INP8 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )LETTER (INP4 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL WRITTEN (INP4 PRED.ADJ NIL NIL ((PAST ))QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : WRITTEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ )(SING SUBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL WRITTEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : WRITTEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ )(SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((SING OBJ ))(W/2 FIN )RESULT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
```

```
        ((THING ))
        WITH FEATURES OF RESP. CASES
        RESULT
        THING
        SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL WRITTEN (INP5 NONFIN.VERB NIL (W/2 FIN )NIL QUAL )(LETTER
(INP8 NOM.OBJ NIL NIL ((SING OBJ ))((THING ))RESULT )))
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (NIL WRITTEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : WRITTEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ )(SING SUBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK
 4. FOR HYPOTHESIS : INP7
   4. 1. CONFIGURATION :
   (NIL WRITTEN (INP7 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       THING
       ((THING ))
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N2 )LETTER (INP8 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS
))((THING ))NIL )(WRITTEN (INP7 ATT.ADJ NIL NIL NIL QUAL )NIL ))
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : WRITTEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N2 )LETTER (INP8 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL )(WRITTEN (INP7 ATT.ADJ NIL NIL NIL QUAL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITTEN (INP5 NONFIN.VERB NIL (W/2 FIN )NIL QUAL )(LETTER (
INP8 NOM.OBJ NIL NIL ((SING OBJ ))((THING ))RESULT )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N5 )JOHN (INP3 NOM.OBJ NIL NIL ((BY SING OBJ )(BY SING SUBJ 3PS
))((PERSON ))NIL )(BY (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

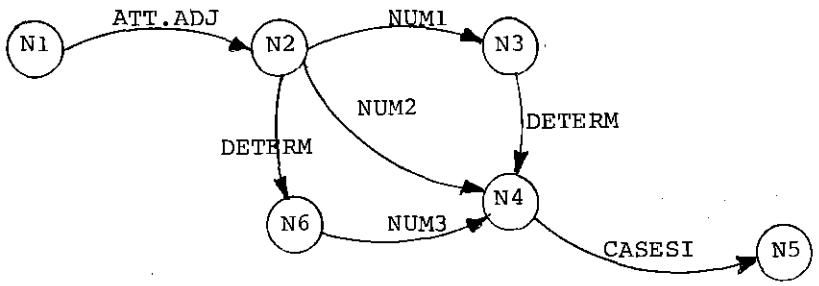
EXPERIMENT 3 SYNTACTIC NETWORKS

Problem 1: internal order of subordinates

Solution: introduction of syntactic networks

Example:

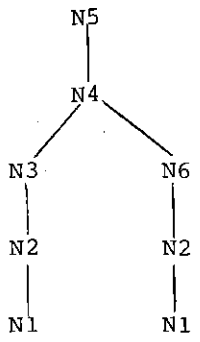
We will consider a leftgoing transition network for nominal objects (cf. label BEFORE of dictionary)
The network is



Notice that we especially concentrate on numerals which are here divided in three classes:

NUM1	(such as TWO,THREE, ...)
NUM2	(such as SOME)
NUM3	(such as ALL)

The inference tree of this network is



Experimental setting:

We will give the following input:

(i) By the two beautiful girls
(transitions covering the whole network:
N1 → N2 → N3 → N4 → N5)

(ii) By two girls
(inference from state N1 to N2 and from N3 to N4)

(iii) By the girls
(illustration of nondeterministic transition from N1 (via inferences) to N3 and N2 which yields after transition N4)

(iv) By some girls
(ambiguity of some - but the same function- which is an illustration of the paral l computation of the particles. Notice also inference via other part of the network.)

(v) By the all girls
(is rejected due to wrong internal order, all girls is discovered but there is no transition possible from N4 with condition determ)

(vi) The some girls
(is rejected not so much on wrong order but based on the fact that the wrong subordinates are there)

(vii) By all two girls
(rejected on similar grounds)

experimental results:

```
IN:
(BY THE TWO BEAUTIFUL GIRLS )


WORD NR :  1   BY
.I. INITIAL PARTICLES :
(NIL BY (INP1 CASES1 NIL NIL NIL NIL ))


WORD NR :  2   THE
.I. INITIAL PARTICLES :
(NIL THE (INP2 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASES1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   TWO
.I. INITIAL PARTICLES :
(NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   BEAUTIFUL
.I. INITIAL PARTICLES :
(NIL BEAUTIFUL (INP4 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEAUTIFUL (INP4 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TWO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  5   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRICT )
       ((PERSON ))
       ((ENTITY ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N2 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))
NIL )(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEAUTIFUL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N2 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL )
(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N2 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
       NEW FEATURE COMPLEX:
       ((TWO PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )GIRLS (INP5 NOM,OBJ NIL NIL ((TWO PLURAL 3PS ))((PERSON
))NIL )(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL )(TWO (INP3
NUM1 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TWO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
     ((N3 )GIRLS (INP5 NOM,OBJ NIL NIL ((TWO PLURAL 3PS ))((PERSON ))
NIL )(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL )(TWO (INP3 NUM1
NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
```

```
   => FROM LEFT TO RIGHT
      SUCCESSFUL TRANSITION FROM (N3 )
      TO THE NEW STATE(S) :  (N4 )
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      (NOT RESTRIC )
      ((TWO PLURAL 3PS ))
      RESULTING DOMAIN:
      ((TWO PLURAL 3PS ))
      NEW FEATURE COMPLEX:
      ((DEF TWO PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      ((N4 )GIRLS (INP5 NOM,OBJ NIL NIL ((DEF TWO PLURAL 3PS ))((
PERSON ))NIL )(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL )(TWO (
INP3 NUM1 NIL NIL NIL NIL )NIL )(THE (INP2 DETERM NIL NIL NIL NIL )
NIL ))
   <= FROM RIGHT TO LEFT
      1. 1. 1. FOR WORD : THE
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
   ((N4 )GIRLS (INP5 NOM,OBJ NIL NIL ((DEF TWO PLURAL 3PS ))((PERSON
))NIL )(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL )(TWO (INP3
NUM1 NIL NIL NIL NIL )NIL )(THE (INP2 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
      SUCCESSFUL TRANSITION FROM (N4 )
      TO THE NEW STATE(S) :  (N5 )
      NEW FEATURE COMPLEX:
      ((BY PREP DEF TWO PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      ((N5 )GIRLS (INP5 NOM,OBJ NIL NIL ((BY PREP DEF TWO PLURAL 3PS
))((PERSON ))NIL )(BEAUTIFUL (INP4 ATT,ADJ NIL NIL NIL UNDET )NIL )(
TWO (INP3 NUM1 NIL NIL NIL NIL )NIL )(THE (INP2 DETERM NIL NIL NIL
NIL )NIL )(BY (INP1 CASESI NIL NIL NIL NIL )NIL ))
   <= FROM RIGHT TO LEFT
      1. 1. 1. FOR WORD : BY
      + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM,OBJ (GIRLS (ATT,ADJ BEAUTIFUL )(NUM1 TWO )(DETERM THE )(CASESI
BY )))
(CASESTRUCTURE (BEAUTIFUL (OF*WHAT GIRLS )))



IN:
(BY TWO GIRLS )


WORD NR :  1   BY
.I. INITIAL PARTICLES :
(NIL BY (INP1 CASESI NIL NIL NIL NIL ))


WORD NR :  2   TWO
.I. INITIAL PARTICLES :
(NIL TWO (INP2 NUM1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
   (NIL TWO (INP2 NUM1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
```

```
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP3 NOM.OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP3 NOM.OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL TWO (INP2 NUM1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
       NEW FEATURE COMPLEX:
       ((TWO PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )GIRLS (INP3 NOM.OBJ NIL NIL ((TWO PLURAL 3PS ))((PERSON
))NIL )(TWO (INP2 NUM1 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TWO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N3 )GIRLS (INP3 NOM.OBJ NIL NIL ((TWO PLURAL 3PS ))((PERSON ))
NIL )(TWO (INP2 NUM1 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N3 )
       TO THE NEW STATE(S) :  (N5 )
       NEW FEATURE COMPLEX:
       ((BY PREP TWO PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 )GIRLS (INP3 NOM.OBJ NIL NIL ((BY PREP TWO PLURAL 3PS ))(
(PERSON ))NIL )(TWO (INP2 NUM1 NIL NIL NIL NIL )NIL )(BY (INP1 CASESI
NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (GIRLS (NUM1 TWO )(CASESI BY )))
(CASESTRUCTURE )
```

```
IN:
(BY THE GIRLS )


WORD NR :  1   BY
.I. INITIAL PARTICLES :
(NIL BY (INP1 CASES1 NIL NIL NIL NIL ))


WORD NR :  2   THE
.I. INITIAL PARTICLES :
(NIL THE (INP2 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASES1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP3 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP3 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (NOT RESTRIC )
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
       NEW FEATURE COMPLEX:
       ((DEF PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )GIRLS (INP3 NOM,OBJ NIL NIL ((DEF PLURAL 3PS ))((
PERSON ))NIL )(THE (INP2 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N4 N6 )GIRLS (INP3 NOM,OBJ NIL NIL ((DEF PLURAL 3PS ))((PERSON
))NIL )(THE (INP2 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASES1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N4 N6 )
       TO THE NEW STATE(S) :  (N5 )
       NEW FEATURE COMPLEX:
       ((BY PREP DEF PLURAL 3PS ))
```

```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      ((NS )GIRLS (INP3 NOM.OBJ NIL NIL ((BY PREP DEF PLURAL 3PS ))(
(PERSON ))NIL )(THE (INP2 DETERM NIL NIL NIL NIL )NIL )(BY (INP1
CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (GIRLS (DETERM THE )(CASESI BY )))
(CASESTRUCTURE )



IN:
(BY SOME GIRLS )


WORD NR :  1   BY
.I. INITIAL PARTICLES :
(NIL BY (INP1 CASESI NIL NIL NIL NIL ))


WORD NR :  2   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  3   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
       NEW FEATURE COMPLEX:
       ((CERTAIN*NUM PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )GIRLS (INP5 NOM,OBJ NIL NIL ((CERTAIN*NUM PLURAL 3PS ))(
(PERSON ))NIL )(SOME (INP2 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       UNCOUNT
       ((PLURAL 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((PLURAL 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N4 )GIRLS (INP5 NOM,OBJ NIL NIL ((CERTAIN*NUM PLURAL 3PS ))((
PERSON ))NIL )(SOME (INP2 NUM2 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASES1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N4 )
       TO THE NEW STATE(S) :  (N5 )
```

```
        NEW FEATURE COMPLEX:
        ((BY PREP CERTAIN*NUM PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N5 )GIRLS (INP5 NOM.OBJ NIL NIL ((BY PREP CERTAIN*NUM PLURAL
3PS ))((PERSON ))NIL )(SOME (INP2 NUM2 NIL NIL NIL NIL )NIL )(BY (
INP1 CASESI NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : BY
        + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NON-OBJ (GIRLS (NUM2 SOME )(CASESI BY )))
(CASESTRUCTURE )
```

```
IN:
(BY THE ALL GIRLS )

WORD NR :  1   BY
.I. INITIAL PARTICLES :
(NIL BY (INP1 CASESI NIL NIL NIL NIL ))

WORD NR :  2   THE
.I. INITIAL PARTICLES :
(NIL THE (INP2 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL BY (INP1 CASESI NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : BY
        + WRONG HEAD OR NO TRANSITION IN SYNT NET

WORD NR :  3   ALL
.I. INITIAL PARTICLES :
(NIL ALL (INP3 NUM3 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL ALL (INP3 NUM3 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : THE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  4   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP4 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )GIRLS (INP4 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL ALL (INP3 NUM3 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) : (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR PLURAL UNCOUNT )
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )GIRLS (INP4 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))
NIL )(ALL (INP3 NUM3 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : ALL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 )GIRLS (INP4 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL )
(ALL (INP3 NUM3 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL THE (INP2 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT


IN:
(THE SOME GIRLS )


WORD NR :  1   THE
.I. INITIAL PARTICLES :
(NIL THE (INP1 DETERM NIL NIL NIL NIL ))


WORD NR :  2   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL THE (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL THE (INP1 DETERM NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : THE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
     (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL THE (INP1 DETERM NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : THE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP5 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        PLURAL
        ((PLURAL 3PS ))
        RESULTING DOMAIN:
        ((PLURAL 3PS ))
        NEW FEATURE COMPLEX:
        ((CERTAIN*NUM PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 )GIRLS (INP5 NOM,OBJ NIL NIL ((CERTAIN*NUM PLURAL 3PS ))(
(PERSON ))NIL )(SOME (INP2 NUM2 NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : SOME
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
    2. 1. CONFIGURATION :
    (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        UNCOUNT
        ((PLURAL 3PS ))
        + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : SOME
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
3. FOR HYPOTHESIS : INP4
  3. 1. CONFIGURATION :
  (NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
   => FROM LEFT TO RIGHT
      SUCCESSFUL TRANSITION FROM (N1 )
      TO THE NEW STATE(S) : (N4 )
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      (AND (NOT UNCOUNT )(NOT PLURAL ))
      ((PLURAL 3PS ))
      + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
   <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : SOME
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(6)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 )GIRLS (INP5 NOM.OBJ NIL NIL ((CERTAIN*NUM PLURAL 3PS ))((
PERSON ))NIL )(SOME (INP2 NUM2 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL THE (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT


IN:
(BY ALL TWO GIRLS )


WORD NR :  1   BY
.I. INITIAL PARTICLES :
(NIL BY (INP1 CASES1 NIL NIL NIL NIL ))


WORD NR :  2   ALL
.I. INITIAL PARTICLES :
(NIL ALL (INP2 NUM3 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL ALL (INP2 NUM3 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BY (INP1 CASES1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  3   TWO
.I. INITIAL PARTICLES :
(NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL ALL (INP2 NUM3 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : ALL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP4 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP4 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TWO (INP3 NUM1 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
       NEW FEATURE COMPLEX:
       ((TWO PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )GIRLS (INP4 NOM,OBJ NIL NIL ((TWO PLURAL 3PS ))((PERSON
))NIL )(TWO (INP3 NUM1 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TWO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N3 )GIRLS (INP4 NOM,OBJ NIL NIL ((TWO PLURAL 3PS ))((PERSON ))
NIL )(TWO (INP3 NUM1 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL ALL (INP2 NUM3 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : ALL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK

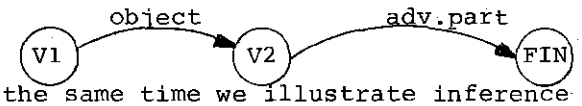
FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

Problem 2: Necessity of certain subordinates

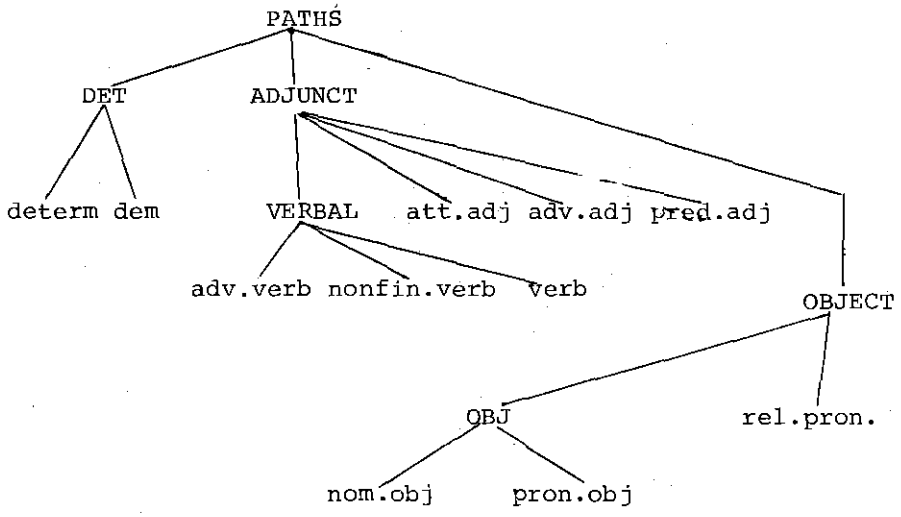
Solution: introduction of syntactic networks.

Example:

We will consider a right-going transition network for verbs needing an adverbial particle. We call these verbs adv.verb and introduce the following network:



At the same time we illustrate inference over functions with the functional inference tree:



Experimental setting:

We will give the following input to the parser:

(1) John knocks the door down .

(Illustration of complete network)

(2) John knocks the door

(Sentence will be rejected due to missing adv. part, i.e. final configuration contains nonfinal state)

(3) John knocks.

(Sentence is accepted for other meaning of 'knock')

Notice how the functional inference tree is used for making a transition.

Experimental results:

```
IN:
(JOHN KNOCKS THE DOOR DOWN )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   KNOCKS
.I. INITIAL PARTICLES :
(NIL KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL KNOCKS (INP3 ADV,VERB (V1 )NIL ((PRES DOWN ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL KNOCKS (INP3 ADV,VERB (V1 )NIL ((PRES DOWN ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND SING 3PS ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED KNOCKS (INP3 ADV,VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN
(INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND SING 3PS ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
WORD NR :  3   THE
.I. INITIAL PARTICLES :
(NIL THE (INP4 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL THE (INP4 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KNOCKS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED KNOCKS (INP3 ADV,VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN (
INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : KNOCKS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

WORD NR :  4   DOOR
.I. INITIAL PARTICLES :
((N1 )DOOR (INP5 NOM,OBJ NIL NIL ((SING 3PS ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )DOOR (INP5 NOM,OBJ NIL NIL ((SING 3PS ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL THE (INP4 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (NOT RESTRIC )
       ((SING 3PS ))
       RESULTING DOMAIN:
       ((SING 3PS ))
       NEW FEATURE COMPLEX:
       ((DEF SING 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )DOOR (INP5 NOM,OBJ NIL NIL ((DEF SING 3PS ))((
THING ))NIL )(THE (INP4 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )DOOR (INP5 NOM,OBJ NIL NIL ((DEF SING 3PS ))((THING
))NIL )(THE (INP4 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KNOCKS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
```

```
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN (
INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : KNOCKS
      SUCCESSFUL TRANSITION FROM (V1 )
      TO THE NEW STATE(S) :  (V2 )
      CONSULT CASE FRAMES WITH SYNT FEATURES :
      ((DEF SING 3PS ))
      SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
      RESULTING TRIPLES (FEATURES * STATE * CASE)
      ((((DEF SING 3PS ))FIN WHAT ))
      MATCH THE FOLLOWING SEMANTIC FEATURES
      ((THING ))
      WITH FEATURES OF RESP. CASES
      WHAT
      THING
      SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (NIL KNOCKS (INP3 ADV.VERB (V2 )FIN ((PRES DOWN ))QUAL )(JOHN
(INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(DOOR (
INP5 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING ))WHAT )(THE (INP4
DETERM NIL NIL NIL NIL )NIL )))

WORD NR :  5   DOWN
.I. INITIAL PARTICLES :
(NIL DOWN (INP6 ADV.PART NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL DOWN (INP6 ADV.PART NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
    (NIL KNOCKS (INP3 ADV.VERB (V2 )FIN ((PRES DOWN ))QUAL )(JOHN (
INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(DOOR (
INP5 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING ))WHAT )(THE (INP4
DETERM NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : DOOR
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
       1. 1. 2. FOR WORD : KNOCKS
      SUCCESSFUL TRANSITION FROM (V2 )
      TO THE NEW STATE(S) :  (FIN )
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      DOWN
      ((PRES DOWN ))
      RESULTING DOMAIN:
      ((PRES DOWN ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (NIL KNOCKS (INP3 ADV.VERB (FIN )FIN ((PRES DOWN ))QUAL )(JOHN
(INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(DOOR (
INP5 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING ))WHAT )(THE (INP4
DETERM NIL NIL NIL NIL )NIL ))(DOWN (INP6 ADV.PART NIL NIL NIL NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(ADV.VERB (KNOCKS (NOM.OBJ JOHN )(NOM.OBJ (DOOR (DETERM THE )))(
ADV.PART DOWN ))
(CASESTRUCTURE (KNOCKS (AGENT JOHN )(WHAT DOOR )))
```

```
IN:
(JOHN KNOCKS THE DOOR )

WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   KNOCKS
.I. INITIAL PARTICLES :
(NIL KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND SING 3PS ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN
(INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND SING 3PS ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
/ORD NR :  3   THE
•I• INITIAL PARTICLES :
(NIL THE (INP4 DETERM NIL NIL NIL NIL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL THE (INP4 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KNOCKS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN (
INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : KNOCKS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   DOOR
•I• INITIAL PARTICLES :
((N1 )DOOR (INP5 NOM.OBJ NIL NIL ((SING 3PS ))((THING ))NIL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )DOOR (INP5 NOM.OBJ NIL NIL ((SING 3PS ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL THE (INP4 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (NOT RESTRIC )
       ((SING 3PS ))
       RESULTING DOMAIN:
       ((SING 3PS ))
       NEW FEATURE COMPLEX:
       ((DEF SING 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )DOOR (INP5 NOM.OBJ NIL NIL ((DEF SING 3PS ))((
THING ))NIL )(THE (INP4 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )DOOR (INP5 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING
))NIL )(THE (INP4 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KNOCKS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
```

```
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN (
INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : KNOCKS
       SUCCESSFUL TRANSITION FROM (V1 )
       TO THE NEW STATE(S) :  (V2 )
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((DEF SING 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((DEF SING 3PS ))FIN WHAT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL KNOCKS (INP3 ADV.VERB (V2 )FIN ((PRES DOWN ))QUAL )(JOHN
(INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(DOOR (
INP5 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING ))WHAT )(THE (INP4
DETERM NIL NIL NIL NIL )NIL ))

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT



 IN:
 (JOHN KNOCKS )


 WORD NR :  1   JOHN
 .I. INITIAL PARTICLES :
 (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


 WORD NR :  2   KNOCKS
 .I. INITIAL PARTICLES :
 (NIL KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL ))
 (NIL KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL ))
 .II. MERGING
 (A)
 **** TRY TO EXPAND CONFIGURATION :
     (NIL KNOCKS (INP3 ADV.VERB (V1 )NIL ((PRES DOWN ))QUAL ))
 * BY COMBINING IT WITH CONFIG OF WORD NR.  1
  1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (NOT OBJ )(AND SING 3PS ))
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((PERSON ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((PERSON ))
```

```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED KNOCKS (INP2 ADV,VERB (V1 )NIL ((PRES DOWN ))QUAL )(JOHN
(INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(8)
**** TRY TO EXPAND CONFIGURATION :
    (NIL KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OF NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(ANL SING 3PS ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED KNOCKS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (KNOCKS (NOM,OBJ JOHN )))
(CASESTRUCTURE (KNOCKS (AGENT JOHN )))
```

EXPERIMENT 4: SYNTACTIC FEATURES

Problem 1: syntactic feature matches of determiners and nominal objects (based on number, count/uncount)

solution: introduction of the feature complex calculus and match processes.

experimental setting:

We will give the following input:

(1) Some girl, some girls and some sand.
(illustration of discrimination between some used as 'a-certain','certain-number', and 'amount-of' respectively; note also how the send-through operation has been applied)

(2) Every girl (normal match), every girls (although successful transition rejected on the basis of false outcome of feature match due to feature'not plural'), every sand (rejected on the basis of false outcome of feature match due to the feature 'NOT UNCOUNT').

(3) Some sheep
(sheep matches with two meanings of 'some', notice how we start with ambiguity of sheep as regards number and due to syntactic feature matching cut out relevant parts of the domain)

experimental results:

```
IN:
(SOME GIRL )

WORD NR :  1   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))

WORD NR :  2   GIRL
.I. INITIAL PARTICLES :
((N1 )GIRL (INP4 NOM.OBJ NIL NIL ((SING 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRL (INP4 NOM.OBJ NIL NIL ((SING 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((SING 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP2
   2. 1. CONFIGURATION :
   (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       UNCOUNT
       ((SING 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP3
   3. 1. CONFIGURATION :
   (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((SING 3PS ))
       RESULTING DOMAIN:
       ((SING 3PS ))
       NEW FEATURE COMPLEX:
       ((A*CERTAIN SING 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )GIRL (INP4 NOM.OBJ NIL NIL ((A*CERTAIN SING 3PS ))((
PERSON ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (GIRL (NUM2 SOME )))
(CASESTRUCTURE )
```

```
IN:
(SOME GIRLS )

WORD NR :  1   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))

WORD NR :  2   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP4 NOM.OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP4 NOM.OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((PLURAL 3PS ))
       RESULTING DOMAIN:
       ((PLURAL 3PS ))
       NEW FEATURE COMPLEX:
       ((CERTAIN*NUM PLURAL 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )GIRLS (INP4 NOM.OBJ NIL NIL ((CERTAIN*NUM PLURAL 3PS ))(
(PERSON ))NIL )(SOME (INP1 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP2
   2. 1. CONFIGURATION :
   (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       UNCOUNT
       ((PLURAL 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP3
   3. 1. CONFIGURATION :
   (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((PLURAL 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (GIRLS (NUM2 SOME )))
(CASESTRUCTURE )
```

```
IN:
(SOME SAND )


WORD NR :  1   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))


WORD NR :  2   SAND
.I. INITIAL PARTICLES :
((N1 )SAND (INP4 NOM.OBJ NIL NIL ((3PS SING UNCOUNT ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )SAND (INP4 NOM.OBJ NIL NIL ((3PS SING UNCOUNT ))((THING ))
NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((3PS SING UNCOUNT ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP2
   2. 1. CONFIGURATION :
   (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       UNCOUNT
       ((3PS SING UNCOUNT ))
       RESULTING DOMAIN:
       ((3PS SING UNCOUNT ))
       NEW FEATURE COMPLEX:
       ((AMOUNT*OF 3PS SING UNCOUNT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )SAND (INP4 NOM.OBJ NIL NIL ((AMOUNT*OF 3PS SING UNCOUNT
))((THING ))NIL )(SOME (INP2 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP3
   3. 1. CONFIGURATION :
   (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((3PS SING UNCOUNT ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (SAND (NUM2 SOME )))
(CASESTRUCTURE )
```

```
IN:
(EVERY GIRL )

WORD NR :  1   EVERY
.I. INITIAL PARTICLES :
(NIL EVERY (INP1 NUM2 NIL NIL NIL NIL ))

WORD NR :  2   GIRL
.I. INITIAL PARTICLES :
((N1 )GIRL (INP2 NOM.OBJ NIL NIL ((SING 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRL (INP2 NOM.OBJ NIL NIL ((SING 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL EVERY (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((SING 3PS ))
       RESULTING DOMAIN:
       ((SING 3PS ))
       NEW FEATURE COMPLEX:
       ((EVERY SING 3PS ))
>>>> ALL TESTS SUCCESSFUL. NEW CONFIGURATION :
       ((N4 )GIRL (INP2 NOM.OBJ NIL NIL ((EVERY SING 3PS ))((PERSON )
)NIL )(EVERY (INP1 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : EVERY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (GIRL (NUM2 EVERY )))
(CASESTRUCTURE )
```

```
IN:
(EVERY GIRLS )

WORD NR :  1   EVERY
.I. INITIAL PARTICLES :
(NIL EVERY (INP1 NUM2 NIL NIL NIL NIL ))

WORD NR :  2   GIRLS
.I. INITIAL PARTICLES :
((N1 )GIRLS (INP2 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )GIRLS (INP2 NOM,OBJ NIL NIL ((PLURAL 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL EVERY (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((PLURAL 3PS ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : EVERY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT


IN:
(EVERY SAND )

WORD NR :  1   EVERY
.I. INITIAL PARTICLES :
(NIL EVERY (INP1 NUM2 NIL NIL NIL NIL ))

WORD NR :  2   SAND
.I. INITIAL PARTICLES :
((N1 )SAND (INP2 NOM,OBJ NIL NIL ((3PS SING UNCOUNT ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )SAND (INP2 NOM,OBJ NIL NIL ((3PS SING UNCOUNT ))((THING ))
NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL EVERY (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((3PS SING UNCOUNT ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : EVERY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

```
IN:
(SOME SHEEP )

WORD NR :  1   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))


WORD NR :  2   SHEEP
.I. INITIAL PARTICLES :
((N1 )SHEEP (INP4 NOM,OBJ NIL NIL ((COUNT PLURAL )(COUNT 3PS SING ))(
(ANIMATE ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )SHEEP (INP4 NOM,OBJ NIL NIL ((COUNT PLURAL )(COUNT 3PS SING
))((ANIMATE ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL SOME (INP1 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((COUNT PLURAL )(COUNT 3PS SING ))
       RESULTING DOMAIN:
       ((COUNT PLURAL ))
       NEW FEATURE COMPLEX:
       ((CERTAIN*NUM COUNT PLURAL ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )SHEEP (INP4 NOM,OBJ NIL NIL ((CERTAIN*NUM COUNT PLURAL )
)((ANIMATE ))NIL )(SOME (INP1 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP2
   2. 1. CONFIGURATION :
   (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       UNCOUNT
       ((COUNT PLURAL )(COUNT 3PS SING ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP3
   3. 1. CONFIGURATION :
```

```
   (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((COUNT PLURAL )(COUNT 3PS SING ))
       RESULTING DOMAIN:
       ((COUNT 3PS SING ))
       NEW FEATURE COMPLEX:
       ((A*CERTAIN COUNT 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )SHEEP (INP4 NOM.OBJ NIL NIL ((A*CERTAIN COUNT 3PS SING )
)((ANIMATE ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (SHEEP (NUM2 SOME )))
(CASESTRUCTURE )
(NOM.OBJ (SHEEP (NUM2 SOME )))
(CASESTRUCTURE )
```

Problem 2: Internal order of auxiliaries and verb forms in the signalling of the tenses.

Solution:

Introduction of syntactic features. When a certain word comes in it should match with features already present, it sends itself an expectation to the general feature complex for the next word and an indicator to prevent the usage of the same tense.

Experimental setting:

The lexicon and grammar contain information for the complete verbsystem in English. We pick out two verbal constructions:

(1) A letter has been being read
(Final result is 'pres perf contin pass'. Notice how the ambiguity of 'read' is resolved. Notice also that has, been and being have also the hypothesis that they are main verbs.)

(2) John will have been reading
(Final result: 'pres fut perf contin')

(3) A letter is had being read.
(Not accepted

Experimental results:

```
IN:
(A LETTER HAS BEEN BEING READ )

WORD NR :  1   A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))

WORD NR :  2   LETTER
.I. INITIAL PARTICLES :
((N1 )LETTER (INP2 NOM,OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )LETTER (INP2 NOM,OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

WORD NR :  3   HAS
.I. INITIAL PARTICLES :
(NIL HAS (INP3 VERB NIL NIL ((PRES ))QUAL ))
(NIL HAS (INP4 AFF,AUX NIL NIL ((PRES PERF ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAS (INP4 AFF,AUX NIL NIL ((PRES PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (NOT OBJ ))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED HAS (INP4 AFF,AUX FIN NIL ((PRES PERF ))NIL )(LETTER (
INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))
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(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL HAS (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : LETTER
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND SING (NOT OBJ ))
        ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
        RESULTING DOMAIN:
        ((UNDEF SING SUBJ 3PS ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((THING ))
        ((ACT ))
        + SEMANTIC FEATURES MATCH UNSUCCESFUL


WORD NR :  4   BEEN
.I. INITIAL PARTICLES :
(NIL BEEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL BEEN (INP6 NONFIN.AUX NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL BEEN (INP6 NONFIN.AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
    1. 1. CONFIGURATION :
    (NIL HAS (INP3 VERB NIL NIL ((PRES ))QUAL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : HAS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
    2. 1. CONFIGURATION :
    (PRED HAS (INP4 AFF.AUX FIN NIL ((PRES PERF ))NIL )(LETTER (INP2
NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : HAS
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND PERF (NOT PERF" ))
        ((PRES PERF ))
        RESULTING DOMAIN:
        ((PRES PERF ))
        NEW FEATURE COMPLEX:
        ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL HAS (INP4 AFF.AUX FIN NIL ((PERF" CONTIN PRES PERF )(
PERF" PASS PRES PERF ))NIL )(LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )
NIL )(BEEN (INP6 NONFIN.AUX NIL NIL NIL NIL )))
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL BEEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
    1. 1. CONFIGURATION :
    (NIL HAS (INP3 VERB NIL NIL ((PRES ))QUAL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : HAS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
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  2. FOR HYPOTHESIS : INP4
    2. 1. CONFIGURATION :
    (PRED HAS (INP4 AFF,AUX FIN NIL ((PRES PERF ))NIL )(LETTER (INP2
NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : HAS
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND PERF (NOT PERF" ))
        ((PRES PERF ))
        RESULTING DOMAIN:
        ((PRES PERF ))
        NEW FEATURE COMPLEX:
        ((PERF" PRES PERF ))
MISSING CASE IN FRAME
        + SEMANTIC FEATURES MATCH UNSUCCESFUL


WORD NR : 5   BEING
.I. INITIAL PARTICLES :
(NIL BEING (INP7 NONFIN,VERB NIL NIL NIL QUAL ))
(NIL BEING (INP8 NONFIN,AUX NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEING (INP8 NONFIN,AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
  1. FOR HYPOTHESIS : INP5
    1. 1. CONFIGURATION :
    (NIL BEEN (INP5 NONFIN,VERB NIL NIL NIL QUAL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : BEEN
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL HAS (INP4 AFF,AUX FIN NIL ((PERF" CONTIN PRES PERF )(PERF"
PASS PRES PERF ))NIL )(LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ
3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN
(INP6 NONFIN,AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
         2. 1. 2. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
       RESULTING DOMAIN:
       ((PERF" CONTIN PRES PERF ))
       NEW FEATURE COMPLEX:
       ((CONTIN" PASS PERF" CONTIN PRES PERF ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HAS (INP4 AFF,AUX FIN NIL ((CONTIN" PASS PERF" CONTIN
PRES PERF ))NIL )(LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS
))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN (
INP6 NONFIN,AUX NIL NIL NIL NIL ))(BEING (INP8 NONFIN,AUX NIL NIL NIL
NIL )))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEING (INP7 NONFIN,VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
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```
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL BEEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL HAS (INP4 AFF.AUX FIN NIL ((PERF" CONTIN PRES PERF )(PERF"
PASS PRES PERF ))NIL )(LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ
3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN
(INP6 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
       RESULTING DOMAIN:
       ((PERF" CONTIN PRES PERF ))
       NEW FEATURE COMPLEX:
       ((CONTIN" PERF" CONTIN PRES PERF ))
MISSING CASE IN FRAME
       + SEMANTIC FEATURES MATCH UNSUCCESFUL


WORD NR :  6   READ
.I. INITIAL PARTICLES :
(NIL READ (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL READ (INP10 VERB NIL NIL ((PAST ))QUAL ))
(NIL READ (INP11 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL READ (INP12 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP12 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL BEING (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP8
   2. 1. CONFIGURATION :
   (NIL HAS (INP4 AFF.AUX FIN NIL ((CONTIN" PASS PERF" CONTIN PRES
PERF ))NIL )(LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN (INP6
NONFIN.AUX NIL NIL NIL NIL ))(BEING (INP8 NONFIN.AUX NIL NIL NIL NIL
)))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 3. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR (AND MODAL (NOT MODAL" ))(AND FUT (NOT FUT" )))
       ((CONTIN" PASS PERF" CONTIN PRES PERF ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP11 NONFIN,VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL BEING (INP7 NONFIN,VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP8
   2. 1. CONFIGURATION :
   (NIL HAS (INP4 AFF,AUX FIN NIL ((CONTIN" PASS PERF" CONTIN PRES
PERF ))NIL )(LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN (INP6
NONFIN,AUX NIL NIL NIL NIL ))(BEING (INP8 NONFIN,AUX NIL NIL NIL NIL
)))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 3. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((CONTIN" PASS PERF" CONTIN PRES PERF ))
       RESULTING DOMAIN:
       ((CONTIN" PASS PERF" CONTIN PRES PERF ))
       NEW FEATURE COMPLEX:
       ((PASS" CONTIN" PASS PERF" CONTIN PRES PERF ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       THING
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED READ (INP11 NONFIN,VERB NIL NIL ((PASS" CONTIN" PASS
PERF" CONTIN PRES PERF ))QUAL )(HAS (INP4 AFF,AUX FIN NIL ((PASS"
CONTIN" PASS PERF" CONTIN PRES PERF ))NIL )(LETTER (INP2 NOM,OBJ NIL
NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL
NIL NIL )NIL )NIL )(BEEN (INP6 NONFIN,AUX NIL NIL NIL NIL ))(BEING (
INP8 NONFIN,AUX NIL NIL NIL NIL ))NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP10 VERB NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL BEING (INP7 NONFIN,VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP8
   2. 1. CONFIGURATION :
   (NIL HAS (INP4 AFF,AUX FIN NIL ((CONTIN" PASS PERF" CONTIN PRES
PERF ))NIL )(LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN (INP6
NONFIN,AUX NIL NIL NIL NIL ))(BEING (INP8 NONFIN,AUX NIL NIL NIL NIL
)))
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     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : BEEN
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
         2. 1. 2. FOR WORD : BEING
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
         2. 1. 3. FOR WORD : HAS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP9 NONFIN,VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL BEING (INP7 NONFIN,VERB NIL NIL NIL QUAL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : BEING
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP8
   2. 1. CONFIGURATION :
   (NIL HAS (INP4 AFF,AUX FIN NIL ((CONTIN" PASS PERF" CONTIN PRES
PERF ))NIL )(LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(BEEN (INP6
NONFIN,AUX NIL NIL NIL NIL ))(BEING (INP8 NONFIN,AUX NIL NIL NIL NIL
)))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : BEEN
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
         2. 1. 2. FOR WORD : BEING
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
         2. 1. 3. FOR WORD : HAS
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (AND PERF (NOT PERF" ))(NOT PASS ))
        ((CONTIN" PASS PERF" CONTIN PRES PERF ))
        + SYNTACTIC FEATURES MATCH UNSUCCESSFUL

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN,VERB (READ (AFF,AUX (HAS (NOM,OBJ (LETTER (DETERM A ))))(
NONFIN,AUX BEEN )(NONFIN,AUX BEING ))))))
(CASESTRUCTURE (READ (WHAT LETTER )))
```

```
IN:
(JOHN WILL HAVE BEEN READING )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   WILL
.I. INITIAL PARTICLES :
(NIL WILL (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL WILL (INP3 AFF.AUX NIL NIL ((PRES FUT ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WILL (INP3 AFF.AUX NIL NIL ((PRES FUT ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (NOT OBJ )
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED WILL (INP3 AFF.AUX FIN NIL ((PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WILL (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (NOT OBJ )
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((PERSON ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED WILL (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
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```
WORD NR :  3   HAVE
•I• INITIAL PARTICLES :
(NIL HAVE (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL HAVE (INP5 NONFIN.AUX NIL NIL NIL NIL ))
(NIL HAVE (INP6 VERB NIL NIL ((PRES ))QUAL ))
(NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF ))NIL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED WILL (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : WILL
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED WILL (INP3 AFF.AUX FIN NIL ((PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : WILL
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAVE (INP6 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED WILL (INP3 AFF.AUX FIN NIL ((PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : WILL
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAVE (INP5 NONFIN.AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED WILL (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : WILL
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED WILL (INP3 AFF.AUX FIN NIL ((PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : WILL
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR (AND FUT (NOT FUT" ))(AND MODAL (NOT MODAL" )))
       ((PRES FUT ))
       RESULTING DOMAIN:
       ((PRES FUT ))
       NEW FEATURE COMPLEX:
       ((PERF FUT" MODAL" PRES FUT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF FUT" MODAL" PRES FUT ))
NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )
NIL )(HAVE (INP5 NONFIN.AUX NIL NIL NIL NIL )))
```

```
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAVE (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED WILL (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : WILL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED WILL (INP3 AFF.AUX FIN NIL ((PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : WILL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR (AND FUT (NOT FUT" ))(AND MODAL (NOT MODAL" )))
       ((PRES FUT ))
       RESULTING DOMAIN:
       ((PRES FUT ))
       BACK
       NEW FEATURE COMPLEX:
       ((FUT"MODAL" PRES FUT ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (PRED HAVE (INP4 NONFIN.VERB NIL NIL ((FUT"MODAL" PRES FUT ))
QUAL )(WILL (INP3 AFF.AUX FIN NIL ((FUT"MODAL" PRES FUT ))NIL )(JOHN
(INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))


WORD NR :  4   BEEN
.I. INITIAL PARTICLES :
(NIL BEEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (PRED HAVE (INP4 NONFIN.VERB NIL NIL ((FUT"MODAL" PRES FUT ))QUAL
)(WILL (INP3 AFF.AUX FIN NIL ((FUT"MODAL" PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF FUT" MODAL" PRES FUT ))NIL
)(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(
HAVE (INP5 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
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        2. 1. 2. FOR WORD : WILL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PERF (NOT PERF" ))
       ((PERF FUT" MODAL" PRES FUT ))
       RESULTING DOMAIN:
       ((PERF FUT" MODAL" PRES FUT ))
       NEW FEATURE COMPLEX:
       ((PERF" CONTIN PERF FUT" MODAL" PRES FUT )(PERF" PASS PERF
FUT" MODAL" PRES FUT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF" CONTIN PERF FUT"
MODAL" PRES FUT )(PERF" PASS PERF FUT" MODAL" PRES FUT ))NIL )(JOHN (
INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HAVE (
INP5 NONFIN.AUX NIL NIL NIL NIL ))(BEEN (INP9 NONFIN.AUX NIL NIL NIL
NIL )))
  3. FOR HYPOTHESIS : INP6
    3. 1. CONFIGURATION :
    (NIL HAVE (INP6 VERB NIL NIL ((PRES ))QUAL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         3. 1. 1. FOR WORD : HAVE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  4. FOR HYPOTHESIS : INP7
    4. 1. CONFIGURATION :
    (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF ))NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         4. 1. 1. FOR WORD : HAVE
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND PERF (NOT PERF" ))
        ((PERF ))
        RESULTING DOMAIN:
        ((PERF ))
        NEW FEATURE COMPLEX:
        ((PERF" CONTIN PERF )(PERF" PASS PERF ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PERF )(PERF"
PASS PERF ))NIL )(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PERF )(PERF" PASS
PERF ))NIL )(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
  1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    (PRED WILL (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : WILL
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  2. FOR HYPOTHESIS : INP3
    2. 1. CONFIGURATION :
    (PRED WILL (INP3 AFF.AUX FIN NIL ((PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : WILL
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
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**** TRY TO EXPAND CONFIGURATION :
    (NIL BEEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (PRED HAVE (INP4 NONFIN.VERB NIL NIL ((FUT"MODAL" PRES FUT ))QUAL
)(WILL (INP3 AFF.AUX FIN NIL ((FUT"MODAL" PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF FUT" MODAL" PRES FUT ))NIL
)(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(
HAVE (INP5 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : WILL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PERF (NOT PERF" ))
       ((PERF FUT" MODAL" PRES FUT ))
       RESULTING DOMAIN:
       ((PERF FUT" MODAL" PRES FUT ))
       NEW FEATURE COMPLEX:
       ((PERF" PERF FUT" MODAL" PRES FUT ))
MISSING CASE IN FRAME
       + SEMANTIC FEATURES MATCH UNSUCCESFUL
 3. FOR HYPOTHESIS : INP6
   3. 1. CONFIGURATION :
   (NIL HAVE (INP6 VERB NIL NIL ((PRES ))QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 4. FOR HYPOTHESIS : INP7
   4. 1. CONFIGURATION :
   (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : HAVE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PERF (NOT PERF" ))
       ((PERF ))
       RESULTING DOMAIN:
       ((PERF ))
       NEW FEATURE COMPLEX:
       ((PERF" PERF ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL


WORD NR.:  5   READING
.I. INITIAL PARTICLES :
(NIL READING (INP10 PRED.ADJ NIL NIL NIL QUAL ))
(NIL READING (INP11 ATT.ADJ NIL NIL NIL UNDET ))
(NIL READING (INP12 NONFIN.VERB NIL NIL NIL QUAL ))
.I. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
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    (NIL READING (INP12 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL BEEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP9
   2. 1. CONFIGURATION :
   (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PERF )(PERF" PASS
PERF ))NIL )(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : HAVE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PERF" CONTIN PERF )(PERF" PASS PERF ))
       RESULTING DOMAIN:
       ((PERF" CONTIN PERF ))
       NEW FEATURE COMPLEX:
       ((CONTIN" PERF" CONTIN PERF ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL
   2. 2. CONFIGURATION :
   (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF" CONTIN PERF FUT" MODAL"
PRES FUT )(PERF" PASS PERF FUT" MODAL" PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HAVE (INP5
NONFIN.AUX NIL NIL NIL NIL ))(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )
))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 2. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 2. 2. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 2. 3. FOR WORD : WILL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PERF" CONTIN PERF FUT" MODAL" PRES FUT )(PERF" PASS PERF
FUT" MODAL" PRES FUT ))
       RESULTING DOMAIN:
       ((PERF" CONTIN PERF FUT" MODAL" PRES FUT ))
       NEW FEATURE COMPLEX:
       ((CONTIN" PERF" CONTIN PERF FUT" MODAL" PRES FUT ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED READING (INP12 NONFIN.VERB NIL NIL ((CONTIN" PERF"
CONTIN PERF FUT" MODAL" PRES FUT ))QUAL )(WILL (INP3 AFF.AUX FIN NIL
((CONTIN" PERF" CONTIN PERF FUT" MODAL" PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HAVE (INP5
NONFIN.AUX NIL NIL NIL NIL ))(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )
)NIL ))
(B)
<<<< TRY TO EXPAND CONFIGURATION :
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    (NIL READING (INP11 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL BEEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP9
   2. 1. CONFIGURATION :
   (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PERF )(PERF" PASS
PERF ))NIL )(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
   2. 2. CONFIGURATION :
   (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF" CONTIN PERF FUT" MODAL"
PRES FUT )(PERF" PASS PERF FUT" MODAL" PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HAVE (INP5
NONFIN.AUX NIL NIL NIL NIL ))(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )
))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 2. 1. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 2. 2. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 2. 3. FOR WORD : WILL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READING (INP10 PRED.ADJ NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL BEEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP9
   2. 1. CONFIGURATION :
   (NIL HAVE (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PERF )(PERF" PASS
PERF ))NIL )(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : HAVE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
   2. 2. CONFIGURATION :
   (NIL WILL (INP3 AFF.AUX FIN NIL ((PERF" CONTIN PERF FUT" MODAL"
PRES FUT )(PERF" PASS PERF FUT" MODAL" PRES FUT ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HAVE (INP5
NONFIN.AUX NIL NIL NIL NIL ))(BEEN (INP9 NONFIN.AUX NIL NIL NIL NIL )
))
    => FROM LEFT TO RIGHT
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      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       2. 2. 1. FOR WORD : HAVE
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
       2. 2. 2. FOR WORD : BEEN
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
       2. 2. 3. FOR WORD : WILL
      + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN.VERB (READING (AFF.AUX (WILL (NOM.OBJ JOHN )(NONFIN.AUX HAVE
)(NONFIN.AUX BEEN )))))
(CASESTRUCTURE (READING (AGENT JOHN )))
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IN:
(A LETTER IS HAD BEING READ )


WORD NR :  1   A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))


WORD NR :  2   LETTER
.I. INITIAL PARTICLES :
((N1 FIN )LETTER (INP2 NOM,OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 FIN )LETTER (INP2 NOM,OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS
))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 FIN )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING OBJ )(
UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL
)NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   IS
.I. INITIAL PARTICLES :
(NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
(NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
(NIL IS (INP5 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP5 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 FIN N6 )LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
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        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND SING (NOT OBJ )))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP5 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL
)(LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL
)(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 FIN N6 )LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       * WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2
NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 FIN N6 )LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       * WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRC )
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2
NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))
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WORD NR :  4   HAD
.I. INITIAL PARTICLES :
(NIL HAD (INP6 VERB NIL NIL ((PAST ))QUAL ))
(NIL HAD (INP7 AFF.AUX NIL NIL ((PAST PERF ))NIL ))
(NIL HAD (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAD (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PERF
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAD (INP7 AFF.AUX NIL NIL ((PAST PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAD (INP6 VERB NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
```

```
 1. FOR HYPOTHESIS : INP3
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM,OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM,OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   BEING
•I. INITIAL PARTICLES :
(NIL BEING (INP9 NONFIN,VERB NIL NIL NIL QUAL ))
(NIL BEING (INP10 NONFIN,AUX NIL NIL NIL NIL ))
•II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEING (INP10 NONFIN,AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL HAD (INP6 VERB NIL NIL ((PAST ))QUAL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : HAD
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP7
   2. 1. CONFIGURATION :
   (NIL HAD (INP7 AFF,AUX NIL NIL ((PAST PERF ))NIL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : HAD
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      (AND CONTIN (NOT CONTIN" ))
      ((PAST PERF ))
      + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
 3. FOR HYPOTHESIS : INP8
   3. 1. CONFIGURATION :
   (NIL HAD (INP8 NONFIN,VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : HAD
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEING (INP9 NONFIN,VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL HAD (INP6 VERB NIL NIL ((PAST ))QUAL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
```

```
        1. 1. 1. FOR WORD : HAD
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP7
   2. 1. CONFIGURATION :
   (NIL HAD (INP7 AFF.AUX NIL NIL ((PAST PERF ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAD
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PAST PERF ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
 3. FOR HYPOTHESIS : INP8
   3. 1. CONFIGURATION :
   (NIL HAD (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : HAD
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   READ
.I. INITIAL PARTICLES :
(NIL READ (INP11 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL READ (INP12 VERB NIL NIL ((PAST ))QUAL ))
(NIL READ (INP13 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL READ (INP14 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP14 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL BEING (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP10
   2. 1. CONFIGURATION :
   (NIL BEING (INP10 NONFIN.AUX NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP13 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL BEING (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP10
   2. 1. CONFIGURATION :
   (NIL BEING (INP10 NONFIN.AUX NIL NIL NIL NIL ))
```

```
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP12 VERB NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL BEING (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP10
   2. 1. CONFIGURATION :
   (NIL BEING (INP10 NONFIN.AUX NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP11 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL BEING (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP10
   2. 1. CONFIGURATION :
   (NIL BEING (INP10 NONFIN.AUX NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 5. Semantic features

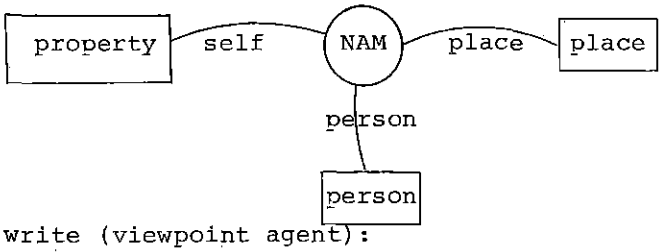
Problem: It is not enough that all syntactic properties of of a certain grammatical relation hold, in addition the two words constituting the relation should be semantically compatible;

Solution:
The introduction of semantic features and the execution of matching tests.

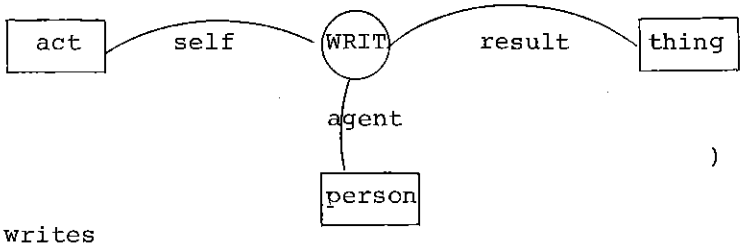
Experimental setting:

We will give the following input

(1) John writes
(Illustration of normal matching with case frames:
for John (viewpoint person):



for write (viewpoint agent):



)

(2) A letter writes
(Semantic feature match unsuccessful; we use the frame of WRIT given before with viewpoint result for letter and agent for writes)

(3) A letter is read.

(Successful match. This is an illustration of the complication for verbal constructs where the features test takes place between predicate and subject when the link is made between non.fin.verb and fin.aux.)

(4) Good soldier

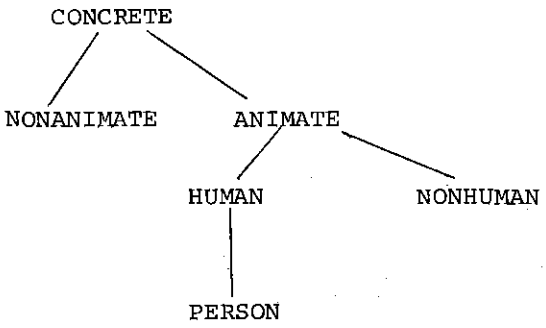
(This is an illustration of ambiguity as regards the modifying (good soldier = good as fighter) and qualifying (good soldier = good as person) distinction. Both lead to successful results so the feature UNDET remains in the configuration.)

(5) Clever soldier

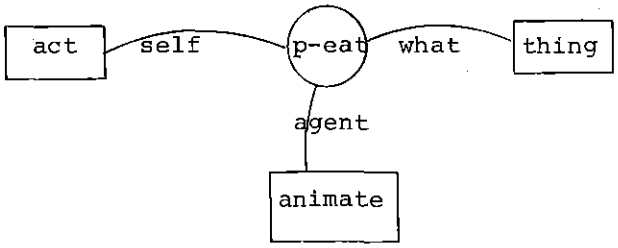
(Illustration how the modifier/qualifier distinction is resolved on the basis of semantic features into only qualifying)

(6) John eats

(Illustration of the use of the inference tree for semantic features, more in particular:



the frame of eats (with viewpoint agent):



)

(7) The stone eats

(No match.)

experimental results:

```
IN:
(JOHN WRITES )

WORD NR : 1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR : 2   WRITES
.I. INITIAL PARTICLES :
(NIL WRITES (INP2 VERB NIL NIL ((PRES ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL WRITES (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED WRITES (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (WRITES (NOM.OBJ JOHN )))
(CASESTRUCTURE (WRITES (AGENT JOHN )))


IN:
(A LETTER WRITES )

WORD NR : 1   A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))
```

```
WORD NR :  2   LETTER
.I. INITIAL PARTICLES :
((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   WRITES
.I. INITIAL PARTICLES :
(NIL WRITES (INP3 VERB NIL NIL ((PRES ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WRITES (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((THING ))
       ((ACT ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

(A LETTER IS READ)

```
WORD NR :  1   A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))


WORD NR :  2   LETTER
.I. INITIAL PARTICLES :
((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )LETTER (INP2 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))(
(THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL A (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   IS
.I. INITIAL PARTICLES :
(NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
(NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
(NIL IS (INP5 AFF.AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL IS (INP5 AFF.AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND SING (NOT OBJ )))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL
)(LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL
)(A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2
NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF
SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : LETTER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((UNDEF SING SUBJ 3PS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRC )
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2
NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL ))


WORD NR :  4   READ
.I. INITIAL PARTICLES :
(NIL READ (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL READ (INP7 VERB NIL NIL ((PAST ))QUAL ))
(NIL READ (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL READ (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2 NOM.OBJ
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```
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR (AND MODAL (NOT MODAL" ))(AND FUT (NOT FUT" )))
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(8)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((PRES PASS )(PRES CONTIN ))
       RESULTING DOMAIN:
       ((PRES PASS ))
       NEW FEATURE COMPLEX:
       ((PASS" PRES PASS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       THING
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
```

```
      (PRED READ (INP8 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL
)(IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(LETTER (INP2
NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP7 VERB NIL NIL ((PAST ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL READ (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(LETTER (INP2 NOM.OBJ
NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING SUBJ 3PS ))((THING ))NIL )(
A (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (AND PERF (NOT PERF" ))(NOT PASS ))
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN.VERB (READ (AFF.AUX (IS (NOM.OBJ (LETTER (DETERM A )))))))
(CASESTRUCTURE (READ (WHAT LETTER )))
NO STRUCTURE FOR GIVEN INPUT
```

```
IN:
(GOOD SOLDIER )

WORD NR :  1   GOOD
.I. INITIAL PARTICLES :
(NIL GOOD (INP1 ATT.ADJ NIL NIL NIL UNDET ))

WORD NR :  2   SOLDIER
.I. INITIAL PARTICLES :
((N1 )SOLDIER (INP2 NOM.OBJ NIL NIL ((3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )SOLDIER (INP2 NOM.OBJ NIL NIL ((3PS SING ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL GOOD (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRICT )
       ((PERSON ))
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N2 )SOLDIER (INP2 NOM.OBJ NIL NIL ((3PS SING ))((PERSON ))
NIL )(GOOD (INP1 ATT.ADJ NIL NIL NIL UNDET )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GOOD
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (SOLDIER (ATT.ADJ GOOD )))
(CASESTRUCTURE (GOOD (OF*WHAT SOLDIER )))

IN:
(CLEVER SOLDIER )

WORD NR :  1   CLEVER
.I. INITIAL PARTICLES :
(NIL CLEVER (INP1 ATT.ADJ NIL NIL NIL UNDET ))

WORD NR :  2   SOLDIER
.I. INITIAL PARTICLES :
((N1 )SOLDIER (INP2 NOM.OBJ NIL NIL ((3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )SOLDIER (INP2 NOM.OBJ NIL NIL ((3PS SING ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL CLEVER (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT ACT )
       ((PERSON ))
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
```

```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      ((N2 )SOLDIER (INP2 NOM.OBJ NIL NIL ((3PS SING ))((PERSON ))
NIL )(CLEVER (INP1 ATT.ADJ NIL NIL NIL QUAL )NIL ))
     <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : CLEVER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (SOLDIER (ATT.ADJ CLEVER )))
(CASESTRUCTURE (CLEVER (OF*WHAT SOLDIER )))


IN:
(JOHN EATS )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   EATS
.I. INITIAL PARTICLES :
(NIL EATS (INP2 VERB NIL NIL ((PRES ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL EATS (INP2 VERB NIL NIL ((PRES ))QUAL ))
+ BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND SING 3PS ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       ANIMATE
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (PRED EATS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (EATS (NOM.OBJ JOHN )))
(CASESTRUCTURE (EATS (AGENT JOHN )))
```

```
IN:
(THE STONE EATS )

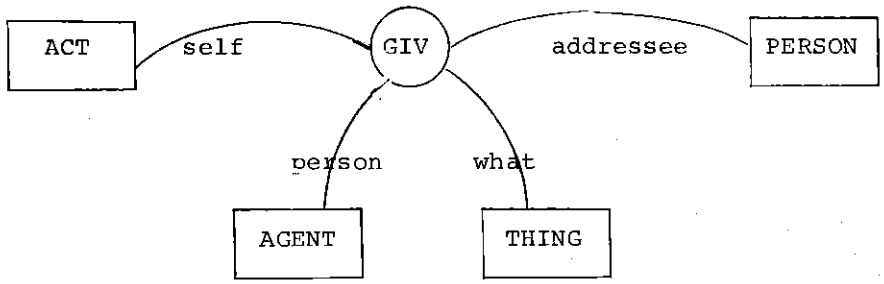

WORD NR :  1   THE
.I. INITIAL PARTICLES :
(NIL THE (INP1 DETERM NIL NIL NIL NIL ))


WORD NR :  2   STONE
.I. INITIAL PARTICLES :
((N1 )STONE (INP2 NOM.OBJ NIL NIL ((SING 3PS ))((THING ))NIL ))
.II. MERGING
(A)
**.. TRY TO EXPAND CONFIGURATION :
    ((N1 )STONE (INP2 NOM.OBJ NIL NIL ((SING 3PS ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL THE (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (NOT RESTRIC )
       ((SING 3PS ))
       RESULTING DOMAIN:
       ((SING 3PS ))
       NEW FEATURE COMPLEX:
       ((DEF SING 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )STONE (INP2 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING
))NIL )(THE (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : THE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   EATS
.I. INITIAL PARTICLES :
(NIL EATS (INP3 VERB NIL NIL ((PRES ))QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL EATS (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 N6 )STONE (INP2 NOM.OBJ NIL NIL ((DEF SING 3PS ))((THING ))
NIL )(THE (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : STONE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND SING 3PS ))
       ((DEF SING 3PS ))
       RESULTING DOMAIN:
       ((DEF SING 3PS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       ANIMATE
       ((THING ))
       ((ENTITY ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL

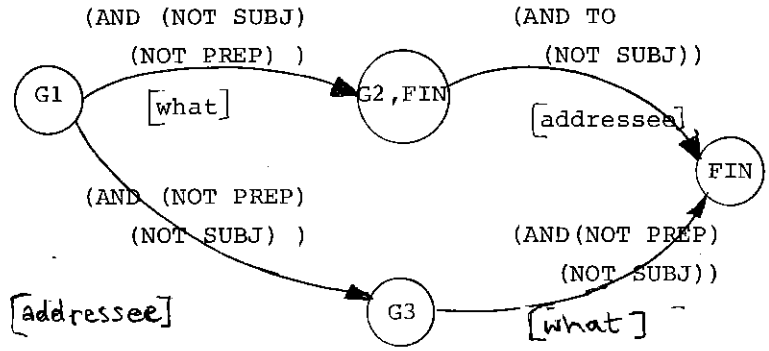
FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

Now we start with a number of experiments related to case. We will make use of on only one surface case frame so that the reader can concentrate fully on the problems of the experiment in question. The frame is that of 'giv' with abstract case frame:

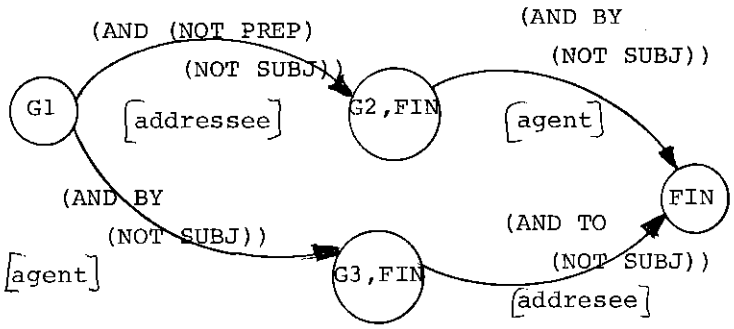


surface case frames:

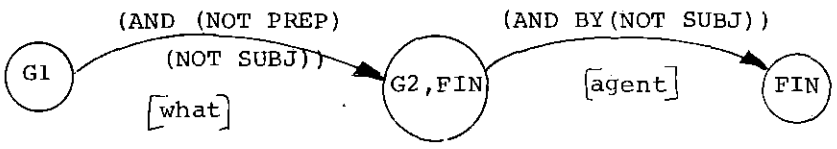
for function adjunct and viewpoint agent:



for function adjunct and viewpoint what:



for function adjunct and viewpoint addressee



EXPERIMENT 6. ORDER OF CASES

Problem:
The various slot filling objects of the same head have particular order restrictions

Solution:
Use of completion networks

Experimental setting:

We will give the following input to the parsing system:

1. John gives a present to her
   (normal transitions to network of adjunct, viewpoint agent)
2. John gives her a present
   (normal transition through other part of the same network)
3. She gives a present
   (idem.)
4. John gives her
   (rejected because incomplete path in network)
5. John gives to her
   (not accepted because one transition was skipped without inference justification)

```
IN:
(JOHN GIVES A PRESENT TO HER )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   A
.I. INITIAL PARTICLES :
(NIL A (INP3 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP3 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR : 4   PRESENT
.1. INITIAL PARTICLES :
((N1 )PRESENT (INP4 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )PRESENT (INP4 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL A (INP3 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )PRESENT (INP4 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       * WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N4 N6 )PRESENT (INP4 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THIN
))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((UNDEF 3PS SING ))(G2 FIN )WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
       ADDRESSEE
       PERSON
       NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP2 VERB NIL ((G2 FIN )NIL QUAL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP
NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM
NIL NIL NIL NIL )NIL )))
```

experimental results:

```
WORD NR :  5   TO
.I. INITIAL PARTICLES :
(NIL TO (INP5 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TO (INP5 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM,OB
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   HER
.I. INITIAL PARTICLES :
(NIL HER (INP6 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP6 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL )
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL TO (INP5 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP TO SING OBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HER (INP6 PRON,OBJ NIL NIL ((PREP TO SING OBJ 3PS ))((
PERSON ))NIL )(TO (INP5 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP6 PRON,OBJ NIL NIL ((PREP TO SING OBJ 3PS ))((PERSON
))NIL )(TO (INP5 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
      <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : PRESENT
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         +MISSING CASE OR FUNCTION IN SEM NETWORK
          1. 1. 2. FOR WORD : GIVES
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         CONSULT CASE FRAMES WITH SYNT FEATURES :
         ((PREP TO SING OBJ 3PS ))
         SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
         RESULTING TRIPLES (FEATURES * STATE * CASE)
         ((((PREP TO SING OBJ 3PS ))FIN ADDRESSEE ))
         MATCH THE FOLLOWING SEMANTIC FEATURES
         ((PERSON ))
         WITH FEATURES OF RESP. CASES
         ADDRESSEE
         PERSON
         SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (NIL GIVES (INP2 VERB NIL FIN NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL ))(HER (INP6 PRON.OBJ NIL NIL ((PREP TO SING OBJ 3PS ))(
(PERSON ) ADDRESSEE )(TO (INP5 CASES1 NIL NIL NIL NIL )NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (GIVES (NOM.OBJ JOHN )(NOM.OBJ (PRESENT (DETERM A )))(PRON.OBJ
(HER (CASES1 TO )))))
(CASESTRUCTURE (GIVES (AGENT JOHN )(WHAT PRESENT )(ADDRESSEE HER )))


  IN:
  (JOHN GIVES HER A PRESENT )


  WORD NR :  1   JOHN
  .I. INITIAL PARTICLES :
  (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


  WORD NR :  2   GIVES
  .I. INITIAL PARTICLES :
  (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
  .II. MERGING
  (A)
  **** TRY TO EXPAND CONFIGURATION :
      (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
  * BY COMBINING IT WITH CONFIG OF WORD NR.  1
   1. FOR HYPOTHESIS : INP1
     1. 1. CONFIGURATION :
     (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )
      => FROM LEFT TO RIGHT
         + WRONG HEAD OR NO TRANSITION IN SYNT NET
      <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : JOHN
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         MATCH THE FOLLOWING FEATURE COMPLEXES:
         (AND (NOT OBJ )(AND 3PS SING ))
         ((MALE 3PS SING ))
         RESULTING DOMAIN:
         ((MALE 3PS SING ))
         INVESTIGATE THE FOLLOWING SEM.FEATURES:
         PERSON
         ((PERSON ))
         SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
         ((PERSON ))
  >>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
         (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ
  NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
WORD NR :  3   HER
.I. INITIAL PARTICLES :
(NIL HER (INP3 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP3 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL )
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((SING OBJ 3PS ))(G2 FIN )WHAT )(((SING OBJ 3PS ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       NO SEM FEATURES MATCH
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP2 VERB NIL (G3 )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HER (INP3 PRON,OBJ
NIL NIL ((SING OBJ 3PS ))((PERSON )ADDRESSEE )))
```

```
WORD NR :  4   A
.I. INITIAL PARTICLES :
(NIL A (INP4 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP4 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G3 )NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HER (INP3 PRON,OBJ NIL
NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  5   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP5 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
```

```
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )PRESENT (INP5 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
    1. 1. CONFIGURATION :
    (NIL A (INP4 DETERM NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 N6 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        SING
        ((3PS SING ))
        RESULTING DOMAIN:
        ((3PS SING ))
        NEW FEATURE COMPLEX:
        ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 N6 )PRESENT (INP5 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP4 DETERM NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : A
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N4 N6 )PRESENT (INP5 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THIN
))NIL )(A (INP4 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
    1. 1. CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL (G3 )NIL QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HER (INP3 PRON.OBJ NIL
NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE )))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : HER
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
         1. 1. 2. FOR WORD : GIVES
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((UNDEF 3PS SING ))
        SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
        RESULTING TRIPLES (FEATURES * STATE * CASE)
        ((((UNDEF 3PS SING ))FIN WHAT ))
        MATCH THE FOLLOWING SEMANTIC FEATURES
        ((THING ))
        WITH FEATURES OF RESP. CASES
        WHAT
        THING
        SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL GIVES (INP2 VERB NIL FIN NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HER (INP3 PRON.OBJ
NIL NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE ))(PRESENT (INP5
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP4 DETERM
NIL NIL NIL NIL )NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (GIVES (NOM.OBJ JOHN )(PRON.OBJ HER )(NOM.OBJ (PRESENT (DETERM
A )))))
(CASESTRUCTURE (GIVES (AGENT JOHN )(ADDRESSEE HER )(WHAT PRESENT )))
```

```
IN:
(SHE GIVES A PRESENT )

WORD NR :  1   SHE
.I. INITIAL PARTICLES :
(NIL SHE (INP1 PRON,OBJ NIL NIL ((SING SUBJ 3PS ))((PERSON ))NIL ))

WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL SHE (INP1 PRON,OBJ NIL NIL ((SING SUBJ 3PS ))((PERSON ))NIL )
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SHE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING SUBJ 3PS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(SHE (INP1 PRON,OBJ
NIL NIL ((SING SUBJ 3PS ))((PERSON ))NIL )NIL ))

WORD NR :  3   A
.I. INITIAL PARTICLES :
(NIL A (INP3 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP3 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(SHE (INP1 PRON,OBJ NIL
NIL ((SING SUBJ 3PS ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

WORD NR :  4   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP4 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
```

```
(A)
**** TRY TO EXPAND CONFIGURATION :
     ((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL )
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL A (INP3 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N4 N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING
))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(SHE (INP1 PRON.OBJ NIL
NIL ((SING SUBJ 3PS ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       (((UNDEF 3PS SING ))(G2 FIN WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
       ADDRESSEE
       PERSON
       NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(SHE (INP1
PRON.OBJ NIL NIL ((SING SUBJ 3PS ))((PERSON ))NIL )NIL )(PRESENT (
INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3
DETERM NIL NIL NIL NIL )NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (GIVES (PRON.OBJ SHE )(NOM.OBJ (PRESENT (DETERM A )))))
(CASESTRUCTURE (GIVES (AGENT SHE )(WHAT PRESENT )))
```

```
IN:
(JOHN GIVES HER )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   HER
.I. INITIAL PARTICLES :
(NIL HER (INP3 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP3 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE).
       ((((SING OBJ 3PS ))(G2 FIN WHAT )(((SING OBJ 3PS ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       NO SEM FEATURES MATCH
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
```

```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP2 VERB NIL (G3 ) NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(HER (INP3 PRON,OBJ
NIL NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE )))
```

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT

IN:
(JOHN GIVES TO HER)

```
WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))

WORD NR :  3   TO
.I. INITIAL PARTICLES :
(NIL TO (INP3 CASEST NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TO (INP3 CASEST NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  4    HER
.I. INITIAL PARTICLES :
(NIL HER (INP4 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
'A'
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP4 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL )
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TO (INP3 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP TO SING OBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HER (INP4 PRON,OBJ NIL NIL ((PREP TO SING OBJ 3PS ))((
PERSON ))NIL )(TO (INP3 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP4 PRON,OBJ NIL NIL ((PREP TO SING OBJ 3PS ))((PERSON
))NIL )(TO (INP3 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO SING OBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK
FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 7: Surface case signals

Problem:

Morphological indicators may be required for a certain case relation (although this is not very common in English)

Solution:

Introduction of syntactic features and matching with feature complex in surface case frame.

Experimental Setting:

We will give the following input:

John gives a present to she

(no successful transition in case network due to unsatisfied condition; compare this with 'John gives a present to her. Notice how economical the features can be due to the relevance logic underlying feature matching.)

Experimental results:

```
IN:
(JOHN GIVES A PRESENT TO SHE )

WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

experimental results

```
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (NOT OBJ )(AND 3PS SING ))
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((PERSON ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   A
.I. INITIAL PARTICLES :
(NIL A (INP3 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP3 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : GIVES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL A (INP3 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 FIN N6 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        SING
        ((3PS SING ))
        RESULTING DOMAIN:
        ((3PS SING ))
        NEW FEATURE COMPLEX:
        ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 FIN N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))
((THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : A
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )PRESENT (INP4 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((UNDEF 3PS SING ))(G2 FIN )WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
       ADDRESSEE
       PERSON
       NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4
NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM
NIL NIL NIL NIL )NIL )))


WORD NR :  5   TO
.I. INITIAL PARTICLES :
(NIL TO (INP5 CASES1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TO (INP5 CASES1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  6   SHE
.I. INITIAL PARTICLES :
(NIL SHE (INP6 PRON,OBJ NIL NIL ((SING SUBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SHE (INP6 PRON,OBJ NIL NIL ((SING SUBJ 3PS ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL TO (INP5 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP TO SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL SHE (INP6 PRON,OBJ NIL NIL ((PREP TO SING SUBJ 3PS ))((
PERSON ))NIL )(TO (INP5 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SHE (INP6 PRON,OBJ NIL NIL ((PREP TO SING SUBJ 3PS ))((
PERSON ))NIL )(TO (INP5 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 1. 2. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO SING SUBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 8 : Surface case signals

Problem:

Besides morphological affixes certain prepositions may be required.

Solution:

The preposition which acts as such a case sign sends a feature to the feature complex of the object and a match is organized just as for morphological affixes.

Experimental setting:

(1) John gives a present by her.
(Wrong preposition - compare with 'John gives a present to her')

(2) A present is given John by her
(missing preposition 'to'- input is not accepted)

Experimental result:

```
IN:
(JOHN GIVES A PRESENT BY HER )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
```

```
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   A
.I. INITIAL PARTICLES :
(NIL A (INP3 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP3 DETERM NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : GIVES
      + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL A (INP3 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : A
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING
))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((UNDEF 3PS SING ))(G2 FIN )WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
       ADDRESSEE
       PERSON
       NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM
NIL NIL NIL NIL )NIL )))


WORD NR :  5   BY
.I. INITIAL PARTICLES :
(NIL BY (INP5 CASES1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BY (INP5 CASES1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   HER
.I. INITIAL PARTICLES :
(NIL HER (INP6 PRON.OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
```

```
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP6 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL BY (INP5 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP BY SING OBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HER (INP6 PRON,OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((
PERSON ))NIL )(BY (INP5 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP6 PRON,OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((PERSON
))NIL )(BY (INP5 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 1. 2. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP BY SING OBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

```
IN:
(A PRESENT IS GIVEN JOHN BY HER )

WORD NR :  1    A
.I. INITIAL PARTICLES :
(NIL A (INP1 DETERM NIL NIL NIL NIL ))

WORD NR :  2    PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP2 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP2 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
```

```
    1. 1. CONFIGURATION :
    (NIL A (INP1 DETERM NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 FIN N6 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        SING
        ((3PS SING ))
        RESULTING DOMAIN:
        ((3PS SING ))
        NEW FEATURE COMPLEX:
        ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))
((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   IS
.I. INITIAL PARTICLES :
(NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
(NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
(NIL IS (INP5 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP5 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND 3PS (AND SING (NOT OBJ )))
        ((UNDEF 3PS SING ))
        RESULTING DOMAIN:
        ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED IS (INP5 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL
)(PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A
(INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND 3PS (AND (NOT OBJ )SING ))
        ((UNDEF 3PS SING ))
        RESULTING DOMAIN:
        ((UNDEF 3PS SING ))
```

```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2
NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF 3PS SING ))
       RESULTING DOMAIN:
       ((UNDEF 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRC )
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2
NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))


WORD NR :  4   GIVEN
.I. INITIAL PARTICLES :
(NIL GIVEN (INP6 PRED,ADJ NIL NIL NIL QUAL ))
(NIL GIVEN (INP7 NONFIN,VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP8 NONFIN,VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP9 NONFIN,VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP9 NONFIN,VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((PRES PASS )(PRES CONTIN ))
       RESULTING DOMAIN:
       ((PRES PASS ))
       NEW FEATURE COMPLEX:
       ((PASS" PRES PASS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((THING ))
       ((ACT ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
```

```
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (NOT PASS" )PASS )
        ((PRES PASS )(PRES CONTIN ))
        RESULTING DOMAIN:
        ((PRES PASS ))
        NEW FEATURE COMPLEX:
        ((PASS" PRES PASS ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        THING
        ((THING ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL
)(IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(PRESENT (INP2
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL )NIL ))
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP6 PRED.ADJ NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   JOHN
.I. INITIAL PARTICLES :
((N1 )JOHN (INP10 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )JOHN (INP10 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))
NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP6 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((MALE 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
```

```
 2. FOR HYPOTHESIS : INP7
   2. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(PRESENT (INP2
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL )NIL ))
     <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((MALE 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
 3. FOR HYPOTHESIS : INP8
   3. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((MALE 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((MALE 3PS SING ))(FIN G2 )WHAT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       NO SEM FEATURES MATCH
       + SEMANTIC FEATURES MATCH UNSUCCESSFUL
 4. FOR HYPOTHESIS : INP9
   4. 1. CONFIGURATION :
   (NIL GIVEN (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((MALE 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((MALE 3PS SING ))(G2 FIN )WHAT )(((MALE 3PS SING ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       NO SEM FEATURES MATCH
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP9 NONFIN.VERB NIL (G3 )NIL QUAL )(JOHN (INP10
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))ADDRESSEE )))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP9 NONFIN.VERB NIL (G3 )NIL QUAL )(JOHN (INP10
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))ADDRESSEE )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
```

```
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL


WORD NR :  6   BY
.I. INITIAL PARTICLES :
(NIL BY (INP11 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BY (INP11 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP9 NONFIN,VERB NIL (G3 )NIL QUAL )(JOHN (INP10
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))ADDRESSEE )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  7   HER
.I. INITIAL PARTICLES :
(NIL HER (INP12 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP12 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP11
   1. 1. CONFIGURATION :
   (NIL BY (INP11 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP BY SING OBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HER (INP12 PRON,OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((
PERSON ))NIL )(BY (INP11 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(8)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP12 PRON.OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((
PERSON ))NIL )(BY (INP11 CASES1 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP9 NONFIN.VERB NIL (G3 )NIL QUAL )(JOHN (INP10
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))ADDRESSEE )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 1. 2. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP BY SING OBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 9: Semantic features

Problem:

The object filling a slot should satisfy certain semantic conditions.

Solution:

Computation of semantic features from case frames and performance of match tests.

Experimental setting:

We will give the following input to the parsing system:

(1' John gives a present to a present

(2) John is given to a present
(Not accepted because (i) semantic features of subject do not match for that viewpoint of given (cf. experiment 5) and (ii) semantic features of case slot do not match for addressee.)

Experimental results:

```
IN:
(JOHN GIVES A PRESENT TO A PRESENT )

WORD NR :  1   JOHN
•I• INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   GIVES
•I• INITIAL PARTICLES :
(NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL GIVES (INP2 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  1
 1, FOR HYPOTHESIS : INP1
   1, 1, CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (NOT OBJ )(AND 3PS SING ))
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((PERSON ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   A
.I. INITIAL PARTICLES :
(NIL A (INP3 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP3 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : GIVES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP4 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL A (INP3 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 FIN N6 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        SING
        ((3PS SING ))
        RESULTING DOMAIN:
        ((3PS SING ))
        NEW FEATURE COMPLEX:
        ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 FIN N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))
((THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : A
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )PRESENT (INP4 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP3 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED GIVES (INP2 VERB NIL NIL NIL QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
      <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : GIVES
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         CONSULT CASE FRAMES WITH SYNT FEATURES :
         ((UNDEF 3PS SING ))
         SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
         RESULTING TRIPLES (FEATURES * STATE * CASE)
         ((((UNDEF 3PS SING ))(G2 FIN )WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
         MATCH THE FOLLOWING SEMANTIC FEATURES
         ((THING ))
         WITH FEATURES OF RESP. CASES
         WHAT
         THING
         SEM FEATURES MATCH SUCCESSFUL
         ADDRESSEE
         PERSON
         NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
         (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM
NIL NIL NIL NIL )NIL )))


WORD NR :  5   TO
.I. INITIAL PARTICLES :
(NIL TO (INP5 CASES1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL TO (INP5 CASES1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
    1. 1. CONFIGURATION :
    (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL )))
     => FROM LEFT TO RIGHT
         + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : PRESENT
         + WRONG HEAD OR NO TRANSITION IN SYNT NET
          1. 1. 2. FOR WORD : GIVES
         + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   A
.I. INITIAL PARTICLES :
(NIL A (INP6 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL A (INP6 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
    1. 1. CONFIGURATION :
    (NIL TO (INP5 CASES1 NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
         + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : TO
         + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  7   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP7 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP7 NOM,OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL A (INP6 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )PRESENT (INP7 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))
((THING ))NIL )(A (INP6 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )PRESENT (INP7 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP6 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL TO (INP5 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N4 FIN N6 )
       TO THE NEW STATE(S) :  (N5 FIN )
       NEW FEATURE COMPLEX:
       ((PREP TO UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 FIN )PRESENT (INP7 NOM,OBJ NIL NIL ((PREP TO UNDEF 3PS
SING ))((THING ))NIL )(A (INP6 DETERM NIL NIL NIL NIL )NIL )(TO (INP5
CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    ((N5 FIN )PRESENT (INP7 NOM,OBJ NIL NIL ((PREP TO UNDEF 3PS SING
))((THING ))NIL )(A (INP6 DETERM NIL NIL NIL NIL )NIL )(TO (INP5
CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVES (INP2 VERB NIL (G2 FIN )NIL QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )(PRESENT (INP4 NOM,OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP3 DETERM NIL NIL
NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
      <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : PRESENT
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         +MISSING CASE OR FUNCTION IN SEM NETWORK
          1. 1. 2. FOR WORD : GIVES
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         CONSULT CASE FRAMES WITH SYNT FEATURES :
         ((PREP TO UNDEF 3PS SING ))
         SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
         RESULTING TRIPLES (FEATURES * STATE * CASE)
         ((((PREP TO UNDEF 3PS SING ))FIN ADDRESSEE ))
         MATCH THE FOLLOWING SEMANTIC FEATURES
         ((THING ))
         WITH FEATURES OF RESP. CASES
         ADDRESSEE
         PERSON
         NO SEM FEATURES MATCH
         + SEMANTIC FEATURES MATCH UNSUCCESSFUL

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT


IN:
(JOHN IS GIVEN TO A PRESENT )

WORD NR :  1   JOHN
•I• INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))

WORD NR :  2   IS
•I• INITIAL PARTICLES :
(NIL IS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL IS (INP3 COPULA NIL NIL ((PRES ))NIL ))
(NIL IS (INP4 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
•II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP4 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
• BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND SING (NOT OBJ )))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP4 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL
)(JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP3 COPULA NIL NIL ((PRES ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL' ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRC )
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   GIVEN
.I. INITIAL PARTICLES :
(NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
(NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((PRES PASS )(PRES CONTIN ))
       RESULTING DOMAIN:
       ((PRES PASS ))
       NEW FEATURE COMPLEX:
       ((PASS" PRES PASS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL
)(IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
```

```
(C)
**** TRY TO EXPAND CONFIGURATION :
     (NIL GIVEN (INP6 NONFIN,VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
  1. FOR HYPOTHESIS : INP2
     1. 1. CONFIGURATION :
     (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
      <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  2. FOR HYPOTHESIS : INP3
     2. 1. CONFIGURATION :
     (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
      <= FROM RIGHT TO LEFT
          2. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  3. FOR HYPOTHESIS : INP4
     3. 1. CONFIGURATION :
     (PRED IS (INP4 AFF,AUX FIN NIL NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
      <= FROM RIGHT TO LEFT
          3. 1. 1. FOR WORD : IS
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND (NOT PASS" )PASS )
        ((PRES PASS )(PRES CONTIN ))
        RESULTING DOMAIN:
        ((PRES PASS ))
        NEW FEATURE COMPLEX:
        ((PASS" PRES PASS ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        THING
        ((PERSON ))
        ((PROPERTY ))
        + SEMANTIC FEATURES MATCH UNSUCCESFUL
(D)
**** TRY TO EXPAND CONFIGURATION :
     (NIL GIVEN (INP5 PRED,ADJ NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
  1. FOR HYPOTHESIS : INP2
     1. 1. CONFIGURATION :
     (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM,OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
      <= FROM RIGHT TO LEFT
          1. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  2. FOR HYPOTHESIS : INP3
     2. 1. CONFIGURATION :
     (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
      <= FROM RIGHT TO LEFT
          2. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  3. FOR HYPOTHESIS : INP4
     3. 1. CONFIGURATION :
     (PRED IS (INP4 AFF,AUX FIN NIL NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
      <= FROM RIGHT TO LEFT
          3. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  4   TO
.I. INITIAL PARTICLES :
(NIL TO (INP9 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TO (INP9 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP7
   3. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 4. FOR HYPOTHESIS : INP8
   4. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   A
.I. INITIAL PARTICLES :
(NIL A (INP10 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP10 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL TO (INP9 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  6   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP11 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
   ((N1 )PRESENT (INP11 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL A (INP10 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )PRESENT (INP11 NOM.OBJ NIL NIL ((UNDEF 3PS SING )
)((THING ))NIL )(A (INP10 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )PRESENT (INP11 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP10 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL TO (INP9 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N4 FIN N6 )
       TO THE NEW STATE(S) :  (N5 FIN )
       NEW FEATURE COMPLEX:
       ((PREP TO UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 FIN )PRESENT (INP11 NOM.OBJ NIL NIL ((PREP TO UNDEF 3PS
SING ))((THING ))NIL )(A (INP10 DETERM NIL NIL NIL NIL )NIL )(TO (
INP9 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    ((N5 FIN )PRESENT (INP11 NOM.OBJ NIL NIL ((PREP TO UNDEF 3PS SING
))((THING ))NIL )(A (INP10 DETERM NIL NIL NIL NIL )NIL )(TO (INP9
CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
```

```
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      CONSULT CASE FRAMES WITH SYNT FEATURES :
      ((PREP TO UNDEF 3PS SING ))
      SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
      RESULTING TRIPLES (FEATURES * STATE * CASE)
      ((((PREP TO UNDEF 3PS SING ))(G2 FIN )ADDRESSEE ))
      MATCH THE FOLLOWING SEMANTIC FEATURES
      ((THING ))
      WITH FEATURES OF RESP. CASES
      ADDRESSEE
      PERSON
      NO SEM FEATURES MATCH
      + SEMANTIC FEATURES MATCH UNSUCCESSFUL
2. FOR HYPOTHESIS : INP6
  2. 1. CONFIGURATION :
  (NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
   => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
   <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : GIVEN
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      CONSULT CASE FRAMES WITH SYNT FEATURES :
      ((PREP TO UNDEF 3PS SING ))
      SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
      RESULTING TRIPLES (FEATURES * STATE * CASE)
      ((((PREP TO UNDEF 3PS SING ))(G2 FIN )ADDRESSEE ))
      MATCH THE FOLLOWING SEMANTIC FEATURES
      ((THING ))
      WITH FEATURES OF RESP. CASES
      ADDRESSEE
      PERSON
      NO SEM FEATURES MATCH
      + SEMANTIC FEATURES MATCH UNSUCCESSFUL
3. FOR HYPOTHESIS : INP7
  3. 1. CONFIGURATION :
  (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
   <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : GIVEN
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      CONSULT CASE FRAMES WITH SYNT FEATURES :
      ((PREP TO UNDEF 3PS SING ))
      +NO TRANSITION IN SEM NETWORK
4. FOR HYPOTHESIS : INP8
  4. 1. CONFIGURATION :
  (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
   => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
   <= FROM RIGHT TO LEFT
       4. 1. 1. FOR WORD : GIVEN
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      CONSULT CASE FRAMES WITH SYNT FEATURES :
      ((PREP TO UNDEF 3PS SING ))
      +NO TRANSITION IN SEM NETWORK

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 10 Changing the viewpoint

Problem:

The same abstract case frame leads to different surface case frames depending on function and viewpoint.

Solution:

assignment of different surface case frames

Experimental setting:

We will use the same word (given) but with different viewpoints and the parser should find out what viewpoint holds in a certain environment.

(1) John is given a present by her
(viewpoint of given is addressee)

(2) A present is given to John
(viewpoint of given is what)

(3) John has given a present to her.
(viewpoint of given is agent)

Experimental results:

```
IN:
(JOHN IS GIVEN A PRESENT BY HER )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   IS
.I. INITIAL PARTICLES :
(NIL IS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL IS (INP3 COPULA NIL NIL ((PRES ))NIL ))
(NIL IS (INP4 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP4 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND SING (NOT OBJ )))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP4 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL
)(JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP3 COPULA NIL NIL ((PRES ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
```

```
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRC )
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   GIVEN
.I. INITIAL PARTICLES :
(NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
(NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
```

```
       2. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : IS
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      (AND PASS (NOT PASS" ))
      ((PRES PASS )(PRES CONTIN ))
      RESULTING DOMAIN:
      ((PRES PASS ))
      NEW FEATURE COMPLEX:
      ((PASS" PRES PASS ))
      INVESTIGATE THE FOLLOWING SEM.FEATURES:
      PERSON
      ((PERSON ))
      SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
      ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL
)(IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       3. 1. 1. FOR WORD : IS
      SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
      MATCH THE FOLLOWING FEATURE COMPLEXES:
      (AND (NOT PASS" )PASS )
      ((PRES PASS )(PRES CONTIN ))
      RESULTING DOMAIN:
      ((PRES PASS ))
      NEW FEATURE COMPLEX:
      ((PASS" PRES PASS ))
      INVESTIGATE THE FOLLOWING SEM.FEATURES:
      THING
      ((PERSON ))
      ((PROPERTY ))
      + SEMANTIC FEATURES MATCH UNSUCCESFUL
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
```

```
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   A
.I. INITIAL PARTICLES :
(NIL A (INP9 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP9 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP7
   3. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 4. FOR HYPOTHESIS : INP8
   4. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP10 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP10 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL A (INP9 DETERM NIL NIL NIL NIL ))
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    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )PRESENT (INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING )
)((THING ))NIL )(A (INP9 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )PRESENT (INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP9 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP5 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
 3. FOR HYPOTHESIS : INP7
   3. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((UNDEF 3PS SING ))(FIN G2 )WHAT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP7 NONFIN.VERB NIL (FIN G2 )((PASS" PRES PASS ))
QUAL )(IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
 4. FOR HYPOTHESIS : INP8
   4. 1. CONFIGURATION :
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   (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((UNDEF 3PS SING ))(G2 FIN )WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((THING ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       SEM FEATURES MATCH SUCCESSFUL
       ADDRESSEE
       PERSON
       NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP8 NONFIN.VERB NIL (G2 FIN )NIL QUAL )(PRESENT (
INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP8 NONFIN.VERB NIL (G2 FIN )NIL QUAL )(PRESENT (
INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED IS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED IS (INP3 COPULA NIL NIL ((PRES ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP4
   3. 1. CONFIGURATION :
   (PRED IS (INP4 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL


WORD NR :  6   BY
.I. INITIAL PARTICLES :
(NIL BY (INP11 CASES1 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BY (INP11 CASES1 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL (G2 FIN )NIL QUAL )(PRESENT (
INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
```

```
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
   1. 2. CONFIGURATION :
   (NIL GIVEN (INP7 NONFIN.VERB NIL (FIN G2 )((PASS" PRES PASS ))QUAL
)(IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 2. 2. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  7   HER
.I. INITIAL PARTICLES :
(NIL HER (INP12 PRON.OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP12 PRON.OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP11
   1. 1. CONFIGURATION :
   (NIL BY (INP11 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP BY SING OBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HER (INP12 PRON.OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((
PERSON ))NIL )(BY (INP11 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP12 PRON.OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((
PERSON ))NIL )(BY (INP11 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL (G2 FIN )NIL QUAL )(PRESENT (
INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 1. 2. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP BY SING OBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK
   1. 2. CONFIGURATION :
   (NIL GIVEN (INP7 NONFIN.VERB NIL (FIN G2 )((PASS" PRES PASS ))QUAL
)(IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL )))
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```
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 2. 2. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP BY SING OBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((PREP BY SING OBJ 3PS ))FIN AGENT ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       AGENT
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP7 NONFIN.VERB NIL FIN ((PASS" PRES PASS ))QUAL
)(IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9
DETERM NIL NIL NIL NIL )NIL ))(HER (INP12 PRON.OBJ NIL NIL ((PREP BY
SING OBJ 3PS ))((PERSON ))AGENT )(BY (INP11 CASESI NIL NIL NIL NIL )
NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN.VERB (GIVEN (AFF.AUX (IS (NOM.OBJ JOHN )))(NOM.OBJ (PRESENT (
DETERM A )))(PRON.OBJ (HER (CASESI BY )))))
(CASESTRUCTURE (GIVEN (ADDRESSEE JOHN )(WHAT PRESENT )(AGENT HER )))

 IN:
 (A PRESENT IS GIVEN TO JOHN )


 WORD NR :  1   A
 .I. INITIAL PARTICLES :
 (NIL A (INP1 DETERM NIL NIL NIL NIL ))


 WORD NR :  2   PRESENT
 .I. INITIAL PARTICLES :
 ((N1 )PRESENT (INP2 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
 .II. MERGING
 (A)
 **** TRY TO EXPAND CONFIGURATION :
     ((N1 )PRESENT (INP2 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
 * BY COMBINING IT WITH CONFIG OF WORD NR.  1
  1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL A (INP1 DETERM NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL TRANSITION FROM (N1 )
        TO THE NEW STATE(S) :  (N4 FIN N6 )
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        SING
        ((3PS SING ))
        RESULTING DOMAIN:
        ((3PS SING ))
        NEW FEATURE COMPLEX:
        ((UNDEF 3PS SING ))
 >>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        ((N4 FIN N6 )PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))
 ((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : A
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
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```
WORD NR : 3   IS
.I. INITIAL PARTICLES :
(NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
(NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
(NIL IS (INP5 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP5 AFF,AUX NIL NIL ((PRES PASS )(PRES CONTIN ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1, FOR HYPOTHESIS : INP2
   1, 1, CONFIGURATION :
   ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1, 1, 1, FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND SING (NOT OBJ )))
       ((UNDEF 3PS SING ))
       RESULTING DOMAIN:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP5 AFF,AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL
)(PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A
(INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP4 COPULA NIL NIL ((PRES ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1, FOR HYPOTHESIS : INP2
   1, 1, CONFIGURATION :
   ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1, 1, 1, FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF 3PS SING ))
       RESULTING DOMAIN:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2
NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IS (INP3 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1, FOR HYPOTHESIS : INP2
   1, 1, CONFIGURATION :
   ((N4 FIN N6 )PRESENT (INP2 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
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```
        1. 1. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND 3PS (AND (NOT OBJ )SING ))
       ((UNDEF 3PS SING ))
       RESULTING DOMAIN:
       ((UNDEF 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT RESTRC )
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL ))


WORD NR :  4   GIVEN
.I. INITIAL PARTICLES :
(NIL GIVEN (INP6 PRED.ADJ NIL NIL NIL QUAL ))
(NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PASS )(PRES CONTIN ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
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```
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((PRES PASS )(PRES CONTIN ))
       RESULTING DOMAIN:
       ((PRES PASS ))
       NEW FEATURE COMPLEX:
       ((PASS" PRES PASS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((THING ))
       ((ACT ))
       + SEMANTIC FEATURES MATCH UNSUCCESFUL
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PASS" )PASS )
       ((PRES PASS )(PRES CONTIN ))
       RESULTING DOMAIN:
       ((PRES PASS ))
       NEW FEATURE COMPLEX:
       ((PASS" PRES PASS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       THING
       ((THING ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((THING ))
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>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL
)(IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(PRESENT (INP2
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL )NIL ))
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP6 PRED.ADJ NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP5
   3. 1. CONFIGURATION :
   (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : IS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   TO
.I. INITIAL PARTICLES :
(NIL TO (INP10 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TO (INP10 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP6 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP7
   2. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(PRESENT (INP2
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : GIVEN
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP8
   3. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
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 4. FOR HYPOTHESIS : INP9
   4. 1. CONFIGURATION :
   (NIL GIVEN (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   JOHN
.I. INITIAL PARTICLES :
((N1 )JOHN (INP11 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )JOHN (INP11 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))
NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL TO (INP10 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N5 FIN )
       NEW FEATURE COMPLEX:
       ((PREP TO MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N5 FIN )JOHN (INP11 NOM.OBJ NIL NIL ((PREP TO MALE 3PS SING
))((PERSON ))NIL )(TO (INP10 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N5 FIN )JOHN (INP11 NOM.OBJ NIL NIL ((PREP TO MALE 3PS SING ))(
(PERSON ))NIL )(TO (INP10 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP6 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO MALE 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((PREP TO MALE 3PS SING ))(G2 FIN )ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP6 PRED.ADJ NIL (G2 FIN )NIL QUAL )(JOHN (INP11
NOM.OBJ NIL NIL ((PREP TO MALE 3PS SING ))((PERSON ))ADDRESSEE )(TO (
INP10 CASESI NIL NIL NIL NIL )NIL )))
 2. FOR HYPOTHESIS : INP7
   2. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PASS" PRES PASS ))QUAL )(
IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(PRESENT (INP2
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL
NIL NIL NIL )NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
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        2. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO MALE 3PS SING ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((PREP TO MALE 3PS SING ))(G2 FIN )ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP7 NONFIN.VERB NIL (G2 FIN )((PASS" PRES PASS ))
QUAL )(IS (INP5 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(PRESENT (
INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1
DETERM NIL NIL NIL NIL )NIL )NIL )NIL )(JOHN (INP11 NOM.OBJ NIL NIL (
(PREP TO MALE 3PS SING ))((PERSON ))ADDRESSEE )(TO (INP10 CASES1 NIL
NIL NIL NIL )NIL )))
 3. FOR HYPOTHESIS : INP8
   3. 1. CONFIGURATION :
   (NIL GIVEN (INP8 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO MALE 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
 4. FOR HYPOTHESIS : INP9
   4. 1. CONFIGURATION :
   (NIL GIVEN (INP9 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO MALE 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP6 PRED.ADJ NIL (G2 FIN )NIL QUAL )(JOHN (INP11
NOM.OBJ NIL NIL ((PREP TO MALE 3PS SING ))((PERSON ))ADDRESSEE )(TO (
INP10 CASES1 NIL NIL NIL NIL )NIL )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (PRED IS (INP3 VERB NIL NIL ((PRES ))QUAL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PRED IS (INP4 COPULA NIL NIL ((PRES ))NIL )(PRESENT (INP2 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL ))
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     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
  3. FOR HYPOTHESIS : INP5
    3. 1. CONFIGURATION :
    (PRED IS (INP5 AFF.AUX FIN NIL ((PRES PASS )(PRES CONTIN ))NIL )(
 PRESENT (INP2 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))NIL )(A (
 INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
     <= FROM RIGHT TO LEFT
         3. 1. 1. FOR WORD : IS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET

 FUNCTIONAL AND CASE STRUCTURES :
 (NONFIN.VERB (GIVEN (AFF.AUX (IS (NOM.OBJ (PRESENT (DETERM A ))))))(
 NOM.OBJ (JOHN (CASES TO ))))
 (CASESTRUCTURE (GIVEN (WHAT PRESENT )(ADDRESSEE JOHN )))


IN:
(JOHN HAS GIVEN A PRESENT TO HER )


WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   HAS
.I. INITIAL PARTICLES :
(NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (NOT OBJ ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
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```
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (NOT OBJ ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


WORD NR :  3   GIVEN
.I. INITIAL PARTICLES :
(NIL GIVEN (INP4 PRED.ADJ NIL NIL NIL QUAL ))
(NIL GIVEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP7 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PERF" )PERF )
       ((PRES PERF ))
       RESULTING DOMAIN:
       ((PRES PERF ))
       NEW FEATURE COMPLEX:
       ((PERF" PRES PERF ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PERF" PRES PERF ))QUAL
)(HAS (INP3 AFF.AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
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 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED HAS (INP3 AFF.AUX FIN NIL NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((PRES PERF ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED HAS (INP3 AFF.AUX FIN NIL NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT PASS" )PASS )
       ((PRES PERF ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVEN (INP4 PRED.ADJ NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   A
.I. INITIAL PARTICLES :
(NIL A (INP8 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL A (INP8 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP4 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL GIVEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
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    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP6
   3. 1. CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 4. FOR HYPOTHESIS : INP7
   4. 1. CONFIGURATION :
   (PRED GIVEN (INP7 NONFIN.VERB NIL NIL ((PERF" PRES PERF ))QUAL )(
HAS (INP3 AFF.AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        4. 1. 1. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   PRESENT
.I. INITIAL PARTICLES :
((N1 )PRESENT (INP9 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )PRESENT (INP9 NOM.OBJ NIL NIL ((3PS SING ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL A (INP8 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING ))
       RESULTING DOMAIN:
       ((3PS SING ))
       NEW FEATURE COMPLEX:
       ((UNDEF 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN N6 )PRESENT (INP9 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))
((THING ))NIL )(A (INP8 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : A
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 FIN N6 )PRESENT (INP9 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((
THING ))NIL )(A (INP8 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP4 PRED.ADJ NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((UNDEF 3PS SING ))
       +NO TRANSITION IN SEM NETWORK
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL GIVEN (INP5 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
```

```
      2. 1. 1. FOR WORD : GIVEN
     SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
     CONSULT CASE FRAMES WITH SYNT FEATURES :
     ((UNDEF 3PS SING ))
     +NO TRANSITION IN SEM NETWORK
3. FOR HYPOTHESIS : INP6
  3. 1. CONFIGURATION :
  (NIL GIVEN (INP6 NONFIN,VERB NIL NIL NIL QUAL ))
   => FROM LEFT TO RIGHT
     + WRONG HEAD OR NO TRANSITION IN SYNT NET
   <= FROM RIGHT TO LEFT
      3. 1. 1. FOR WORD : GIVEN
     SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
     CONSULT CASE FRAMES WITH SYNT FEATURES :
     ((UNDEF 3PS SING ))
     SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
     RESULTING TRIPLES (FEATURES * STATE * CASE)
     ((((UNDEF 3PS SING ))(FIN G2 )WHAT ))
     MATCH THE FOLLOWING SEMANTIC FEATURES
     ((THING ))
     WITH FEATURES OF RESP. CASES
     WHAT
     THING
     SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
     (NIL GIVEN (INP6 NONFIN,VERB NIL (FIN G2 )NIL QUAL )(PRESENT (
INP9 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8
DETERM NIL NIL NIL NIL )NIL )))
 4. FOR HYPOTHESIS : INP7
  4. 1. CONFIGURATION :
  (PRED GIVEN (INP7 NONFIN,VERB NIL NIL ((PERF" PRES PERF ))QUAL )(
HAS (INP3 AFF,AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL ))
   <= FROM RIGHT TO LEFT
      4. 1. 1. FOR WORD : GIVEN
     SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
     CONSULT CASE FRAMES WITH SYNT FEATURES :
     ((UNDEF 3PS SING ))
     SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
     RESULTING TRIPLES (FEATURES * STATE * CASE)
     ((((UNDEF 3PS SING ))(G2 FIN )WHAT )(((UNDEF 3PS SING ))(G3 )
ADDRESSEE ))
     MATCH THE FOLLOWING SEMANTIC FEATURES
     ((THING ))
     WITH FEATURES OF RESP. CASES
     WHAT
     THING
     SEM FEATURES MATCH SUCCESSFUL
     ADDRESSEE
     PERSON
     NO SEM FEATURES MATCH
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
     (NIL GIVEN (INP7 NONFIN,VERB NIL (G2 FIN )((PERF" PRES PERF ))
QUAL )(HAS (INP3 AFF,AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM,OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP9 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8
DETERM NIL NIL NIL NIL )NIL )))
(C)
**** TRY TO EXPAND CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN,VERB NIL (FIN G2 )NIL QUAL )(PRESENT (
INP9 NOM,OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8
DETERM NIL NIL NIL NIL )NIL )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
  1. 1. CONFIGURATION :
  (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM,OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
   <= FROM RIGHT TO LEFT
      1. 1. 1. FOR WORD : HAS
     + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PASS (NOT PASS" ))
       ((PRES PERF ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL


WORD NR :  6   TO
.I. INITIAL PARTICLES :
(NIL TO (INP10 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL TO (INP10 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP7 NONFIN.VERB NIL (G2 FIN )((PERF" PRES PERF ))QUAL
)(HAS (INP3 AFF.AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP9 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8
DETERM NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
   1. 2. CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN.VERB NIL (FIN G2 )NIL QUAL )(PRESENT (INP9
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8 DETERM
NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : PRESENT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 2. 2. FOR WORD : GIVEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  7   HER
.I. INITIAL PARTICLES :
(NIL HER (INP11 PRON.OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP11 PRON.OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL TO (INP10 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       NEW FEATURE COMPLEX:
       ((PREP TO SING OBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL HER (INP11 PRON.OBJ NIL NIL ((PREP TO SING OBJ 3PS ))((
PERSON ))NIL )(TO (INP10 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TO
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(8)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP11 PRON.OBJ NIL NIL ((PREP TO SING OBJ 3PS ))((
PERSON ))NIL )(TO (INP10 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL GIVEN (INP7 NONFIN.VERB NIL (G2 FIN )((PERF" PRES PERF ))QUAL
)(HAS (INP3 AFF.AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP9 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8
DETERM NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 1. 2. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO SING OBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((PREP TO SING OBJ 3PS ))FIN ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVEN (INP7 NONFIN.VERB NIL FIN ((PERF" PRES PERF ))QUAL
)(HAS (INP3 AFF.AUX FIN NIL ((PERF" PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT
(INP9 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8
DETERM NIL NIL NIL NIL )NIL ))(HER (INP11 PRON.OBJ NIL NIL ((PREP TO
SING OBJ 3PS ))((PERSON ))ADDRESSEE )(TO (INP10 CASESI NIL NIL NIL
NIL )NIL )))
   1. 2. CONFIGURATION :
   (NIL GIVEN (INP6 NONFIN.VERB NIL (FIN G2 )NIL QUAL )(PRESENT (INP9
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP8 DETERM
NIL NIL NIL NIL )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : PRESENT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 2. 2. FOR WORD : GIVEN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((PREP TO SING OBJ 3PS ))
       +NO TRANSITION IN SEM NETWORK

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN.VERB (GIVEN (AFF.AUX (HAS (NOM.OBJ JOHN )))(NOM.OBJ (PRESENT
(DETERM A )))(PRON.OBJ (HER (CASESI TO )))))
(CASESTRUCTURE (GIVEN (AGENT JOHN )(WHAT PRESENT )(ADDRESSEE HER )))
```

EXPERIMENT 11: Relationwords

Problem:

It is possible to connect objects to a head by other means than casefillers.

Solution:

The introduction of the function relationword which behaves like an adjunct

experimental setting:

We given the following se ence:
John has been living in Paris
(Notice how 'in' first links with 'living' and after that 'Paris' with 'in')

results:

```
IN:
(JOHN HAS BEEN LIVING IN PARIS )

WORD NR :  1   JOHN
.I. INITIAL PARTICLES :
(NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))


WORD NR :  2   HAS
.I. INITIAL PARTICLES :
(NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : JOHN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (NOT OBJ ))
       ((MALE 3PS SING ))
       RESULTING DOMAIN:
       ((MALE 3PS SING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
 (B)
 **** TRY TO EXPAND CONFIGURATION :
     (NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
 * BY COMBINING IT WITH CONFIG OF WORD NR.  1
  1. FOR HYPOTHESIS : INP1
    1. 1. CONFIGURATION :
    (NIL JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL ))
     => FROM LEFT TO RIGHT
        * WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JOHN
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND SING (NOT OBJ ))
        ((MALE 3PS SING ))
        RESULTING DOMAIN:
        ((MALE 3PS SING ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        PERSON
        ((PERSON ))
        SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
        ((PERSON ))
 >>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1
 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))


 WORD NR :  3   BEEN
 .I. INITIAL PARTICLES :
 (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
 (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
 .II. MERGING
 (A)
 **** TRY TO EXPAND CONFIGURATION :
     (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
 * BY COMBINING IT WITH CONFIG OF WORD NR.  2
  1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
 NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : HAS
        * WRONG HEAD OR NO TRANSITION IN SYNT NET
  2. FOR HYPOTHESIS : INP3
    2. 1. CONFIGURATION :
    (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : HAS
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND PERF (NOT PERF" ))
        ((PRES PERF ))
        RESULTING DOMAIN:
        ((PRES PERF ))
        NEW FEATURE COMPLEX:
        ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
 >>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL HAS (INP3 AFF.AUX FIN NIL ((PERF" CONTIN PRES PERF )(
 PERF" PASS PRES PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS
 SING ))((PERSON ))NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL )))
 (B)
 **** TRY TO EXPAND CONFIGURATION :
     (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
 * BY COMBINING IT WITH CONFIG OF WORD NR.  2
  1. FOR HYPOTHESIS : INP2
    1. 1. CONFIGURATION :
    (PRED HAS (INP2 VERB NIL NIL ((PRES ))QUAL )(JOHN (INP1 NOM.OBJ
 NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : HAS
        * WRONG HEAD OR NO TRANSITION IN SYNT NET
  2. FOR HYPOTHESIS : INP3
    2. 1. CONFIGURATION :
    (PRED HAS (INP3 AFF.AUX FIN NIL ((PRES PERF ))NIL )(JOHN (INP1
 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL ))
```

```
      <= FROM RIGHT TO LEFT
          2. 1. 1. FOR WORD : HAS
         SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
         MATCH THE FOLLOWING FEATURE COMPLEXES:
         (AND PERF (NOT PERF" ))
         ((PRES PERF ))
         RESULTING DOMAIN:
         ((PRES PERF ))
         NEW FEATURE COMPLEX:
         ((PERF" PRES PERF ))
MISSING CASE IN FRAME
        + SEMANTIC FEATURES MATCH UNSUCCESFUL


WORD NR :  4   LIVING
.I. INITIAL PARTICLES :
(NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL HAS (INP3 AFF.AUX FIN NIL ((PERF" CONTIN PRES PERF )(PERF"
PASS PRES PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))(
(PERSON ))NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        2. 1. 2. FOR WORD : HAS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
       RESULTING DOMAIN:
       ((PERF" CONTIN PRES PERF ))
       NEW FEATURE COMPLEX:
       ((CONTIN" PERF" CONTIN PRES PERF ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED LIVING (INP6 NONFIN.VERB NIL NIL ((CONTIN" PERF" CONTIN
PRES PERF ))QUAL )(HAS (INP3 AFF.AUX FIN NIL ((CONTIN" PERF" CONTIN
PRES PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((
PERSON ))NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))NIL ))


WORD NR :  5   IN
.I. INITIAL PARTICLES :
(NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  4
```

```
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (PRED LIVING (INP6 NONFIN.VERB NIL NIL ((CONTIN" PERF" CONTIN PRES
PERF ))QUAL )(HAS (INP3 AFF.AUX FIN NIL ((CONTIN" PERF" CONTIN PRES
PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))
NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
       1. 1. 2. FOR WORD : LIVING
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (XOR ACT THING )
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((ACT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL LIVING (INP6 NONFIN.VERB NIL NIL ((CONTIN" PERF" CONTIN
PRES PERF ))QUAL )(HAS (INP3 AFF.AUX FIN NIL ((CONTIN" PERF" CONTIN
PRES PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((
PERSON ))NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))NIL )(IN
(INP7 RELWORD NIL NIL NIL MOD )))

WORD NR :  6   PARIS
.I. INITIAL PARTICLES :
((N1 FIN )PARIS (INP8 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
PLACE ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
   ((N1 FIN )PARIS (INP8 NOM.OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS
))((PLACE ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL LIVING (INP6 NONFIN.VERB NIL NIL ((CONTIN" PERF" CONTIN PRES
PERF ))QUAL )(HAS (INP3 AFF.AUX FIN NIL ((CONTIN" PERF" CONTIN PRES
PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((PERSON ))
NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))NIL )(IN (INP7
RELWORD NIL NIL NIL MOD )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
       1. 1. 2. FOR WORD : IN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ )(SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((SING OBJ ))FIN WHERE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PLACE ))
       WITH FEATURES OF RESP. CASES
       WHERE
       PLACE
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL LIVING (INP6 NONFIN.VERB NIL NIL ((CONTIN" PERF" CONTIN
PRES PERF ))QUAL )(HAS (INP3 AFF.AUX FIN NIL ((CONTIN" PERF" CONTIN
PRES PERF ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL ((MALE 3PS SING ))((
PERSON ))NIL )NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))NIL )(IN
(INP7 RELWORD NIL FIN NIL MOD )(PARIS (INP8 NOM.OBJ NIL NIL ((SING
OBJ ))((PLACE ))WHERE ))))
       1. 1. 3. FOR WORD : LIVING
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN.VERB (LIVING (AFF.AUX (HAS (NOM.OBJ JOHN )(NONFIN.AUX BEEN ))
)(RELWORD (IN (NOM.OBJ PARIS )))))
(CASESTRUCTURE (LIVING (AGENT JOHN ))(IN (LOCATE LIVING )(WHERE PARIS
)))
```

EXPERIMENT 12: Other languages

Problem:

The construction of a parser that is universal in the sense that it can work for different languages

Solution:

To keep the grammar completely out of the program, i.e. the grammar is consulted as an exterior source of knowledge.

Example:

We will give a sentence for German and one for Dutch:

German

'Der pensionierte General setze eine Kanone neben ein fremdes Fräulein'

(literally: The retired general placed a gun near a foreign girl)

English

"Het in Amsterdam wonend kind doet nogal vreemd de laatste tijd"

(literally: The in Amsterdam living child behaves rather strangely (since) the latest week)

```
WELCOME TO THE PARSING SYSTEM

SPECIFY THE LANGUAGE
INPUT LANGUAGE :G
GIVE INPUT SENTENCE

IN:
('DER PENSIONIERTE GENERAL SETZTE EINE KANONE NEBEN EIN FREMDES
FRAU"LEIN ')
```

```
WORD NR :  1   DER
.I. INITIAL PARTICLES :
(NIL DER (INP1 DETERM NIL NIL NIL NIL ))


WORD NR :  2   PENSIONIERTE
.I. INITIAL PARTICLES :
(NIL PENSIONIERTE (INP2 ATT,ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL PENSIONIERTE (INP2 ATT,ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL DER (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : DER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   GENERAL
.I. INITIAL PARTICLES :
((N1 )GENERAL (INP3 NOM,OBJ NIL NIL ((3PS SING MALE UNDEF DAT )(3PS
SING MALE UNDEF ACC )(3PS SING MALE UNDEF NOM )(3PS SING MALE DEF DAT
)(3PS SING MALE DEF ACC )(3PS SING MALE DEF NOM ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )GENERAL (INP3 NOM,OBJ NIL NIL ((3PS SING MALE UNDEF DAT )(
3PS SING MALE UNDEF ACC )(3PS SING MALE UNDEF NOM )(3PS SING MALE DEF
DAT )(3PS SING MALE DEF ACC )(3PS SING MALE DEF NOM ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL PENSIONIERTE (INP2 ATT,ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR (AND PLURAL (AND (XOR NOM ACC )(NOT DEF )))(AND SING (XOR
(AND FEM (XOR ACC NOM ))(AND DEF (XOR (AND NEUT ACC )(AND (AND DEF
NOM )(XOR MALE NEUT ))))))))
       ((3PS SING MALE UNDEF DAT )(3PS SING MALE UNDEF ACC )(3PS SING
MALE UNDEF NOM )(3PS SING MALE DEF DAT )(3PS SING MALE DEF ACC )(3PS
SING MALE DEF NOM ))
       RESULTING DOMAIN:
       ((3PS SING MALE DEF NOM ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       ENTITY
       ((PERSON ))
       ((ENT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N2 )GENERAL (INP3 NOM,OBJ NIL NIL ((3PS SING MALE DEF NOM ))
((PERSON ))NIL )(PENSIONIERTE (INP2 ATT,ADJ NIL NIL NIL QUAL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PENSIONIERTE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N2 )GENERAL (INP3 NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))((
PERSON ))NIL )(PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL DER (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N2 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (XOR (AND PLUR GEN )(AND SING (XOR (AND MALE NOM )(AND FEM (
XOR GEN DAT ))))))
       ((3PS SING MALE DEF NOM ))
       RESULTING DOMAIN:
       ((3PS SING MALE DEF NOM ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )GENERAL (INP3 NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))
((PERSON ))NIL )(PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )(
DER (INP1 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : DER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   SETZTE
.I. INITIAL PARTICLES :
(NIL SETZTE (INP4 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SETZTE (INP4 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N3 )GENERAL (INP3 NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))((
PERSON ))NIL )(PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )(DER
(INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GENERAL
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       SING
       ((3PS SING MALE DEF NOM ))
       RESULTING DOMAIN:
       ((3PS SING MALE DEF NOM ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED SETZTE (INP4 VERB NIL NIL NIL QUAL )(GENERAL (INP3
NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(
PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM
NIL NIL NIL NIL )NIL )NIL ))


WORD NR :  5   EINE
.I. INITIAL PARTICLES :
(NIL EINE (INP5 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL EINE (INP5 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
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```
   (PRED SETZTE (INP4 VERB NIL NIL NIL QUAL )(GENERAL (INP3 NOM.OBJ
NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(PENSIONIERTE (INP2
ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM NIL NIL NIL NIL )NIL
)NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SETZTE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   KANONE
.I. INITIAL PARTICLES :
((N1 )KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF DAT )(3PS
SING FEM UNDEF ACC )(3PS SING FEM UNDEF GEN )(3PS SING FEM UNDEF NOM
)(3PS SING FEM DEF DAT )(3PS SING FEM DEF ACC )(3PS SING FEM DEF GEN
)(3PS SING FEM DEF NOM ))((THING ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF DAT )(3PS
SING FEM UNDEF ACC )(3PS SING FEM UNDEF GEN )(3PS SING FEM UNDEF NOM
)(3PS SING FEM DEF DAT )(3PS SING FEM DEF ACC )(3PS SING FEM DEF GEN
)(3PS SING FEM DEF NOM ))((THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL EINE (INP5 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (XOR ACC NOM )(AND SING FEM ))
       ((3PS SING FEM UNDEF DAT )(3PS SING FEM UNDEF ACC )(3PS SING
FEM UNDEF GEN )(3PS SING FEM UNDEF NOM )(3PS SING FEM DEF DAT )(3PS
SING FEM DEF ACC )(3PS SING FEM DEF GEN )(3PS SING FEM DEF NOM ))
       RESULTING DOMAIN:
       ((3PS SING FEM UNDEF ACC )(3PS SING FEM UNDEF NOM )(3PS SING
FEM DEF ACC )(3PS SING FEM DEF NOM ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(
3PS SING FEM UNDEF NOM )(3PS SING FEM DEF ACC )(3PS SING FEM DEF NOM
))((THING ))NIL )(EINE (INP5 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : EINE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N3 )KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(3PS
SING FEM UNDEF NOM )(3PS SING FEM DEF ACC )(3PS SING FEM DEF NOM ))((
THING ))NIL )(EINE (INP5 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (PRED SETZTE (INP4 VERB NIL NIL NIL QUAL )(GENERAL (INP3 NOM.OBJ
NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(PENSIONIERTE (INP2
ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM NIL NIL NIL NIL )NIL
)NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SETZTE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS SING FEM UNDEF ACC )(3PS SING FEM UNDEF NOM )(3PS SING
FEM DEF ACC )(3PS SING FEM DEF NOM ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((3PS SING FEM UNDEF ACC )(3PS SING FEM DEF ACC ))(P2 )WHAT
))
```

```
      MATCH THE FOLLOWING SEMANTIC FEATURES
      ((THING ))
      WITH FEATURES OF RESP. CASES
      WHAT
      ENTITY
      SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (NIL SETZTE (INP4 VERB NIL (P2 )NIL QUAL )(GENERAL (INP3
NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(
PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM
NIL NIL NIL NIL )NIL )NIL )(KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING
FEM UNDEF ACC )(3PS SING FEM DEF ACC ))((THING ))WHAT )(EINE (INP5
DETERM NIL NIL NIL NIL )NIL )))


WORD NR :  7   NEBEN
.I. INITIAL PARTICLES :
(NIL NEBEN (INP7 CASESI NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL NEBEN (INP7 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL SETZTE (INP4 VERB NIL (P2 )NIL QUAL )(GENERAL (INP3 NOM.OBJ
NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(PENSIONIERTE (INP2
ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM NIL NIL NIL NIL )NIL
)NIL )(KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(3PS
SING FEM DEF ACC ))((THING ))WHAT )(EINE (INP5 DETERM NIL NIL NIL NIL
)NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KANONE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : SETZTE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  8   EIN
.I. INITIAL PARTICLES :
(NIL EIN (INP8 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL EIN (INP8 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  7
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL NEBEN (INP7 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : NEBEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  9   FREMDES
.I. INITIAL PARTICLES :
(NIL FREMDES (INP9 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL FREMDES (INP9 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  8
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL EIN (INP8 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : EIN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
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```
WORD NR : 10   FRAU"LEIN
.I. INITIAL PARTICLES :
((N1 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((3PS NEUT UNDEF PLURAL GEN )(
3PS NEUT UNDEF PLUR DAT )(3PS NEUT UNDEF PLUR ACC )(3PS NEUT UNDEF
PLUR NOM )(3PS NEUT UNDEF SING DAT )(3PS NEUT UNDEF SING ACC )(3PS
NEUT UNDEF SING NOM )(3PS NEUT DEF PLURAL GEN )(3PS NEUT DEF PLUR DAT
)(3PS NEUT DEF PLUR ACC )(3PS NEUT DEF PLUR NOM )(3PS NEUT DEF SING
DAT )(3PS NEUT DEF SING ACC )(3PS NEUT DEF SING NOM ))((PERSON ))NIL
))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((3PS NEUT UNDEF PLURAL
GEN )(3PS NEUT UNDEF PLUR DAT )(3PS NEUT UNDEF PLUR ACC )(3PS NEUT
UNDEF PLUR NOM )(3PS NEUT UNDEF SING DAT )(3PS NEUT UNDEF SING ACC )(
3PS NEUT UNDEF SING NOM )(3PS NEUT DEF PLURAL GEN )(3PS NEUT DEF PLUR
DAT )(3PS NEUT DEF PLUR ACC )(3PS NEUT DEF PLUR NOM )(3PS NEUT DEF
SING DAT )(3PS NEUT DEF SING ACC )(3PS NEUT DEF SING NOM ))((PERSON )
)NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  9
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL FREMDES (INP9 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND DEF (AND SING (XOR (AND NEUT (NOT DAT ))(AND GEN MALE ))))
       ((3PS NEUT UNDEF PLURAL GEN )(3PS NEUT UNDEF PLUR DAT )(3PS
NEUT UNDEF PLUR ACC )(3PS NEUT UNDEF PLUR NOM )(3PS NEUT UNDEF SING
DAT )(3PS NEUT UNDEF SING ACC )(3PS NEUT UNDEF SING NOM )(3PS NEUT
DEF PLURAL GEN )(3PS NEUT DEF PLUR DAT )(3PS NEUT DEF PLUR ACC )(3PS
NEUT DEF PLUR NOM )(3PS NEUT DEF SING DAT )(3PS NEUT DEF SING ACC )(
3PS NEUT DEF SING NOM ))
       RESULTING DOMAIN:
       ((3PS NEUT DEF SING ACC )(3PS NEUT DEF SING NOM ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       ENTITY
       ((PERSON ))
       ((ENT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL. DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL. NEW CONFIGURATION :
       ((N2 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((3PS NEUT DEF SING ACC
)(3PS NEUT DEF SING NOM ))((PERSON ))NIL )(FREMDES (INP9 ATT.ADJ NIL
NIL NIL QUAL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : FREMDES
       * WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N2 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((3PS NEUT DEF SING ACC )(
3PS NEUT DEF SING NOM ))((PERSON ))NIL )(FREMDES (INP9 ATT.ADJ NIL
NIL NIL QUAL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  8
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (N1 SYN (INP8 DETERM NIL NIL NIL NIL ))
```

```
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N2 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (XOR (AND MALE NOM )(AND NEUT (XOR NOM ACC ))))
       ((3PS NEUT DEF SING ACC )(3PS NEUT DEF SING NOM ))
       RESULTING DOMAIN:
       ((3PS NEUT DEF SING ACC )(3PS NEUT DEF SING NOM ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((3PS NEUT DEF SING ACC
)(3PS NEUT DEF SING NOM ))((PERSON ))NIL )(FREMDES (INP9 ATT.ADJ NIL
NIL NIL QUAL )NIL )(EIN (INP8 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : EIN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    ((N3 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((3PS NEUT DEF SING ACC )(
3PS NEUT DEF SING NOM ))((PERSON ))NIL )(FREMDES (INP9 ATT.ADJ NIL
NIL NIL QUAL )NIL )(EIN (INP8 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  7
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL NEBEN (INP7 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N3 )
       TO THE NEW STATE(S) :  (N4 )
       NEW FEATURE COMPLEX:
       ((DIR*PREP 3PS NEUT DEF SING ACC )(DIR*PREP 3PS NEUT DEF SING
NOM ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((DIR*PREP 3PS NEUT DEF
SING ACC )(DIR*PREP 3PS NEUT DEF SING NOM ))((PERSON ))NIL )(FREMDES
(INP9 ATT.ADJ NIL NIL NIL QUAL )NIL )(EIN (INP8 DETERM NIL NIL NIL
NIL )NIL )(NEBEN (INP7 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : NEBEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 )FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((DIR*PREP 3PS NEUT DEF
SING ACC )(DIR*PREP 3PS NEUT DEF SING NOM ))((PERSON ))NIL )(FREMDES
(INP9 ATT.ADJ NIL NIL NIL QUAL )NIL )(EIN (INP8 DETERM NIL NIL NIL
NIL )NIL )(NEBEN (INP7 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL SETZTE (INP4 VERB NIL (P2 )NIL QUAL )(GENERAL (INP3 NOM.OBJ
NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(PENSIONIERTE (INP2
ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM NIL NIL NIL NIL )NIL
)NIL )(KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(3PS
SING FEM DEF ACC ))((THING ))WHAT )(EINE (INP5 DETERM NIL NIL NIL NIL
)NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KANONE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
        1. 1. 2. FOR WORD : SETZTE
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((DIR*PREP 3PS NEUT DEF SING ACC )(DIR*PREP 3PS NEUT DEF SING
NOM ))
```

```
      SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
      RESULTING TRIPLES (FEATURES * STATE * CASE)
      ((((DIR*PREP 3PS NEUT DEF SING ACC ))FIN ENDPOINT ))
      MATCH THE FOLLOWING SEMANTIC FEATURES
      ((PERSON ))
      WITH FEATURES OF RESP. CASES
      ENDPOINT
      ENTITY
      SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
      (NIL SETZTE (INP4 VERB NIL FIN NIL QUAL )(GENERAL (INP3
NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(
PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM
NIL NIL NIL NIL )NIL )NIL )(KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING
FEM UNDEF ACC )(3PS SING FEM DEF ACC ))((THING ))WHAT )(EINE (INP5
DETERM NIL NIL NIL NIL )NIL ))(FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((
DIR*PREP 3PS NEUT DEF SING ACC ))((PERSON ))ENDPOINT )(FREMDES (INP9
ATT.ADJ NIL NIL NIL QUAL )NIL )(EIN (INP8 DETERM NIL NIL NIL NIL )NIL
)(NEBEN (INP7 CASESI NIL NIL NIL NIL )NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (SETZTE (NOM.OBJ (GENERAL (ATT.ADJ PENSIONIERTE )(DETERM DER ))
)(NOM.OBJ (KANONE (DETERM EINE )))(NOM.OBJ (FRAU"LEIN (ATT.ADJ
FREMDES )(DETERM EIN )(CASESI NEBEN )))))
(CASESTRUCTURE (SETZTE (AGENT GENERAL )(WHAT KANONE )(ENDPOINT
FRAU"LEIN ))(FREMDES (WHAT FRAU"LEIN ))(PENSIONIERTE (WHAT GENERAL )))
```

```
WELCOME TO THE PARSING SYSTEM

SPECIFY THE LANGUAGE
INPUT LANGUAGE :N
GIVE INPUT SENTENCE

IN:
(HET IN AMSTERDAM WONEND KIND DOET NOGAL VREEMD DE LAATSTE WEEK )


WORD NR :  1   HET
•I. INITIAL PARTICLES :
(NIL HET (INP1 DETERM NIL NIL NIL NIL ))


WORD NR :  2   IN
•I. INITIAL PARTICLES :
(NIL IN (INP2 CASESI NIL NIL NIL NIL ))
•II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IN (INP2 CASESI NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL HET (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HET
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  3   AMSTERDAM
.I. INITIAL PARTICLES :
((N1 )AMSTERDAM (INP3 NOM.OBJ NIL NIL ((3PS SING NEUT ))((PLACE ))NIL
))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )AMSTERDAM (INP3 NOM.OBJ NIL NIL ((3PS SING NEUT ))((PLACE )
)NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL IN (INP2 CASESI NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N4 )
       NEW FEATURE COMPLEX:
       ((LOC 3PS SING NEUT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 )AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((
PLACE ))NIL )(IN (INP2 CASESI NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N4 )AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((
PLACE ))NIL )(IN (INP2 CASESI NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL HET (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HET
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   WONEND
.I. INITIAL PARTICLES :
(NIL WONEND (INP4 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WONEND (INP4 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   ((N4 )AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((
PLACE ))NIL )(IN (INP2 CASESI NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((LOC 3PS SING NEUT ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((LOC 3PS SING NEUT ))FIN PLACE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PLACE ))
       WITH FEATURES OF RESP. CASES
       PLACE
       THING
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL WONEND (INP4 ATT.ADJ NIL FIN NIL UNDET )(AMSTERDAM (INP3
NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2
CASESI NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : AMSTERDAM
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL WONEND (INP4 ATT.ADJ NIL FIN NIL UNDET )(AMSTERDAM (INP3
NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2
CASESI NIL NIL NIL NIL )NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL HET (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HET
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   KIND
.I. INITIAL PARTICLES :
((N1 )KIND (INP5 NOM.OBJ NIL NIL ((SING 3PS NEUT UNDEF )(SING 3PS
NEUT DEF ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )KIND (INP5 NOM.OBJ NIL NIL ((SING 3PS NEUT UNDEF )(SING 3PS
NEUT DEF ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL WONEND (INP4 ATT.ADJ NIL FIN NIL UNDET )(AMSTERDAM (INP3
NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2
CASESI NIL NIL NIL NIL )NIL )NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING NEUT )
       ((SING 3PS NEUT UNDEF )(SING 3PS NEUT DEF ))
       RESULTING DOMAIN:
       ((SING 3PS NEUT UNDEF )(SING 3PS NEUT DEF ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       ANIMATE
       ((PERSON ))
       ((STATE ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N2 )KIND (INP5 NOM.OBJ NIL NIL ((SING 3PS NEUT UNDEF )(SING
3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT.ADJ NIL FIN NIL QUAL
)(AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))
PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : WONEND
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N2 )KIND (INP5 NOM.OBJ NIL NIL ((SING 3PS NEUT UNDEF )(SING 3PS
NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT.ADJ NIL FIN NIL QUAL )(
AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE
)(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL HET (INP1 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N2 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND NEUT (AND SING DEF ))
       ((SING 3PS NEUT UNDEF )(SING 3PS NEUT DEF ))
       RESULTING DOMAIN:
       ((SING 3PS NEUT DEF ))
```

```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )KIND (INP5 NOM,OBJ NIL NIL ((SING 3PS NEUT DEF ))((
PERSON ))NIL )(WONEND (INP4 ATT,ADJ NIL FIN NIL QUAL )(AMSTERDAM (
INP3 NOM,OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2
CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(HET (INP1 DETERM NIL NIL NIL
NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HET
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   DOET
.I. INITIAL PARTICLES :
(NIL DOET (INP6 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL DOET (INP6 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   ((N3 )KIND (INP5 NOM,OBJ NIL NIL ((SING 3PS NEUT DEF ))((PERSON ))
NIL )(WONEND (INP4 ATT,ADJ NIL FIN NIL QUAL )(AMSTERDAM (INP3 NOM,OBJ
NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2 CASESI NIL
NIL NIL NIL )NIL )NIL )NIL )(HET (INP1 DETERM NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : KIND
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (AND (XOR 2PS 3PS )SING )(NOT OBJ ))
       ((SING 3PS NEUT DEF ))
       RESULTING DOMAIN:
       ((SING 3PS NEUT DEF ))
       INVESTIGATE THE FOLLOWING SEM,FEATURES:
       ANIMATE
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED DOET (INP6 VERB NIL NIL NIL QUAL )(KIND (INP5 NOM,OBJ
NIL NIL ((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT,ADJ
NIL FIN NIL QUAL )(AMSTERDAM (INP3 NOM,OBJ NIL NIL ((LOC 3PS SING
NEUT ))((PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )
NIL )(HET (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))


WORD NR :  7   NOGAL
.I. INITIAL PARTICLES :
(NIL NOGAL (INP7 OP,ADV NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL NOGAL (INP7 OP,ADV NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (PRED DOET (INP6 VERB NIL NIL NIL QUAL )(KIND (INP5 NOM,OBJ NIL
NIL ((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT,ADJ NIL
FIN NIL QUAL )(AMSTERDAM (INP3 NOM,OBJ NIL NIL ((LOC 3PS SING NEUT ))
((PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(
HET (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : DOET
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  8   VREEMD
.I. INITIAL PARTICLES :
(NIL VREEMD (INP8 ADV.ADJ NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL VREEMD (INP8 ADV.ADJ NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  7
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL NOGAL (INP7 OP.ADV NIL NIL NIL MOD ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (OR PROP ACT )
       ((PROP ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PROP ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL VREEMD (INP8 ADV.ADJ NIL NIL NIL MOD )(NOGAL (INP7 OP.ADV
NIL NIL NIL MOD )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : NOGAL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL VREEMD (INP8 ADV.ADJ NIL NIL NIL MOD )(NOGAL (INP7 OP.ADV
NIL NIL NIL MOD )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (PRED DOET (INP6 VERB NIL NIL NIL QUAL )(KIND (INP5 NOM.OBJ NIL
NIL ((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT.ADJ NIL
FIN NIL QUAL )(AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))
((PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(
HET (INP1 DETERM NIL NIL NIL NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : DOET
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (OR PROP ACT )
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((ACT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL DOET (INP6 VERB NIL NIL NIL QUAL )(KIND (INP5 NOM.OBJ NIL
NIL ((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT.ADJ NIL
FIN NIL QUAL )(AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))
((PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(
HET (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(VREEMD (INP8 ADV.ADJ NIL
NIL NIL MOD )(NOGAL (INP7 OP.ADV NIL NIL NIL MOD )NIL )))


WORD NR :  9   DE
.I. INITIAL PARTICLES :
(NIL DE (INP9 DETERM NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL DE (INP9 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  8
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL DOET (INP6 VERB NIL NIL NIL QUAL )(KIND (INP5 NOM.OBJ NIL NIL
((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT.ADJ NIL FIN
NIL QUAL )(AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((
PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(HET
(INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(VREEMD (INP8 ADV.ADJ NIL NIL
NIL MOD )(NOGAL (INP7 OP.ADV NIL NIL NIL MOD )NIL )))
```

```
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : VREEMD
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : DOET
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR : 10   LAATSTE
.I. INITIAL PARTICLES :
(NIL LAATSTE (INP10 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LAATSTE (INP10 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  9
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL DE (INP9 DETERM NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : DE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR : 11   WEEK
.I. INITIAL PARTICLES :
((N1 )WEEK (INP11 NOM.OBJ NIL NIL ((UNDEF 3PS SING TIM MALE GEN )(
UNDEF 3PS SING TIM MALE CONC )(DEF 3PS SING TIM MALE GEN )(DEF 3PS
SING TIM MALE CONC ))((TIME ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 )WEEK (INP11 NOM.OBJ NIL NIL ((UNDEF 3PS SING TIM MALE GEN )
(UNDEF 3PS SING TIM MALE CONC )(DEF 3PS SING TIM MALE GEN )(DEF 3PS
SING TIM MALE CONC ))((TIME ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR. 10
 1. FOR HYPOTHESIS : INP10
   1. 1. CONFIGURATION :
   (NIL LAATSTE (INP10 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 )
       TO THE NEW STATE(S) :  (N2 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       CONC
       ((UNDEF 3PS SING TIM MALE GEN )(UNDEF 3PS SING TIM MALE CONC )
(DEF 3PS SING TIM MALE GEN )(DEF 3PS SING TIM MALE CONC ))
       RESULTING DOMAIN:
       ((UNDEF 3PS SING TIM MALE CONC )(DEF 3PS SING TIM MALE CONC ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       ENTITY
       ((TIME ))
       ((ABSTRACTION ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((TIME ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N2 )WEEK (INP11 NOM.OBJ NIL NIL ((UNDEF 3PS SING TIM MALE
CONC )(DEF 3PS SING TIM MALE CONC ))((TIME ))NIL )(LAATSTE (INP10
ATT.ADJ NIL NIL NIL QUAL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LAATSTE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((N2 )WEEK (INP11 NOM.OBJ NIL NIL ((UNDEF 3PS SING TIM MALE CONC
)(DEF 3PS SING TIM MALE CONC ))((TIME ))NIL )(LAATSTE (INP10 ATT.ADJ
NIL NIL NIL QUAL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  9
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL DE (INP9 DETERM NIL NIL NIL NIL ))
```

```
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N2 )
       TO THE NEW STATE(S) :  (N3 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND DEF (NOT (AND SING NEUT )))
       ((UNDEF 3PS SING TIM MALE CONC )(DEF 3PS SING TIM MALE CONC ))
       RESULTING DOMAIN:
       ((DEF 3PS SING TIM MALE CONC ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N3 )WEEK (INP11 NOM,OBJ NIL NIL ((DEF 3PS SING TIM MALE CONC
))((TIME ))NIL )(LAATSTE (INP10 ATT,ADJ NIL NIL NIL QUAL )NIL )(DE (
INP9 DETERM NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : DE
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    ((N3 )WEEK (INP11 NOM,OBJ NIL NIL ((DEF 3PS SING TIM MALE CONC ))
((TIME ))NIL )(LAATSTE (INP10 ATT,ADJ NIL NIL NIL QUAL )NIL )(DE (
INP9 DETERM NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  8
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL DOET (INP6 VERB NIL NIL NIL QUAL )(KIND (INP5 NOM,OBJ NIL NIL
((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT,ADJ NIL FIN
NIL QUAL )(AMSTERDAM (INP3 NOM,OBJ NIL NIL ((LOC 3PS SING NEUT ))((
PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(MET
(INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(VREEMD (INP8 ADV,ADJ NIL NIL
NIL MOD )(NOGAL (INP7 OP,ADV NIL NIL NIL MOD )NIL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : VREEMD
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : DOET
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((DEF 3PS SING TIM MALE CONC ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((DEF 3PS SING TIM MALE CONC ))FIN WHEN ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((TIME ))
       WITH FEATURES OF RESP. CASES
       WHEN
       TIME
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL DOET (INP6 VERB NIL FIN NIL QUAL )(KIND (INP5 NOM,OBJ NIL
NIL ((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT,ADJ NIL
FIN NIL QUAL )(AMSTERDAM (INP3 NOM,OBJ NIL NIL ((LOC 3PS SING NEUT ))
((PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(
MET (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(VREEMD (INP8 ADV,ADJ NIL
NIL NIL MOD )(NOGAL (INP7 OP,ADV NIL NIL NIL MOD )NIL ))(WEEK (INP11
NOM,OBJ NIL NIL ((DEF 3PS SING TIM MALE CONC ))((TIME ))WHEN )(
LAATSTE (INP10 ATT,ADJ NIL NIL NIL QUAL )NIL )(DE (INP9 DETERM NIL
NIL NIL NIL )NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(VERB (DOET (NOM,OBJ (KIND (ATT,ADJ (WONEND (NOM,OBJ (AMSTERDAM (
CASESI IN )))))(DETERM MET )))(ADV,ADJ (VREEMD (OP,ADV NOGAL )))(
NOM,OBJ (WEEK (ATT,ADJ LAATSTE )(DETERM DE ))))))
(CASESTRUCTURE (DOET (AGENT KIND )(WHEN WEEK ))(LAATSTE (OF*WHAT WEEK
))(VREEMD (WHAT DOET ))(NOGAL (WHAT VREEMD ))(WONEND (AGENT KIND )(
PLACE AMSTERDAM )))
```

EXPERIMENT 13: Reverse the order

Problem

To illustrate how modular the theory is, we do the following experiment. We interchange the values of the atoms BEFORE and AFTER (such that before is now 'coming after' and vice-versa) and then we present the parser with input sentence in reverse order. We stress that we do not change the linguistic information itself in any way.

Experimental setting

We will give the following input:

1. Author clever very the

   (notice how the syntactic networks now proceed as right-going and how the object-position now applies in the other direction)

2. Paris in living been has Jones:

   (compare with the normal order, especially for the nonfin.verb which gives unsuccessful semantic features match until the subject is there. Notice how the semantic networks operate in reverse order and how the features tests for the auxiliaries still yield good results.)

3. Jones has been living in Paris

   No successful parsing because all the order tests yield false.

```
IN:
(AUTHOR CLEVER VERY THE )


WORD NR :  1   AUTHOR
.I. INITIAL PARTICLES :
(NIL AUTHOR (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ )(SING SUBJ 3PS ))(
(PERSON ))NIL ))


WORD NR :  2   CLEVER
.I. INITIAL PARTICLES :
(NIL CLEVER (INP2 ATT.ADJ NIL NIL NIL UNDET ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL CLEVER (INP2 ATT.ADJ NIL NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL AUTHOR (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ )(SING SUBJ 3PS
))((PERSON ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : AUTHOR
       SUCCESSFUL TRANSITION FROM (N1 FIN )
       TO THE NEW STATE(S) :  (N2 FIN )
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (NOT ACT )
       ((PERSON ))
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL AUTHOR (INP1 NOM.OBJ (N2 FIN )NIL ((SING OBJ )(SING SUBJ
3PS ))((PERSON ))NIL )(CLEVER (INP2 ATT.ADJ NIL NIL NIL QUAL )))


WORD NR :  3   VERY
.I. INITIAL PARTICLES :
(NIL VERY (INP3 ADV.ADJ NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL VERY (INP3 ADV.ADJ NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL AUTHOR (INP1 NOM.OBJ (N2 FIN )NIL ((SING OBJ )(SING SUBJ 3PS
))((PERSON ))NIL )(CLEVER (INP2 ATT.ADJ NIL NIL NIL QUAL )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : CLEVER
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (OR PROPERTY THING )
       ((PROPERTY ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PROPERTY ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL AUTHOR (INP1 NOM.OBJ (N2 FIN )NIL ((SING OBJ )(SING SUBJ
3PS ))((PERSON ))NIL )(CLEVER (INP2 ATT.ADJ NIL NIL NIL QUAL )(VERY (
INP3 ADV.ADJ NIL NIL NIL MOD ))))
        1. 1. 2. FOR WORD : AUTHOR
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  4   THE
•I. INITIAL PARTICLES :
(NIL THE (INP4 DETERM NIL NIL NIL NIL ))
•II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL THE (INP4 DETERM NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL AUTHOR (INP1 NOM.OBJ (N2 FIN )NIL ((SING OBJ )(SING SUBJ 3PS
))((PERSON ))NIL )(CLEVER (INP2 ATT.ADJ NIL NIL NIL QUAL )(VERY (INP3
ADV.ADJ NIL NIL NIL MOD ))))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : VERY
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : CLEVER
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 3. FOR WORD : AUTHOR
       SUCCESSFUL TRANSITION FROM (N2 FIN )
       TO THE NEW STATE(S) :  (N4 FIN N6 )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (NOT RESTRIC )
       ((SING OBJ )(SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((SING OBJ )(SING SUBJ 3PS ))
       NEW FEATURE COMPLEX:
       ((DEF SING OBJ )(DEF SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL AUTHOR (INP1 NOM.OBJ (N4 FIN N6 )NIL ((DEF SING OBJ )(DEF
SING SUBJ 3PS ))((PERSON ))NIL )(CLEVER (INP2 ATT.ADJ NIL NIL NIL
QUAL )(VERY (INP3 ADV.ADJ NIL NIL NIL MOD )))(THE (INP4 DETERM NIL
NIL NIL NIL )))

FUNCTIONAL AND CASE STRUCTURES :
(NOM.OBJ (AUTHOR (ATT.ADJ (CLEVER (ADV.ADJ VERY )))(DETERM THE )))
(CASESTRUCTURE (CLEVER (OF*WHAT AUTHOR ))(VERY (OF*WHAT CLEVER )))
```

```
WELCOME TO THE PARSING SYSTEM

SPECIFY THE LANGUAGE
INPUT LANGUAGE :E
GIVE INPUT SENTENCE

IN:
(PARIS IN LIVING BEEN HAS JONES )


WORD NR :  1   PARIS
.I. INITIAL PARTICLES :
(NIL PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ )(SING SUBJ 3PS ))((
PLACE ))NIL ))


WORD NR :  2   IN
.I. INITIAL PARTICLES :
(NIL IN (INP2 RELWORD NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IN (INP2 RELWORD NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ )(SING SUBJ 3PS )
))((PLACE ))NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ )(SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((SING OBJ ))FIN WHERE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PLACE ))
       WITH FEATURES OF RESP. CASES
       WHERE
       PLACE
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL IN (INP2 RELWORD NIL FIN NIL QUAL )(PARIS (INP1 NOM.OBJ (
N1 FIN )NIL ((SING OBJ ))((PLACE ))WHERE )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PARIS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   LIVING
.I. INITIAL PARTICLES :
(NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL IN (INP2 RELWORD NIL FIN NIL QUAL )(PARIS (INP1 NOM.OBJ (N1
FIN )NIL ((SING OBJ ))((PLACE ))WHERE )NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
```

```
       (XOR ACT THING )
       ((PERSON ))
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((ACT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP2
RELWORD NIL FIN NIL UNDET )(PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING
OBJ ))((PLACE ))WHERE )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   BEEN
.I. INITIAL PARTICLES :
(NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP2 RELWORD
NIL FIN NIL UNDET )(PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ ))((
PLACE ))WHERE )NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIVING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP2 RELWORD
NIL FIN NIL UNDET )(PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ ))((
PLACE ))WHERE )NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIVING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   HAS
.I. INITIAL PARTICLES :
(NIL HAS (INP6 VERB NIL NIL ((PRES ))QUAL ))
(NIL HAS (INP7 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HAS (INP7 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND PERF (NOT PERF" ))
       ((PERF PERF ))
```

```
        ((PRES PERF ))
        RESULTING DOMAIN:
        ((PRES PERF ))
        NEW FEATURE COMPLEX:
        ((PERF" PRES PERF ))
        + SEMANTIC FEATURES MATCH UNSUCCESFUL
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : BEEN
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
    2. 1. CONFIGURATION :
    (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND PERF (NOT PERF" ))
        ((PRES PERF ))
        RESULTING DOMAIN:
        ((PRES PERF ))
        NEW FEATURE COMPLEX:
        ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL HAS (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PRES PERF )(
PERF" PASS PRES PERF ))NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL )
NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : BEEN
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL HAS (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PRES PERF )(PERF"
PASS PRES PERF ))NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
    1. 1. CONFIGURATION :
    (NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP2 RELWORD
NIL FIN NIL UNDET )(PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ ))((
PLACE ))WHERE )NIL )NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES:
        (AND CONTIN (NOT CONTIN" ))
        ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
        RESULTING DOMAIN:
        ((PERF" CONTIN PRES PERF ))
        NEW FEATURE COMPLEX:
        ((CONTIN" PERF" CONTIN PRES PERF ))
        + SEMANTIC FEATURES MATCH UNSUCCESFUL
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : LIVING
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
     (NIL HAS (INP6 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
    1. 1. CONFIGURATION :
    (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : BEEN
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
    2. 1. CONFIGURATION :
    (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
     => FROM LEFT TO RIGHT
```

```
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : BEEN
      + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  6   JONES
.I. INITIAL PARTICLES :
(NIL JONES (INP8 NOM.OBJ (N1 FIN )NIL ((FEMALE SING OBJ )(FEMALE SING
SUBJ 3PS )(MALE SING OBJ )(MALE SING SUBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL JONES (INP8 NOM.OBJ (N1 FIN )NIL ((FEMALE SING OBJ )(FEMALE
SING SUBJ 3PS )(MALE SING OBJ )(MALE SING SUBJ 3PS ))((PERSON ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL HAS (INP6 VERB NIL NIL ((PRES ))QUAL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (NOT OBJ ))
       ((FEMALE SING OBJ )(FEMALE SING SUBJ 3PS )(MALE SING OBJ )(
MALE SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((FEMALE SING SUBJ 3PS )(MALE SING SUBJ 3PS ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED HAS (INP6 VERB NIL NIL ((PRES ))QUAL )(JONES (INP8
NOM OBJ (N1 FIN )NIL ((FEMALE SING SUBJ 3PS )(MALE SING SUBJ 3PS ))((
PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       1. 1. 1. FOR WORD : HAS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP7
   2. 1. CONFIGURATION :
   (NIL HAS (INP7 AFF.AUX NIL NIL ((PERF" CONTIN PRES PERF )(PERF"
PASS PRES PERF ))NIL )(BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND SING (NOT OBJ ))
       ((FEMALE SING OBJ )(FEMALE SING SUBJ 3PS )(MALE SING OBJ )(
MALE SING SUBJ 3PS ))
       RESULTING DOMAIN:
       ((FEMALE SING SUBJ 3PS )(MALE SING SUBJ 3PS ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED HAS (INP7 AFF.AUX FIN NIL ((PERF" CONTIN PRES PERF )(
PERF" PASS PRES PERF ))NIL )(JONES (INP8 NOM.OBJ (N1 FIN )NIL ((
FEMALE SING SUBJ 3PS )(MALE SING SUBJ 3PS ))((PERSON ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
       2. 1. 1. FOR WORD : HAS
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
    (PRED HAS (INP7 AFF.AUX FIN NIL ((PERF" CONTIN PRES PERF )(PERF"
PASS PRES PERF ))NIL )(JONES (INP8 NOM.OBJ (N1 FIN )NIL ((FEMALE SING
SUBJ 3PS )(MALE SING SUBJ 3PS ))((PERSON ))NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
```

```
   *** CONFIGURATION :
   (NIL LIVING (INP3 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP2 RELWORD
NIL FIN NIL UNDET )(PARIS (INP1 NOM.OBJ (N1 FIN )NIL ((SING OBJ ))((
PLACE ))WHERE )NIL )NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND CONTIN (NOT CONTIN" ))
       ((PERF" CONTIN PRES PERF )(PERF" PASS PRES PERF ))
       RESULTING DOMAIN:
       ((PERF" CONTIN PRES PERF ))
       NEW FEATURE COMPLEX:
       ((CONTIN" PERF" CONTIN PRES PERF ))
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       PERSON
       ((PERSON ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((PERSON ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (PRED LIVING (INP3 NONFIN.VERB NIL NIL ((CONTIN" PERF" CONTIN
PRES PERF ))QUAL )(HAS (INP7 AFF.AUX FIN NIL ((CONTIN" PERF" CONTIN
PRES PERF ))NIL )(JONES (INP8 NOM.OBJ (N1 FIN )NIL ((FEMALE SING SUBJ
3PS )(MALE SING SUBJ 3PS ))((PERSON ))NIL )NIL )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIVING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(C)
**** TRY TO EXPAND CONFIGURATION :
    (PRED HAS (INP6 VERB NIL NIL ((PRES ))QUAL )(JONES (INP8 NOM.OBJ
(N1 FIN )NIL ((FEMALE SING SUBJ 3PS )(MALE SING SUBJ 3PS ))((PERSON )
)NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
(NONFIN.VERB (LIVING (AFF.AUX (HAS (NOM.OBJ JONES )))))
(CASESTRUCTURE (LIVING (AGENT JONES )))

MEMORY CELLS LEFT: 660
GIVE INPUT SENTENCE
END OF FILE DURING INPUT
```

```
IN:
(JONES HAS BEEN LIVING IN PARIS )

WORD NR :  1   JONES
.I. INITIAL PARTICLES :
(NIL JONES (INP1 NOM.OBJ (N1 FIN )NIL ((FEMALE SING OBJ )(FEMALE SING
SUBJ 3PS )(MALE SING OBJ )(MALE SING SUBJ 3PS ))((PERSON ))NIL ))


WORD NR :  2   HAS
.I. INITIAL PARTICLES :
(NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
(NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JONES (INP1 NOM.OBJ (N1 FIN )NIL ((FEMALE SING OBJ )(FEMALE
SING SUBJ 3PS )(MALE SING OBJ )(MALE SING SUBJ 3PS ))((PERSON ))NIL ))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JONES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL JONES (INP1 NOM.OBJ (N1 FIN )NIL ((FEMALE SING OBJ )(FEMALE
SING SUBJ 3PS )(MALE SING OBJ )(MALE SING SUBJ 3PS ))((PERSON ))NIL ))
     => FROM LEFT TO RIGHT
        SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
        +MISSING CASE OR FUNCTION IN SEM NETWORK
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : JONES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   BEEN
.I. INITIAL PARTICLES :
(NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
(NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
    => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : HAS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
    => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : HAS
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP2
   1. 1. CONFIGURATION :
   (NIL HAS (INP2 VERB NIL NIL ((PRES ))QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP3
   2. 1. CONFIGURATION :
   (NIL HAS (INP3 AFF.AUX NIL NIL ((PRES PERF ))NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : HAS
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   LIVING
.I. INITIAL PARTICLES :
(NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP4
   1. 1. CONFIGURATION :
   (NIL BEEN (INP4 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP5
   2. 1. CONFIGURATION :
   (NIL BEEN (INP5 NONFIN.AUX NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : BEEN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   IN
.I. INITIAL PARTICLES :
(NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIVING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR : 6   PARIS
•I• INITIAL PARTICLES :
(NIL PARIS (INP8 NOM.OBJ (N1 FIN )NIL ((SING OBJ )(SING SUBJ 3PS ))((
PLACE ))NIL ))
II• MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL PARIS (INP8 NOM.OBJ (N1 FIN )NIL ((SING OBJ )(SING SUBJ 3PS
))((PLACE ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR. 5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       •MISSING CASE OR FUNCTION IN SEM NETWORK
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IN
       • WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 14 garbage environments

Problem:

Another powerful result of the modular approach is that a garbage environment does not affect the discovery of good input pieces.

Experimental setting:

We will give the following input:

'beautiful some sand living in Paris gives her'

(Notice how 'some sand', 'living in Paris', 'gives her' are all found as valid pieces of input.)

results:

```
IN:
(BEAUTIFUL SOME SAND LIVING IN PARIS GIVES HER )


WORD NR :  1   BEAUTIFUL
.I. INITIAL PARTICLES :
(NIL BEAUTIFUL (INP1 ATT.ADJ NIL NIL NIL UNDET ))


WORD NR :  2   SOME
.I. INITIAL PARTICLES :
(NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
(NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BEAUTIFUL (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEAUTIFUL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BEAUTIFUL (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEAUTIFUL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  1
 1, FOR HYPOTHESIS : INP1
   1, 1, CONFIGURATION :
   (NIL BEAUTIFUL (INP1 ATT,ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1, 1, 1, FOR WORD : BEAUTIFUL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  3   SAND
.I, INITIAL PARTICLES :
((N1 FIN )SAND (INP5 NOM,OBJ NIL NIL ((3PS SING UNCOUNT ))((THING ))
NIL ))
.II, MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 FIN )SAND (INP5 NOM,OBJ NIL NIL ((3PS SING UNCOUNT ))((THING
))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR,  2
 1, FOR HYPOTHESIS : INP2
   1, 1, CONFIGURATION :
   (NIL SOME (INP2 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 FIN )
       TO THE NEW STATE(S) :  (N4 FIN )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       PLURAL
       ((3PS SING UNCOUNT ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        1, 1, 1, FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2, FOR HYPOTHESIS : INP3
   2, 1, CONFIGURATION :
   (NIL SOME (INP3 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 FIN )
       TO THE NEW STATE(S) :  (N4 FIN )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       UNCOUNT
       ((3PS SING UNCOUNT ))
       RESULTING DOMAIN:
       ((3PS SING UNCOUNT ))
       NEW FEATURE COMPLEX:
       ((AMOUNT*OF 3PS SING UNCOUNT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((N4 FIN )SAND (INP5 NOM,OBJ NIL NIL ((AMOUNT*OF 3PS SING
UNCOUNT ))((THING ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2, 1, 1, FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3, FOR HYPOTHESIS : INP4
   3, 1, CONFIGURATION :
   (NIL SOME (INP4 NUM2 NIL NIL NIL NIL ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM (N1 FIN )
       TO THE NEW STATE(S) :  (N4 FIN )
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT UNCOUNT )(NOT PLURAL ))
       ((3PS SING UNCOUNT ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
    <= FROM RIGHT TO LEFT
        3, 1, 1, FOR WORD : SOME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

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(B)
**** TRY TO EXPAND CONFIGURATION :
     ((N4 FIN )SAND (INP5 NOM.OBJ NIL NIL ((AMOUNT*OF 3PS SING UNCOUNT
))((THING ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL BEAUTIFUL (INP1 ATT.ADJ NIL NIL NIL UNDET ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : BEAUTIFUL
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   LIVING
.I. INITIAL PARTICLES :
(NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   ((N4 FIN )SAND (INP5 NOM.OBJ NIL NIL ((AMOUNT*OF 3PS SING UNCOUNT
))((THING ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SAND
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   IN
.I. INITIAL PARTICLES :
(NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL IN (INP7 RELWORD NIL NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
 1. FOR HYPOTHESIS : INP6
   1. 1. CONFIGURATION :
   (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIVING
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (XOR ACT THING )
       ((ACT ))
       SEMANTIC FEATURES MATCH SUCCESSFUL, DOMAIN :
       ((ACT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP7
RELWORD NIL NIL NIL MOD )))
(B)
**** TRY TO EXPAND CONFIGURATION :
     (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP7 RELWORD
NIL NIL NIL MOD )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   ((N4 FIN )SAND (INP5 NOM.OBJ NIL NIL ((AMOUNT*OF 3PS SING UNCOUNT
))((THING ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SAND
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
```

```
WORD NR :  6   PARIS
.I. INITIAL PARTICLES :
((N1 FIN )PARIS (INP8 NOM,OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS ))((
PLACE ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    ((N1 FIN )PARIS (INP8 NOM,OBJ NIL NIL ((SING OBJ )(SING SUBJ 3PS
))((PLACE ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  5
 1. FOR HYPOTHESIS : INP7
   1. 1. CONFIGURATION :
   (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP7 RELWORD
NIL NIL NIL MOD )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : IN
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ )(SING SUBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((SING OBJ ))FIN WHERE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PLACE ))
       WITH FEATURES OF RESP. CASES
       WHERE
       PLACE
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP7
RELWORD NIL FIN NIL MOD )(PARIS (INP8 NOM,OBJ NIL NIL ((SING OBJ ))((
PLACE ))WHERE ))))
        1. 1. 2. FOR WORD : LIVING
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       +MISSING CASE OR FUNCTION IN SEM NETWORK
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP7 RELWORD
NIL FIN NIL MOD )(PARIS (INP8 NOM,OBJ NIL NIL ((SING OBJ ))((PLACE ))
WHERE ))))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   ((N4 FIN )SAND (INP5 NOM,OBJ NIL NIL ((AMOUNT*OF 3PS SING UNCOUNT
))((THING ))NIL )(SOME (INP3 NUM2 NIL NIL NIL NIL )NIL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : SAND
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  7   GIVES
.I. INITIAL PARTICLES :
(NIL GIVES (INP9 VERB NIL NIL NIL QUAL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP9 VERB NIL NIL NIL QUAL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL LIVING (INP6 NONFIN.VERB NIL NIL NIL QUAL )(IN (INP7 RELWORD
NIL FIN NIL MOD )(PARIS (INP8 NOM,OBJ NIL NIL ((SING OBJ ))((PLACE ))
WHERE ))))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
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        1. 1. 1. FOR WORD : PARIS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((SING OBJ ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
        1. 1. 2. FOR WORD : IN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 3. FOR WORD : LIVING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  8   HER
.I. INITIAL PARTICLES :
(NIL HER (INP10 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL HER (INP10 PRON,OBJ NIL NIL ((SING OBJ 3PS ))((PERSON ))NIL
))
* BY COMBINING IT WITH CONFIG OF WORD NR.  7
 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL GIVES (INP9 VERB NIL NIL NIL QUAL ))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : GIVES
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING OBJ 3PS ))
       SUCCESSFUL TRANSITION IN SEMANTIC NETWORKS
       RESULTING TRIPLES (FEATURES * STATE * CASE)
       ((((SING OBJ 3PS ))(G2 FIN )WHAT )(((SING OBJ 3PS ))(G3 )
ADDRESSEE ))
       MATCH THE FOLLOWING SEMANTIC FEATURES
       ((PERSON ))
       WITH FEATURES OF RESP. CASES
       WHAT
       THING
       NO SEM FEATURES MATCH
       ADDRESSEE
       PERSON
       SEM FEATURES MATCH SUCCESSFUL
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL GIVES (INP9 VERB NIL (G3 )NIL QUAL )(HER (INP10 PRON,OBJ
NIL NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE )))
(B)
**** TRY TO EXPAND CONFIGURATION :
    (NIL GIVES (INP9 VERB NIL (G3 )NIL QUAL )(HER (INP10 PRON,OBJ NIL
NIL ((SING OBJ 3PS ))((PERSON ))ADDRESSEE )))
* BY COMBINING IT WITH CONFIG OF WORD NR.  6
 1. FOR HYPOTHESIS : INP8
   1. 1. CONFIGURATION :
   (NIL LIVING (INP6 NONFIN,VERB NIL NIL NIL QUAL )(IN (INP7 RELWORD
NIL FIN NIL MOD )(PARIS (INP8 NOM,OBJ NIL NIL ((SING OBJ ))((PLACE ))
WHERE ))))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : PARIS
       SUCCESSFUL ORDER AND RELATIONS ENVIRONMENT TESTS
       MATCH THE FOLLOWING FEATURE COMPLEXES:
       (AND (NOT OBJ )(AND 3PS SING ))
       ((SING OBJ ))
       + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
        1. 1. 2. FOR WORD : IN
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 3. FOR WORD : LIVING
       + WRONG HEAD OR NO TRANSITION IN SYNT NET

FUNCTIONAL AND CASE STRUCTURES :
NO STRUCTURE FOR GIVEN INPUT
```

EXPERIMENT 15 : the whole system

Problem:

How to organise the nondeterministic process of particle confrontation and merging.

Solution:

Introduction of the tasklist concept

Experimental setting:

We will give the following input sentence :
'Time flies like an arrow'.

(The reader should compare this with the discussion in previous chapter. However this sentence was parsed on an earlier version of the system, so that the convention of the internal details of the particles are a little bit different. But this does not matter so much because the example concentrates on the general flow of control.)

results:

```
IN:
(TIME FLIES LIKE AN ARROW )


WORD NR :  1   TIME
.I. INITIAL PARTICLES :
(NIL TIME (INP1 NOM,OBJ FIN NIL ((SING 3PS )(OBJECTIVE SING 3PS ))((
PROPERTY )(THING ))NIL ))
(NIL TIME (INP2 VERB FIN NIL UNDET ((PRESENT ))))


WORD NR :  2   FLIES
.I. INITIAL PARTICLES :
(OBJ/1 FLIES (INP3 NOM,OBJ FIN NIL ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((ANIMATE ))NIL ))
(NIL FLIES (INP4 VERB FIN NIL UNDET ((PRESENT ))))
.-T. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
     (NIL FLIES (INP4 VERB FIN NIL UNDET ((PRESENT ))))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL TIME (INP1 NOM,OBJ FIN NIL ((SING 3PS )(OBJECTIVE SING 3PS ))
((PROPERTY )(THING ))NIL ))
     => FROM LEFT TO RIGHT
        + HEAD TAKES NO OBJECTS OR WRONG POSITION
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : TIME
        SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES :
        (AND (NOT OBJECTIVE )(AND SING 3PS ))
        ((SING 3PS )(OBJECTIVE SING 3PS ))
        SUCCESSFUL SYNT FEAT MATCH, RESULTING DOMAIN:
        ((SING 3PS ))
        INVESTIGATE THE FOLLOWING SEM,FEATURES:
        (XOR ANIMATE THING )
        ((PROPERTY )(THING ))
        ((PROPERTY )(THING ))
        SEMANTIC FEAT MATCH SUCCESSFUL,SATISFIED DOMAIN:
        ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PREDIC FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (
INP1 NOM,OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL ))
 2. FOR HYPOTHESIS : INP2
   2. 1. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN NIL UNDET ((PRESENT ))))
    => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : TIME
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(B)
**** TRY TO EXPAND CONFIGURATION :
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    (OBJ/1 FLIES (INP3 NOM,OBJ FIN NIL ((OBJECTIVE PLURAL 3PS )(
PLURAL 3PS ))((ANIMATE ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  1
 1. FOR HYPOTHESIS : INP1
   1. 1. CONFIGURATION :
   (NIL TIME (INP1 NOM,OBJ FIN NIL ((SING 3PS )(OBJECTIVE SING 3PS ))
((PROPERTY )(THING ))NIL ))
    => FROM LEFT TO RIGHT
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((SING 3PS )(OBJECTIVE SING 3PS ))
       SUCCESSFUL TRANSITION IN SEM NETW FROM  INS/1
       TO THE NEW STATE(S): FIN
       RESULTING CASE(S):   KIND
       NEW FEATURE COMPLEX  ((OBJECTIVE SING 3PS ))
       MATCH FOLLOWING SEM,FEAT:
      ((PROPERTY )(THING ))
       PROPERTY
       SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
       ((PROPERTY ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL FLIES (INP3 NOM,OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(
PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM,OBJ FIN NIL ((
OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : TIME
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       + MISSING CASE OR FUNCTION IN SEM NETWORK
 2. FOR HYPOTHESIS : INP2
   2. 1. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN NIL UNDET ((PRESENT ))))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : TIME
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((OBJECTIVE PLURAL 3PS )(PLURAL 3PS ))
       SUCCESSFUL TRANSITION IN SEM NETW FROM  MEAS/1
       TO THE NEW STATE(S): FIN
       RESULTING CASE(S):   WHAT
       NEW FEATURE COMPLEX  ((OBJECTIVE PLURAL 3PS ))
       MATCH FOLLOWING SEM,FEAT:
      ((ANIMATE ))
       (XOR ANIMATE THING )
       SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
       ((ANIMATE ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM,OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )))


WORD NR :  3   LIKE
.I. INITIAL PARTICLES :
(NIL LIKE (INP5 CASES1 FIN ))
(NIL LIKE (INP6 NOM,ATT,ADJ NIL NIL UNDET ))
(NIL LIKE (INP7 NOM,ADV,ADJ NIL NIL MOD ))
(NIL LIKE (INP8 VERB FIN NIL UNDET ((PRESENT ))))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIKE (INP8 VERB FIN NIL UNDET ((PRESENT ))))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
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NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT ))))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : FLIES
        SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES :
        (AND (NOT OBJECTIVE ))(XOR PLURAL (AND SING (NOT 3PS ))))
        ((OBJECTIVE PLURAL 3PS ))
        + SYNTACTIC FEATURES MATCH UNSUCCESSFUL
         1. 1. 2. FOR WORD : TIME
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
    1. 2. CONFIGURATION :
    (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL ))
     => FROM LEFT TO RIGHT
        + HEAD TAKES NO OBJECTS OR WRONG POSITION
     <= FROM RIGHT TO LEFT
         1. 2. 1. FOR WORD : FLIES
        SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
        MATCH THE FOLLOWING FEATURE COMPLEXES :
        (AND (NOT OBJECTIVE )(XOR PLURAL (AND SING (NOT 3PS ))))
        ((OBJECTIVE PLURAL 3PS )(PLURAL 3PS ))
        SUCCESSFUL SYNT FEAT MATCH, RESULTING DOMAIN:
        ((PLURAL 3PS ))
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        ANIMATE
        ((PROPERTY ))
        ((ANIMATE ))
        SEMANTIC FEAT MATCH SUCCESSFUL,SATISFIED DOMAIN:
        ((ANIMATE ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (PREDIC LIKE (INP8 VERB FIN NIL UNDET ((PRESENT )))(FLIES (
INP3 NOM.OBJ FIN FIN ((PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1
NOM.OBJ FIN NIL ((OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL )NIL ))
 2. FOR HYPOTHESIS : INP4
    2. 1. CONFIGURATION :
    (PREDIC FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : FLIES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
(8)
**** TRY TO EXPAND CONFIGURATION :
     (NIL LIKE (INP7 NOM.ADV.ADJ NIL NIL MOD ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP3
    1. 1. CONFIGURATION :
    (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT ))))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : FLIES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
         1. 1. 2. FOR WORD : TIME
        SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
        INVESTIGATE THE FOLLOWING SEM.FEATURES:
        (XOR ANIMATE (XOR THING ACT ))
        ((ACT ))
        SEMANTIC FEAT MATCH SUCCESSFUL,SATISFIED DOMAIN:
        ((ACT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT ))(LIKE (
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INP7 NOM.ADV.ADJ NIL NIL MOD )))
   1. 2. CONFIGURATION :
   (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL ))
    => FROM LEFT TO RIGHT
       + HEAD TAKES NO OBJECTS OR WRONG POSITION
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : FLIES
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PREDIC FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : FLIES
       SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (XOR ANIMATE (XOR THING ACT ))
       ((ACT ))
       SEMANTIC FEAT MATCH SUCCESSFUL,SATISFIED DOMAIN:
       ((ACT ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL )(LIKE (
INP7 NOM.ADV.ADJ NIL NIL MOD )))
(C)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIKE (INP6 NOM.ATT.ADJ NIL NIL UNDET ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP1
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : FLIES
       SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (XOR ANIMATE (XOR THING ACT ))
       ((ANIMATE ))
       ((ANIMATE ))
       SEMANTIC FEAT MATCH SUCCESSFUL,SATISFIED DOMAIN:
       ((ANIMATE ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )(LIKE (
INP6 NOM.ATT.ADJ NIL NIL UNDET ))))
        1. 1. 2. FOR WORD : TIME
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
   1. 2. CONFIGURATION :
   (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL ))
    => FROM LEFT TO RIGHT
       + HEAD TAKES NO OBJECTS OR WRONG POSITION
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : FLIES
       SUCCESSFUL ORDER AND FUNCTION-OF-HEAD TESTS
       INVESTIGATE THE FOLLOWING SEM.FEATURES:
       (XOR ANIMATE (XOR THING ACT ))
       ((PROPERTY ))
       ((ANIMATE ))
       SEMANTIC FEAT MATCH SUCCESSFUL,SATISFIED DOMAIN:
       ((ANIMATE ))
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```
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(
PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((
OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL )(LIKE (INP6 NOM.ATT.ADJ
NIL NIL UNDET )))
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PREDIC FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : FLIES
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
(D)
**** TRY TO EXPAND CONFIGURATION :
    (NIL LIKE (INP5 CASESI FIN ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : FLIES
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
        1. 1. 2. FOR WORD : TIME
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
   1. 2. CONFIGURATION :
   (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL ))
    => FROM LEFT TO RIGHT
      + HEAD TAKES NO OBJECTS OR WRONG POSITION
    <= FROM RIGHT TO LEFT
        1. 2. 1. FOR WORD : FLIES
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PREDIC FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL ))
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : FLIES
      + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  4   AN
.I. INITIAL PARTICLES :
(NIL AN (INP9 DET FIN ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (NIL AN (INP9 DET FIN ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL LIKE (INP5 CASESI FIN ))
    => FROM LEFT TO RIGHT
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIKE
      + WRONG HEAD OR NO TRANSITION IN SYNT NET
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL )(LIKE (INP6 NOM.ATT.ADJ NIL NIL UNDET )
```

```
))
     => FROM LEFT TO RIGHT
        + HEAD TAKES NO OBJECTS OR WRONG POSITION
     <= FROM RIGHT TO LEFT
          2. 1. 1. FOR WORD : LIKE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
          2. 1. 2. FOR WORD : FLIES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
   2. 2. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )(LIKE (
INP6 NOM.ATT.ADJ NIL NIL UNDET ))))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          2. 2. 1. FOR WORD : LIKE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
          2. 2. 2. FOR WORD : FLIES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
          2. 2. 3. FOR WORD : TIME
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 3. FOR HYPOTHESIS : INP7
   3. 1. CONFIGURATION :
   (NIL FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL )(LIKE (
INP7 NOM.ADV.ADJ NIL NIL MOD )))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          3. 1. 1. FOR WORD : LIKE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
          3. 1. 2. FOR WORD : FLIES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
   3. 2. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT ))(LIKE (
INP7 NOM.ADV.ADJ NIL NIL MOD )))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
          3. 2. 1. FOR WORD : FLIES
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
          3. 2. 2. FOR WORD : LIKE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
          3. 2. 3. FOR WORD : TIME
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
 4. FOR HYPOTHESIS : INP8
   4. 1. CONFIGURATION :
   (PREDIC LIKE (INP8 VERB FIN NIL UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN FIN ((PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ
FIN NIL ((OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL )NIL ))
     <= FROM RIGHT TO LEFT
          4. 1. 1. FOR WORD : LIKE
        + WRONG HEAD OR NO TRANSITION IN SYNT NET


WORD NR :  5   ARROW
.I. INITIAL PARTICLES :
(OBJ/1 ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING ))((THING ))
NIL ))
.II. MERGING
(A)
**** TRY TO EXPAND CONFIGURATION :
    (OBJ/1 ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING ))((
THING ))NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  4
```

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 1. FOR HYPOTHESIS : INP9
   1. 1. CONFIGURATION :
   (NIL AN (INP9 DET FIN ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM OBJ/1
       TO THE NEW STATE(S):   (OBJ/2 )
       MATCH THE FOLLOWING FEATURE COMPLEXES :
       SING
       ((3PS OBJECTIVE SING ))
       SUCCESSFUL SYNT FEAT MATCH, RESULTING DOMAIN:
       ((3PS OBJECTIVE SING ))
       NEW FEATURE COMPLEX: ((3PS OBJECTIVE SING UNDEF ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((OBJ/2 )ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING
UNDEF ))((THING ))NIL )(AN (INP9 DET FIN )NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : AN
       + HEAD TAKES NO OBJECTS OR WRONG POSITION
(B)
**** TRY TO EXPAND CONFIGURATION :
    ((OBJ/2 )ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING UNDEF
))((THING ))NIL )(AN (INP9 DET FIN )NIL ))
* BY COMBINING IT WITH CONFIG OF WORD NR.  3
 1. FOR HYPOTHESIS : INP5
   1. 1. CONFIGURATION :
   (NIL LIKE (INP5 CASESI FIN ))
    => FROM LEFT TO RIGHT
       SUCCESSFUL TRANSITION FROM OBJ/2
       TO THE NEW STATE(S):   (OBJ/3 )
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       ((OBJ/3 )ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING
UNDEF ))((THING ))NIL )(AN (INP9 DET FIN )NIL )(LIKE (INP5 CASESI FIN
)NIL ))
    <= FROM RIGHT TO LEFT
        1. 1. 1. FOR WORD : LIKE
       + HEAD TAKES NO OBJECTS OR WRONG POSITION
 2. FOR HYPOTHESIS : INP6
   2. 1. CONFIGURATION :
   (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL )(LIKE (INP6 NOM.ATT.ADJ NIL NIL UNDET )
))
    => FROM LEFT TO RIGHT
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       + MISSING CASE OR FUNCTION IN SEM NETWORK
    <= FROM RIGHT TO LEFT
        2. 1. 1. FOR WORD : LIKE
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS OBJECTIVE SING UNDEF ))
       SUCCESSFUL TRANSITION IN SEM NETW FROM  SIMIL/1
       TO THE NEW STATE(S): FIN
       RESULTING CASE(S):   TO
       NEW FEATURE COMPLEX  ((3PS OBJECTIVE SING UNDEF ))
       MATCH FOLLOWING SEM.FEAT:
      ((THING ))
       (XOR ANIMATE (XOR THING ACT ))
      SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(
PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((
OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL )(LIKE (INP6 NOM.ATT.ADJ
FIN FIN UNDET )(ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING
UNDEF ))((THING ))TO )(AN (INP9 DET FIN )NIL ))))
        2. 1. 2. FOR WORD : FLIES
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```
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS OBJECTIVE SING UNDEF ))
       + NO TRANSITION IN SEM NETWORK
   2. 2. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )(LIKE (
INP6 NOM.ATT.ADJ NIL NIL UNDET ))))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        2. 2. 1. FOR WORD : LIKE
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS OBJECTIVE SING UNDEF ))
       SUCCESSFUL TRANSITION IN SEM NETW FROM  SIMIL/1
       TO THE NEW STATE(S): FIN
       RESULTING CASE(S):   TO
       NEW FEATURE COMPLEX  ((3PS OBJECTIVE SING UNDEF ))
       MATCH FOLLOWING SEM.FEAT:
      ((THING ))
       (XOR ANIMATE (XOR THING ACT ))
       SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )(LIKE (
INP6 NOM.ATT.ADJ FIN FIN UNDET )(ARROW (INP10 NOM.OBJ FIN NIL ((3PS
OBJECTIVE SING UNDEF ))((THING ))TO )(AN (INP9 DET FIN )NIL )))))
        2. 2. 2. FOR WORD : FLIES
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS OBJECTIVE SING UNDEF ))
       + NO TRANSITION IN SEM NETWORK
        2. 2. 3. FOR WORD : TIME
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS OBJECTIVE SING UNDEF ))
       + NO TRANSITION IN SEM NETWORK
 3. FOR HYPOTHESIS : INP7
   3. 1. CONFIGURATION :
   (NIL FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL )(LIKE (
INP7 NOM.ADV.ADJ NIL NIL MOD )))
    => FROM LEFT TO RIGHT
       + WRONG HEAD OR NO TRANSITION IN SYNT NET
    <= FROM RIGHT TO LEFT
        3. 1. 1. FOR WORD : LIKE
       ORDER TEST SUCCESSFUL FOR SLOTFILLER
       CONSULT CASE FRAMES WITH SYNT FEATURES :
       ((3PS OBJECTIVE SING UNDEF ))
       SUCCESSFUL TRANSITION IN SEM NETW FROM  SIMIL/1
       TO THE NEW STATE(S): FIN
       RESULTING CASE(S):   TO
       NEW FEATURE COMPLEX  ((3PS OBJECTIVE SING UNDEF ))
       MATCH FOLLOWING SEM.FEAT:
      ((THING ))
       (XOR ANIMATE (XOR THING ACT ))
       SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
       ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
       (NIL FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL )(LIKE (
INP7 NOM.ADV.ADJ FIN FIN MOD )(ARROW (INP10 NOM.OBJ FIN NIL ((3PS
OBJECTIVE SING UNDEF ))((THING ))TO )(AN (INP9 DET FIN )NIL ))))
        3. 1. 2. FOR WORD : FLIES
```

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        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        + MISSING CASE OR FUNCTION IN SEM NETWORK
    3. 2. CONFIGURATION :
    (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT ))(LIKE (
INP7 NOM.ADV.ADJ NIL NIL MOD )))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET
     <= FROM RIGHT TO LEFT
         3. 2. 1. FOR WORD : FLIES
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        + NO TRANSITION IN SEM NETWORK
         3. 2. 2. FOR WORD : LIKE
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        SUCCESSFUL TRANSITION IN SEM NETW FROM  SIMIL/1
        TO THE NEW STATE(S): FIN
        RESULTING CASE(S):   TO
        NEW FEATURE COMPLEX  ((3PS OBJECTIVE SING UNDEF ))
        MATCH FOLLOWING SEM.FEAT:
       ((THING ))
        (XOR ANIMATE (XOR THING ACT ))
        SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
        ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT ))(LIKE (
INP7 NOM.ADV.ADJ FIN FIN MOD )(ARROW (INP10 NOM.OBJ FIN NIL ((3PS
OBJECTIVE SING UNDEF ))((THING ))TO )(AN (INP9 DET FIN )NIL ))))
         3. 2. 3. FOR WORD : TIME
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        + NO TRANSITION IN SEM NETWORK
 4. FOR HYPOTHESIS : INP8
    4. 1. CONFIGURATION :
    (PREDIC LIKE (INP8 VERB FIN NIL UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN FIN ((PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ
FIN NIL ((OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL )NIL ))
     <= FROM RIGHT TO LEFT
         4. 1. 1. FOR WORD : LIKE
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        SUCCESSFUL TRANSITION IN SEM NETW FROM  ENJ/1
        TO THE NEW STATE(S): FIN
        RESULTING CASE(S):   WHAT
        NEW FEATURE COMPLEX  ((3PS OBJECTIVE SING UNDEF ))
        MATCH FOLLOWING SEM.FEAT:
       ((THING ))
        THING
        SEM FEATURES MATCH SUCCESSFUL, RESULTING DOMAIN:
        ((THING ))
>>>> ALL TESTS SUCCESSFUL, NEW CONFIGURATION :
        (NIL LIKE (INP8 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN FIN ((PLURAL 3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ
FIN NIL ((OBJECTIVE SING 3PS ))((PROPERTY ))KIND )NIL )NIL )(ARROW (
INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING UNDEF ))((THING ))WHAT )(
AN (INP9 DET FIN )NIL )))
(C)
**** TRY TO EXPAND CONFIGURATION :
    ((OBJ/3 )ARROW (INP10 NOM.OBJ FIN NIL ((3PS OBJECTIVE SING UNDEF
))((THING ))NIL )(AN (INP9 DET FIN )NIL )(LIKE (INP5 CASES1 FIN )NIL
```

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))
* BY COMBINING IT WITH CONFIG OF WORD NR.  2
 1. FOR HYPOTHESIS : INP3
   1. 1. CONFIGURATION :
   (NIL TIME (INP2 VERB FIN FIN UNDET ((PRESENT )))(FLIES (INP3
NOM.OBJ FIN NIL ((OBJECTIVE PLURAL 3PS ))((ANIMATE ))WHAT )))
     => FROM LEFT TO RIGHT
        + WRONG HEAD OR NO TRANSITION IN SYNT NET.
     <= FROM RIGHT TO LEFT
         1. 1. 1. FOR WORD : FLIES
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        + NO TRANSITION IN SEM NETWORK
         1. 1. 2. FOR WORD : TIME
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        + NO TRANSITION IN SEM NETWORK
   1. 2. CONFIGURATION :
   (NIL FLIES (INP3 NOM.OBJ FIN FIN ((OBJECTIVE PLURAL 3PS )(PLURAL
3PS ))((PROPERTY ))NIL )(TIME (INP1 NOM.OBJ FIN NIL ((OBJECTIVE SING
3PS ))((PROPERTY ))KIND )NIL ))
     => FROM LEFT TO RIGHT
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        + MISSING CASE OR FUNCTION IN SEM NETWORK
     <= FROM RIGHT TO LEFT
         1. 2. 1. FOR WORD : FLIES
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        CONSULT CASE FRAMES WITH SYNT FEATURES :
        ((3PS OBJECTIVE SING UNDEF ))
        + NO TRANSITION IN SEM NETWORK
 2. FOR HYPOTHESIS : INP4
   2. 1. CONFIGURATION :
   (PREDIC FLIES (INP4 VERB FIN NIL UNDET ((PRESENT )))(TIME (INP1
NOM.OBJ FIN NIL ((SING 3PS ))((PROPERTY )(THING ))NIL )NIL ))
     <= FROM RIGHT TO LEFT
         2. 1. 1. FOR WORD : FLIES
        ORDER TEST SUCCESSFUL FOR SLOTFILLER
        + MISSING CASE OR FUNCTION IN SEM NETWORK

**** FUNCTIONAL AND CASE STRUCTURES *****
(VERB (LIKE (NOM.OBJ (FLIES (NOM.OBJ TIME )))(NOM.OBJ (ARROW (DET AN
)))))
(CASESTRUCTURE (LIKE (NIL FLIES )(WHAT ARROW ))(FLIES (KIND TIME )))
(VERB (TIME (NOM.OBJ FLIES )(NOM.ADV.ADJ (LIKE (NOM.OBJ (ARROW (DET
AN ))))))))
(CASESTRUCTURE (TIME (WHAT FLIES ))(LIKE (WHAT TIME )(TO ARROW )))
(VERB (FLIES (NOM.OBJ TIME )(NOM.ADV.ADJ (LIKE (NOM.OBJ (ARROW (DET
AN ))))))))
(CASESTRUCTURE (FLIES (NIL TIME ))(LIKE (WHAT FLIES )(TO ARROW )))
(VERB (TIME (NOM.OBJ (FLIES (NOM.ATT.ADJ (LIKE (NOM.OBJ (ARROW (DET
AN ))))))))))
(CASESTRUCTURE (TIME (WHAT FLIES ))(LIKE (WHAT FLIES )(TO ARROW )))
(NOM.OBJ (FLIES (NOM.OBJ TIME )(NOM.ATT.ADJ (LIKE (NOM.OBJ (ARROW (
DET AN ))))))))
(CASESTRUCTURE (FLIES (KIND TIME ))(LIKE (WHAT FLIES )(TO ARROW )))
GIVE INPUT SENTENCE
```

EXPERIMENT 16 Functional structure

Problem:

To make clear the functional relations that hold in the sentence by means of a graphical representation.

Solution:

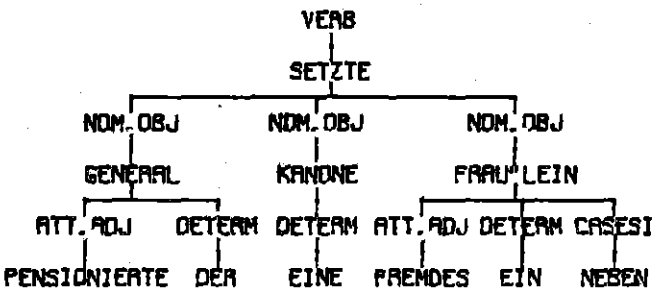
The introduction of functional structures

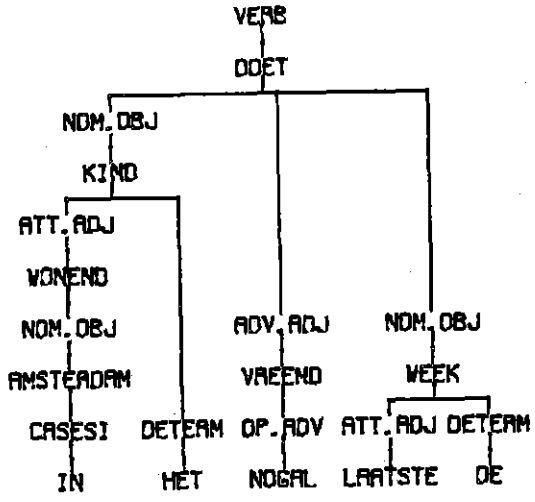
Example:

We will give the structures as computed and plotted by the system for the German and Dutch example and for the following English sentences:

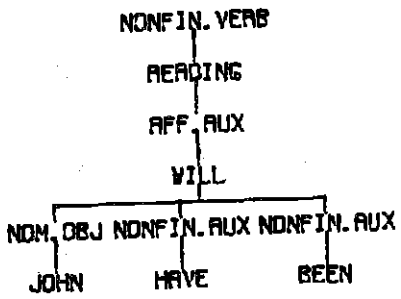
John will have been reading
A very urgent letter has been given to her.
John has given her a present

Results:

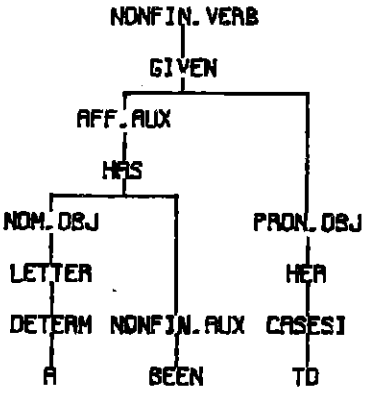

VERB
SETZTE
NOM.OBJ
NOM.OBJ
NOM.OBJ
GENERAAL
KANONE
FRAU'LEIN
ATT.ADJ
DETERM
DETERM
ATT.ADJ
DETERM
CASESI
PENSIONIERTE
DER
EINE
FREMDES
EIN
NEBEN


VERB
DOET
NOM.OBJ
KIND
ATT.ADJ
VONEND
NOM.OBJ
AMSTERDAM
CASESI
IN
DETERM
HET
ADV.ADJ
VREEND
OP.ADV
NOGAL
NOM.OBJ
WEEK
ATT.ADJ
LAATSTE
DETERM
DE

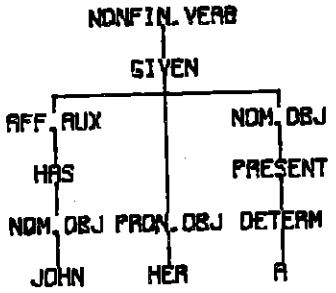
(1)


NONFIN.VERB
AERDING
AFF.AUX
WILL
NOM.OBJ
NONFIN.AUX
NONFIN.AUX
JOHN
HAVE
BEEN

(ii)


NONFIN. VERB
GIVEN
AFF. AUX
HAS
NOM. OBJ
PRON. OBJ
LETTER
HER
DETERM
NONFIN. AUX
CASES1
A
BEEN
TO

(iii)


NONFIN. VERB
GIVEN
AFF. AUX
NOM. OBJ
HAS
PRESENT
NOM. OBJ
PRON. OBJ
DETERM
JOHN
HER
A

EXPERIMENT 17: Case structure

Problem:

To make clear the case relations that hold in the sentence by means of a graphical representation.

Solution:

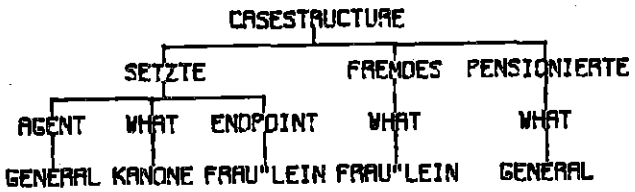
The introduction of case structures

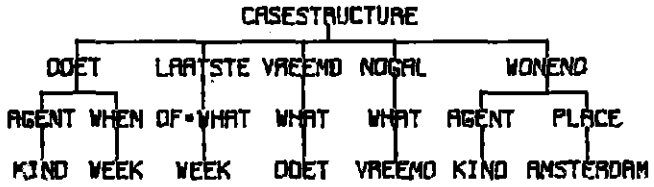
Experimental setting:

We will compute the structures for the German and Dutch example and for the following English examples

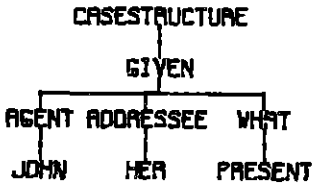
(i) John has given her a present
(ii) John has given a present to her
(iii) She was given a present by her
(iv) A present is given to her.

Results:

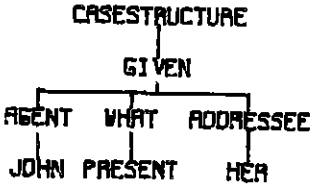



CASESTRUCTURE
DOET
LAATSTE
VREEMD
NOGAL
WONEND
AGENT
WHEN
OF-WHAT
WHAT
WHAT
AGENT
PLACE
KIND
WEEK
WEEK
DOET
VREEMD
KIND
AMSTERDAM

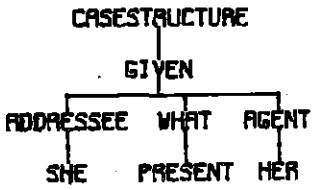
(i)


CASESTRUCTURE
GIVEN
AGENT
ADDRESSEE
WHAT
JOHN
HER
PRESENT

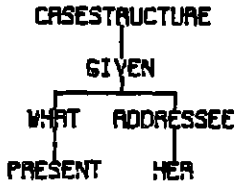
(ii)


CASESTRUCTURE
GIVEN
AGENT
WHAT
ADDRESSEE
JOHN
PRESENT
HER

(IV)


CASESTRUCTURE
GIVEN
ADDRESSEE
WHAT
AGENT
SHE
PRESENT
HER

(V)


CASESTRUCTURE
GIVEN
WHAT
ADDRESSEE
PRESENT
HER

EXPERIMENT 18: The semantic structure

Problem:

The extraction of semantic structures from the particles

Experimental setting:

We will give a number of computations of semantic structures with detailed comments by the program about how this computation process proceeds.
Before each process we give the sentence and the particle which forms the basis of the semantic structure.

Results :

```
SEMANTIC STRUCTURES FOR :
(A LETTER WRITTEN BY THE AUTHOR OF THE ARTICLES )
(LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF SING SUBJ 3PS
))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )(WRITTEN (INP3
PRED.ADJ NIL (W/2 FIN )((PAST ))QUAL )(AUTHOR (INP9 NOM.OBJ NIL (W/2
FIN )((PREP BY DEF SING OBJ ))((PERSON ))AGENT )(THE (INP8 DETERM NIL
NIL NIL NIL )NIL )(BY (INP7 CASES1 NIL NIL NIL NIL )NIL )(ARTICLES (
INP12 NOM.OBJ NIL NIL ((OF DEF PLUR OBJ ))((THING ))RESULT )(THE (
INP11 DETERM NIL NIL NIL NIL )NIL )(OF (INP10 CASES1 NIL NIL NIL NIL
)NIL )))))
CREATING TOP OF SEMANTIC STRUCTURE
CREATING INITIAL TASK IMAGE

[ 1]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (LETTER (INP2 NOM.OBJ NIL NIL ((UNDEF SING OBJ )(UNDEF SING
SUBJ 3PS ))((THING ))NIL )(A (INP1 DETERM NIL NIL NIL NIL )NIL )(
WRITTEN (INP3 PRED.ADJ NIL (W/2 FIN )((PAST ))QUAL )(AUTHOR (INP9
NOM.OBJ NIL (W/2 FIN )((PREP BY DEF SING OBJ ))((PERSON ))AGENT )(THE
(INP8 DETERM NIL NIL NIL NIL )NIL )(BY (INP7 CASES1 NIL NIL NIL NIL )
NIL )(ARTICLES (INP12 NOM.OBJ NIL NIL ((OF DEF PLUR OBJ ))((THING ))
RESULT )(THE (INP11 DETERM NIL NIL NIL NIL )NIL )(OF (INP10 CASES1
NIL NIL NIL NIL )NIL )))))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL
```

```
.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
* PRESENT WORD IS FIRST WORD IN CONFIGURATION
* OBJECT NODE COMPLETED AND ATTACHED TOSEMANTIC STRUCTURE
(01 (PRED RESULT WRIT )(FEAT (XOR (AND UNDEF STNG OBJ )(AND UNDEF
SING SUBJ 3PS ))))
CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
    TOP OF NODE (FOR QUAL):
        01
    PREDICATE NODE (FOR MOD):
        (WRIT )
 => DEPENDENT WORD FOUND: A
    FUNCTION IS: DETERM
    WORD: A              IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD
                                                    - POS EMPTY
 => DEPENDENT WORD FOUND: WRITTEN
    FUNCTION IS: PRED.ADJ
    WORD: WRITTEN        IS OF ADJUNCT-TYPE
      SUBTYPE: QUAL      - PUSHING NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (01 (PRED RESULT WRIT )(FEAT (XOR (AND UNDEF SING OBJ )(AND
UNDEF SING SUBJ 3PS ))))

[ 2]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (WRITTEN (INP3 PRED.ADJ NIL (W/2 FIN )((PAST ))QUAL )(AUTHOR
(INP9 NOM.OBJ NIL (W/2 FIN )((PREP BY DEF SING OBJ ))((PERSON ))AGENT
)(THE (INP8 DETERM NIL NIL NIL NIL )NIL )(BY (INP7 CASES1 NIL NIL NIL
NIL )NIL )(ARTICLES (INP12 NOM.OBJ NIL NIL ((OF DEF PLUR OBJ ))((
THING ))RESULT )((THE (INP11 DETERM NIL NIL NIL NIL )NIL )(OF (INP10
CASES1 NIL NIL NIL NIL )NIL ))))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (XOR (AND UNDEF SING OBJ )(AND UNDEF SING SUBJ 3PS ))))
    TOP OF NODE (FOR QUAL):
        01
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        ((FEAT (XOR (AND UNDEF SING OBJ )(AND) UNDEF SING SUBJ 3PS ))))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: PRED.ADJ
PRESENT WORD: WRITTEN        IS OF ADJUNCT-TYPE
  SUBTYPE:   QUAL
NOW ATTACHING TOP:       TOQARGUMENTS OF QUALIFIER
(ARG (RESULT 01 ))
QUAL   NODE COMPLETED AND ATTACHED
(QUAL (PRED RESULT WRIT )(ARG (RESULT 01 )))
CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
    TOP OF NODE (FOR QUAL):
        QUAL
    PREDICATE NODE (FOR MOD):
        (WRIT )
 => DEPENDENT WORD FOUND: AUTHOR
    FUNCTION IS: NOM.OBJ
    WORD: AUTHOR         IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TOSEMANTIC STRUCTURE
(02 (PRED AGENT WRIT )(FEAT (AND PREP BY DEF SING OBJ )))
    NOW ATTACHING OBJECT: 02      TO ARGUMENTS
(ARG (RESULT 01 )(AGENT 02 ))
    AUTHOR       HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (01 (PRED RESULT WRIT )(FEAT (XOR (AND UNDEF SING OBJ )(AND
UNDEF SING SUBJ 3PS )))(QUAL (PRED RESULT WRIT )(ARG (RESULT 01 )(
AGENT 02 ))))
      (02 (PRED AGENT WRIT )(FEAT (AND PREP BY DEF SING OBJ )))
```

```
[ 3]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (AUTHOR (INP9 NOM,OBJ NIL (N/P FIN )((PREP BY DEF SING OBJ ))
((PERSON ))AGENT )((THE (INP8 DETERM NIL NIL NIL NIL )NIL )(BY (INP7
CASESI NIL NIL NIL NIL )NIL )(ARTICLES (INP12 NOM,OBJ NIL NIL ((OF
DEF PLUR OBJ ))((THING ))RESULT )(THE (INP11 DETERM NIL NIL NIL NIL )
NIL )(OF (INP10 CASESI NIL NIL NIL NIL )NIL )))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND PREP BY DEF SING OBJ )))
    TOP OF NODE (FOR QUAL):
        02
    PREDICATE NODE (FOR MOD):
        (WRIT )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND PREP BY DEF SING OBJ )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM,OBJ
PRESENT WORD: AUTHOR       IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: THE
    FUNCTION IS: DETERM
    WORD: THE              IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD
                                                    - POS EMPTY
 => DEPENDENT WORD FOUND: BY
    FUNCTION IS: CASESI
    WORD: BY               IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD
                                                    - POS EMPTY
 => DEPENDENT WORD FOUND: ARTICLES
    FUNCTION IS: NOM,OBJ
    WORD: ARTICLES         IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TOSEMANTIC STRUCTURE
(03 (PRED RESULT WRIT )(FEAT (AND OF DEF PLUR OBJ )))
    NOW ATTACHING OBJECT: 03      TO ARGUMENTS
(ARG (RESULT 03 ))
    ARTICLES      HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (01 (PRED RESULT WRIT )(FEAT (XOR (AND) UNDEF SING OBJ )(AND
UNDEF SING SUBJ 3PS )))(QUAL (PRED RESULT WRIT )(ARG (RESULT 01 )(
AGENT 02 ))))
      (02 (PRED AGENT WRIT )(FEAT (AND PREP BY DEF SING OBJ ))(ARG (
RESULT 03 )))
      (03 (PRED RESULT WRIT )(FEAT (AND OF DEF PLUR OBJ )))

[ 4]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (ARTICLES (INP12 NOM,OBJ NIL NIL ((OF DEF PLUR OBJ ))((THING
))RESULT )(THE (INP11 DETERM NIL NIL NIL NIL )NIL )(OF (INP10 CASESI
NIL NIL NIL NIL )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND OF DEF PLUR OBJ )))
    TOP OF NODE (FOR QUAL):
        03
    PREDICATE NODE (FOR MOD):
        (WRIT )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND OF DEF PLUR OBJ )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM,OBJ
PRESENT WORD: ARTICLES     IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: THE
    FUNCTION IS: DETERM
    WORD: THE              IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD
                                                    - POS EMPTY
```

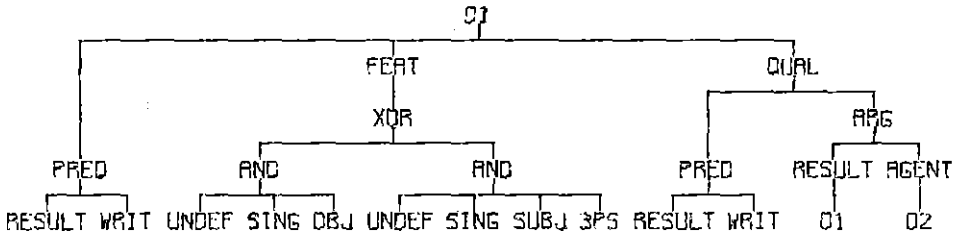
```
=> DEPENDENT WORD FOUND: OF
   FUNCTION IS: CASES1
   WORD: OF                IS OF FUNCTIONWORD-TYPE
     - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD
                                                    - POS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

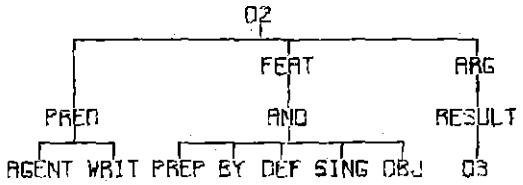
      (01 (PRED RESULT WRIT )(FEAT (XOR (AND UNDEF SING OBJ )(AND
UNDEF SING SUBJ 3PS )))(QUAL (PRED RESULT WRIT )(ARG (RESULT 01 )(
AGENT 02 ))))
      (02 (PRED AGENT WRIT )(FEAT (AND PREP BY DEF SING OBJ ))(ARG (
RESULT 03 )))
      (03 (PRED RESULT WRIT )(FEAT (AND OF DEF PLUR OBJ )))

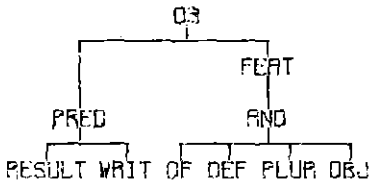
( 5)

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
       NIL
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
       NIL
    TOP OF NODE (FOR QUAL):
       NIL
    PREDICATE NODE (FOR MOD):
       NIL

>>>>> SEMANTIC STRUCTURE COMPLETED NOW
      FINAL OUTPUT:
      (01 (PRED RESULT WRIT )(FEAT (XOR (AND UNDEF SING OBJ )(AND
UNDEF SING SUBJ 3PS )))(QUAL (PRED RESULT WRIT )(ARG (RESULT 01 )(
AGENT 02 ))))
      (02 (PRED AGENT WRIT )(FEAT (AND PREP BY DEF SING OBJ ))(ARG (
RESULT 03 )))
      (03 (PRED RESULT WRIT )(FEAT (AND OF DEF PLUR OBJ )))
```




O2
FEAT
ARG
PRED
AND
RESULT
AGENT WRIT PREP BY DEF SING OBJ
O3


O3
FEAT
PRED
AND
RESULT WRIT OF DEF PLUR OBJ

```
SEMANTIC STRUCTURES FOR :
(DER PENSIONIERTE GENERAL SETZTE EINE KANONE NEBEN EIN FREMDES
FRAU"LEIN )
(SETZTE (INP4 VERB NIL FIN NIL QUAL )(GENERAL (INP3 NOM.OBJ NIL NIL (
(3PS SING MALE DEF NOM ))((PERSON ))NIL )(PENSIONIERTE (INP2 ATT.ADJ
NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(
KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(3PS SING FEM
DEF ACC ))((THING ))WHAT )(EINE (INP5 DETERM NIL NIL NIL NIL )NIL ))(
FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((DIR*PREP 3PS NEUT DEF SING ACC ))(
(PERSON ))ENDPOINT )(FREMDES (INP9 ATT.ADJ NIL NIL NIL QUAL )NIL )(
EIN (INP8 DETERM NIL NIL NIL NIL )NIL )(NEBEN (INP7 CASES) NIL NIL
NIL NIL )NIL )))
CREATING TOP OF SEMANTIC STRUCTURE
CREATING INITIAL TASK IMAGE

[ 1]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (SETZTE (INP4 VERB NIL FIN NIL QUAL )(GENERAL (INP3 NOM.OBJ
NIL NIL ((3PS SING MALE DEF NOM ))((PERSON ))NIL )(PENSIONIERTE (INP2
ATT.ADJ NIL NIL NIL QUAL )NIL )(DER (INP1 DETERM NIL NIL NIL NIL )NIL
)NIL )(KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(3PS
SING FEM DEF ACC ))((THING ))WHAT )(EINE (INP5 DETERM NIL NIL NIL NIL
)NIL ))(FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((DIR*PREP 3PS NEUT DEF SING
ACC ))((PERSON ))ENDPOINT )(FREMDES (INP9 ATT.ADJ NIL NIL NIL QUAL )
NIL )(EIN (INP8 DETERM NIL NIL NIL NIL )NIL )(NEBEN (INP7 CASES) NIL
NIL NIL NIL )NIL )))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: VERB
* PRESENT WORD IS FIRST WORD IN CONFIGURATION
    STARTING TO CREATE INITIAL OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (EXPRESSION (PRED AGENT P-PLACE ))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((PRED AGENT P-PLACE ))
    TOP OF NODE (FOR QUAL):
        EXPRESSION
    PREDICATE NODE (FOR MOD):
        (P-PLACE )
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: GENERAL
    FUNCTION IS: NOM.OBJ
    WORD: GENERAL        IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (01 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM )))
    NOW ATTACHING OBJECT: 01      TO ARGUMENTS
      (ARG (AGENT 01 ))
    GENERAL      HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
 => DEPENDENT WORD FOUND: KANONE
    FUNCTION IS: NOM.OBJ
    WORD: KANONE         IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (02 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
```

```
)(AND 3PS SING FEM DEF ACC ))))
    NOW ATTACHING OBJECT: 02      TO ARGUMENTS
      (ARG (AGENT 01 )(WHAT 02 ))
    KANONE        HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
 => DEPENDENT WORD FOUND: FRAU"LEIN
    FUNCTION IS: NOM.OBJ
    WORD: FRAU"LEIN      IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (03 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC )))
    NOW ATTACHING OBJECT: 03      TO ARGUMENTS
      (ARG (AGENT 01 )(WHAT 02 )(ENDPOINT 03 ))
    FRAU"LEIN     HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT 01 )(WHAT 02 )(
ENDPOINT 03 )))
      (01 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM )))
      (02 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (03 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC )))

[ 2]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
      (FRAU"LEIN (INP10 NOM.OBJ NIL NIL ((DIR*PREP 3PS NEUT DEF
SING ACC ))((PERSON ))ENDPOINT )(FREMDES (INP9 ATT.ADJ NIL NIL NIL
QUAL )NIL )(EIN (INP8 DETERM NIL NIL NIL NIL )NIL )(NEBEN (INP7
CASESI NIL NIL NIL NIL )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
      ((FEAT (AND DIR*PREP 3PS NEUT DEF SING ACC )))
    TOP OF NODE (FOR QUAL):
      03
    PREDICATE NODE (FOR MOD):
      (ENTITY )
    READJUSTED ATTACHMENT POINT:
      ((FEAT (AND DIR*PREP 3PS NEUT DEF SING ACC )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: FRAU"LEIN   IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: FREMDES
    FUNCTION IS: ATT.ADJ
    WORD: FREMDES        IS OF ADJUNCT-TYPE
      SUBTYPE: QUAL      - PUSHING NEW TASK IMAGE
 => DEPENDENT WORD FOUND: EIN
    FUNCTION IS: DETERM
    WORD: EIN            IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - POS EMPTY
 => DEPENDENT WORD FOUND: NEBEN
    FUNCTION IS: CASESI
    WORD: NEBEN          IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - POS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT 01 )(WHAT 02 )(
ENDPOINT 03 )))
      (01 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM )))
      (02 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (03 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC )))
```

```
[ 3]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (FREMDES (INP9 ATT.ADJ NIL NIL NIL QUAL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND DIR*PREP 3PS NEUT DEF SING ACC )))
    TOP OF NODE (FOR QUAL):
        03
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND DIR*PREP 3PS NEUT DEF SING ACC )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: ATT.ADJ
PRESENT WORD: FREMDES        IS OF ADJUNCT-TYPE
  SUBTYPE:   QUAL
    STARTING TO CREATE NEW ADJUNCT NODE
NOW ATTACHING TOP: 03    TO ARGUMENTS OF QUALIFIER
(ARG (WHAT 03 ))
* QUAL  NODE COMPLETED AND ATTACHED:
(QUAL (PRED WHAT P-PROP )(ARG (WHAT 03 )))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((ARG (WHAT 03 )))
    TOP OF NODE (FOR QUAL):
        QUAL
    PREDICATE NODE (FOR MOD):
        (P-PROP )
STARTING TO TRACE DEPENDENT WORDS
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT 01 )(WHAT 02 )(
ENDPOINT 03 )))
      (01 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM )))
      (02 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (03 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC ))(QUAL (PRED WHAT P-PROP )(ARG (WHAT 03 ))))

[ 4]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (KANONE (INP6 NOM.OBJ NIL NIL ((3PS SING FEM UNDEF ACC )(3PS
SING FEM DEF ACC ))((THING ))WHAT )(EINE (INP5 DETERM NIL NIL NIL NIL
)NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (XOR (AND 3PS SING FEM UNDEF ACC )(AND 3PS SING FEM
DEF ACC ))))
    TOP OF NODE (FOR QUAL):
        02
    PREDICATE NODE (FOR MOD):
        (ENTITY )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (XOR (AND 3PS SING FEM UNDEF ACC )(AND 3PS SING FEM
DEF ACC ))))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: KANONE       IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: EINE
    FUNCTION IS: DETERM
    WORD: EINE           IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - PDS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
```

```
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT O1 )(WHAT O2 )(
ENDPOINT O3 )))
      (O1 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM )))
      (O2 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (O3 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC ))(QUAL (PRED WHAT P-PROP )(ARG (WHAT O3 ))))

( 5)

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (GENERAL (INP3 NOM.OBJ NIL NIL ((3PS SING MALE DEF NOM ))((
PERSON ))AGENT )(PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )(
DER (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND 3PS SING MALE DEF NOM )))
    TOP OF NODE (FOR QUAL):
        O1
    PREDICATE NODE (FOR MOD):
        (ENTITY )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND 3PS SING MALE DEF NOM )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: GENERAL      IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: PENSIONIERTE
    FUNCTION IS: ATT.ADJ
    WORD: PENSIONIERTE  IS OF ADJUNCT-TYPE
      SUBTYPE: QUAL      - PUSHING NEW TASK IMAGE
 => DEPENDENT WORD FOUND: DER
    FUNCTION IS: DETERM
    WORD: DER             IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - PDS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT O1 )(WHAT O2 )(
ENDPOINT O3 )))
      (O1 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM )))
      (O2 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (O3 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC ))(QUAL (PRED WHAT P-PROP )(ARG (WHAT O3 ))))

( 6)

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (PENSIONIERTE (INP2 ATT.ADJ NIL NIL NIL QUAL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND 3PS SING MALE DEF NOM )))
    TOP OF NODE (FOR QUAL):
        O1
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND 3PS SING MALE DEF NOM )))
```

```
•II• EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: ATT ADJ
PRESENT WORD: PENSIONIERTE   IS OF ADJUNCT-TYPE
  SUBTYPE:   QUAL
    STARTING TO CREATE NEW ADJUNCT NODE
NOW ATTACHING TOP: 01     TO ARGUMENTS OF QUALIFIER
(ARG (WHAT 01 ))
* QUAL  NODE COMPLETED AND ATTACHED:
(QUAL (PRED WHAT P-PROP )(ARG (WHAT 01 )))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((ARG (WHAT 01 ))
    TOP OF NODE (FOR QUAL):
        QUAL
    PREDICATE NODE (FOR MOD):
        (P-PROP )
STARTING TO TRACE DEPENDENT WORDS
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

•III• SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT 01 )(WHAT 02 )(
ENDPOINT 03 )))
      (01 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM ))(
QUAL (PRED WHAT P-PROP )(ARG (WHAT 01 ))))
      (02 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (03 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC ))(QUAL (PRED WHAT P-PROP )(ARG (WHAT 03 ))))

[ 7]

•I• POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        NIL
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

>>>>> SEMANTIC STRUCTURE COMPLETED NOW
      FINAL OUTPUT:

      (EXPRESSION (PRED AGENT P-PLACE )(ARG (AGENT 01 )(WHAT 02 )(
ENDPOINT 03 )))
      (01 (PRED PERSON ENTITY )(FEAT (AND 3PS SING MALE DEF NOM ))(
QUAL (PRED WHAT P-PROP )(ARG (WHAT 01 ))))
      (02 (PRED THING ENTITY )(FEAT (XOR (AND 3PS SING FEM UNDEF ACC
)(AND 3PS SING FEM DEF ACC ))))
      (03 (PRED PERSON ENTITY )(FEAT (AND DIR*PREP 3PS NEUT DEF SING
ACC ))(QUAL (PRED WHAT P-PROP )(ARG (WHAT 03 ))))
END OF FILE DURING INPUT
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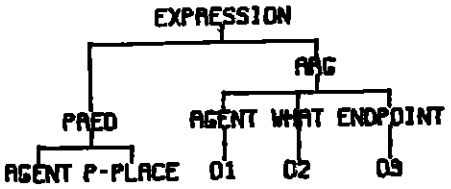
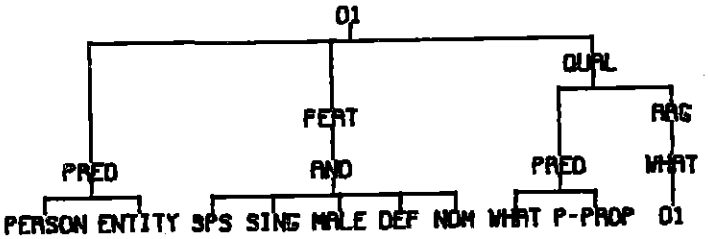

EXPRESSION
ARG
PRED
AGENT WHAT ENDPOINT
AGENT P-PLACE
01
02
03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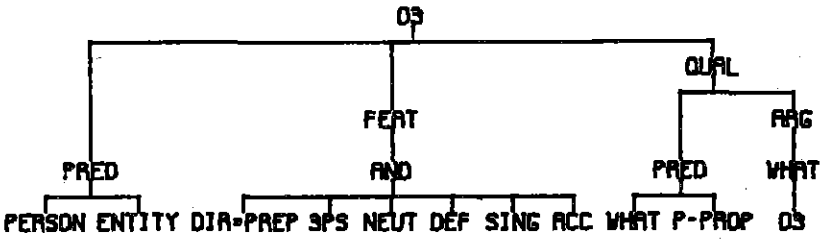
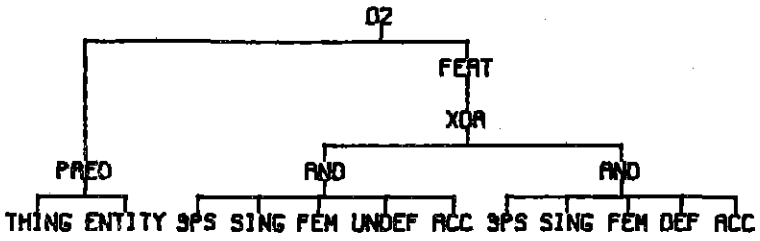
QUAL
FEAT
ARG
PRED
AND
PRED
WHAT
PERSON ENTITY 3PS SING MALE DEF NOM
WHAT P-PROP
01


03
QUAL
FEAT
ARG
PRED
AND
PRED
WHAT
PERSON ENTITY DIA-PREP 3PS NEUT DEF SING ACC
WHAT P-PROP
03


02
FEAT
XOR
PRED
AND
AND
THING ENTITY 3PS SING FEM UNDEF ACC
3PS SING FEM DEF ACC

```
SEMANTIC STRUCTURES FOR :
(HET IN AMSTERDAM WONEND KIND DOET NOGAL VREEMD DE LAATSTE WEEK )
(DOET (INP6 VERB NIL FIN NIL QUAL )(KIND (INP5 NOM,OBJ NIL NIL ((SING
3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT,ADJ NIL FIN NIL QUAL
)(AMSTERDAM (INP3 NOM,OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))
PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(HET (INP1
DETERM NIL NIL NIL NIL )NIL )NIL )(VREEMD (INP8 ADV,ADJ NIL NIL NIL
MOD )(NOGAL (INP7 OP,ADV NIL NIL NIL MOD )NIL ))(WEEK (INP11 NOM,OBJ
NIL NIL ((DEF 3PS SING TIM MALE CONC ))((TIME ))WHEN )(LAATSTE (INP10
ATT,ADJ NIL NIL NIL QUAL )NIL )(DE (INP9 DETERM NIL NIL NIL NIL )NIL
)))
CREATING TOP OF SEMANTIC STRUCTURE
CREATING INITIAL TASK IMAGE

( 1)

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (DOET (INP6 VERB NIL FIN NIL QUAL )(KIND (INP5 NOM,OBJ NIL
NIL ((SING 3PS NEUT DEF ))((PERSON ))NIL )(WONEND (INP4 ATT,ADJ NIL
FIN NIL QUAL )(AMSTERDAM (INP3 NOM,OBJ NIL NIL ((LOC 3PS SING NEUT ))
((PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )NIL )(
HET (INP1 DETERM NIL NIL NIL NIL )NIL )NIL )(VREEMD (INP8 ADV,ADJ NIL
NIL NIL MOD )(NOGAL (INP7 OP,ADV NIL NIL NIL MOD )NIL ))(WEEK (INP11
NOM,OBJ NIL NIL ((DEF 3PS SING TIM MALE CONC ))((TIME ))WHEN )(
LAATSTE (INP10 ATT,ADJ NIL NIL NIL QUAL )NIL )(DE (INP9 DETERM NIL
NIL NIL NIL )NIL )))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: VERB
* PRESENT WORD IS FIRST WORD IN CONFIGURATION
    STARTING TO CREATE INITIAL OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (EXPRESSION (PRED AGENT P-BEHAVE ))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((PRED AGENT P-BEHAVE ))
    TOP OF NODE (FOR QUAL):
        EXPRESSION
    PREDICATE NODE (FOR MOD):
        (P-BEHAVE )
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: KIND
    FUNCTION IS: NOM,OBJ
    WORD: KIND          IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
    NOW ATTACHING OBJECT: O1     TO ARGUMENTS
      (ARG (AGENT O1 ))
    KIND          HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
 => DEPENDENT WORD FOUND: VREEMD
    FUNCTION IS: ADV,ADJ
    WORD: VREEMD        IS OF ADJUNCT-TYPE
      SUBTYPE: MOD      - PUSHING NEW TASK IMAGE
 => DEPENDENT WORD FOUND: WEEK
    FUNCTION IS: NOM,OBJ
    WORD: WEEK          IS OF OBJECT-TYPE
```

```
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
)))
    NOW ATTACHING OBJECT: O2      TO ARGUMENTS
      (ARG (AGENT O1 )(WHEN O2 ))
    WEEK          HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE )(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
)))

[ 2]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (WEEK (INP11 NOM,OBJ NIL NIL ((DEF 3PS SING TIM MALE CONC ))(
(TIME ))WHEN )(LAATSTE (INP10 ATT,ADJ NIL NIL NIL QUAL )NIL )(DE (
INP9 DETERM NIL NIL NIL NIL )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND DEF 3PS SING TIM MALE CONC )))
    TOP OF NODE (FOR QUAL):
        O2
    PREDICATE NODE (FOR MOD):
        (TIME*SEQ )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND DEF 3PS SING TIM MALE CONC )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM,OBJ
PRESENT WORD: WEEK          IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: LAATSTE
    FUNCTION IS: ATT,ADJ
    WORD: LAATSTE          IS OF ADJUNCT-TYPE
      SUBTYPE: QUAL        - PUSHING NEW TASK IMAGE
 => DEPENDENT WORD FOUND: DE
    FUNCTION IS: DETERM
    WORD: DE               IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - PDS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE )(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
)))

[ 3]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (LAATSTE (INP10 ATT,ADJ NIL NIL NIL QUAL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND DEF 3PS SING TIM MALE CONC )))
    TOP OF NODE (FOR QUAL):
        O2
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND DEF 3PS SING TIM MALE CONC )))
```

```
.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: ATT.ADJ
PRESENT WORD: LAATSTE          IS OF ADJUNCT-TYPE
  SUBTYPE:   QUAL
    STARTING TO CREATE NEW ADJUNCT NODE
NOW ATTACHING TOP: O2     TO ARGUMENTS OF QUALIFIER
(ARG (OF*WHAT O2 ))
* QUAL   NODE COMPLETED AND ATTACHED:
(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 )))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((ARG (OF*WHAT O2 )))
    TOP OF NODE (FOR QUAL):
        QUAL
    PREDICATE NODE (FOR MOD):
        (LAST )
STARTING TO TRACE DEPENDENT WORDS
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE )(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))

[ 4]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (VREEMD (INP8 ADV.ADJ NIL NIL NIL MOD )(NOGAL (INP7 OP.ADV
NIL NIL NIL MOD )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        (P-BEHAVE )
    TOP OF NODE (FOR QUAL):
        EXPRESSION
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        (P-BEHAVE )

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: ADV.ADJ
PRESENT WORD: VREEMD          IS OF ADJUNCT-TYPE
  SUBTYPE:   MOD
    STARTING TO CREATE NEW ADJUNCT NODE
* MOD   NODE COMPLETED AND ATTACHED:
(MOD (PRED WHAT PROP STRANGE ))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((PRED WHAT PROP STRANGE ))
    TOP OF NODE (FOR QUAL):
        MOD
    PREDICATE NODE (FOR MOD):
        (STRANGE )
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: NOGAL
    FUNCTION IS: OP.ADV
    WORD: NOGAL          IS OF ADJUNCT-TYPE
      SUBTYPE: MOD       - PUSHING NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE (MOD (PRED WHAT PROP STRANGE )
))(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))
```

```
[ 5]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (NOGAL (INP7 OP.ADV NIL NIL NIL MOD )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        (STRANGE )
    TOP OF NODE (FOR QUAL):
        MOD
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        (STRANGE )

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: OP.ADV
PRESENT WORD: NOGAL          IS OF ADJUNCT-TYPE
  SUBTYPE:   MOD
    STARTING TO CREATE NEW ADJUNCT NODE
* MOD   NODE COMPLETED AND ATTACHED:
(MOD (PRED WHAT PROP RATHER ))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((PRED WHAT PROP RATHER ))
    TOP OF NODE (FOR QUAL):
        MOD
    PREDICATE NODE (FOR MOD):
        (RATHER )
STARTING TO TRACE DEPENDENT WORDS
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE (MOD (PRED WHAT PROP STRANGE (
MOD (PRED WHAT PROP RATHER )))))(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))

[ 6]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (KIND (INP5 NOM.OBJ NIL NIL ((SING 3PS NEUT DEF ))((PERSON ))
AGENT )(WONEND (INP4 ATT.ADJ NIL FIN NIL QUAL )(AMSTERDAM (INP3
NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2
CASES1 NIL NIL NIL NIL )NIL )NIL )NIL )(HET (INP1 DETERM NIL NIL NIL
NIL )NIL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND SING 3PS NEUT DEF )))
    TOP OF NODE (FOR QUAL):
        O1
    PREDICATE NODE (FOR MOD):
        (P-FAM )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND SING 3PS NEUT DEF )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: KIND           IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: WONEND
    FUNCTION IS: ATT.ADJ
    WORD: WONEND          IS OF ADJUNCT-TYPE
      SUBTYPE: QUAL       - PUSHING NEW TASK IMAGE
 => DEPENDENT WORD FOUND: HET
    FUNCTION IS: DETERM
    WORD: HET             IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - POS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
```

```
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE (MOD (PRED WHAT PROP STRANGE (
MOD (PRED WHAT PROP RATHER )))))(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF )))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))

[ 7]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (WONEND (INP4 ATT.ADJ NIL FIN NIL QUAL )(AMSTERDAM (INP3
NOM.OBJ NIL NIL NIL ((LOC 3PS SING NEUT ))((PLACE ))PLACE )(IN (INP2
CASES1 NIL NIL NIL NIL )NIL )NIL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND SING 3PS NEUT DEF )))
    TOP OF NODE (FOR QUAL):
        O1
    PREDICATE NODE (FOR MOD):
        NIL
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND SING 3PS NEUT DEF )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: ATT.ADJ
PRESENT WORD: WONEND          IS OF ADJUNCT-TYPE
  SUBTYPE:   QUAL
    STARTING TO CREATE NEW ADJUNCT NODE
NOW ATTACHING TOP: O1     TO ARGUMENTS OF QUALIFIER
(ARG (AGENT O1 ))
* QUAL  NODE COMPLETED AND ATTACHED:
(QUAL (PRED AGENT P-DWELL )(ARG (AGENT O1 )))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((ARG (AGENT O1 )))
    TOP OF NODE (FOR QUAL):
        QUAL
    PREDICATE NODE (FOR MOD):
        (P-DWELL )
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: AMSTERDAM
    FUNCTION IS: NOM.OBJ
    WORD: AMSTERDAM     IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (O3 (PRED WHERE SPEC*PLACE ADAM )(FEAT (AND LOC 3PS SING NEUT )
))
    NOW ATTACHING OBJECT: O3     TO ARGUMENTS
      (ARG (AGENT O1 )(PLACE O3 ))
    AMSTERDAM    HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT P-BEHAVE (MOD (PRED WHAT PROP STRANGE (
MOD (PRED WHAT PROP RATHER )))))(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF ))(QUAL (PRED
AGENT P-DWELL )(ARG (AGENT O1 )(PLACE O3 ))))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))
      (O3 (PRED WHERE SPEC*PLACE ADAM )(FEAT (AND LOC 3PS SING NEUT )
))
```

```
[ 8]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (AMSTERDAM (INP3 NOM.OBJ NIL NIL ((LOC 3PS SING NEUT ))((
PLACE ))PLACE )(IN (INP2 CASESI NIL NIL NIL NIL )NIL )NIL )
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND LOC 3PS SING NEUT )))
    TOP OF NODE (FOR QUAL):
        O3
    PREDICATE NODE (FOR MOD):
        (ADAM )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND LOC 3PS SING NEUT )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: AMSTERDAM   IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: IN
    FUNCTION IS: CASESI
    WORD: IN              IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - POS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

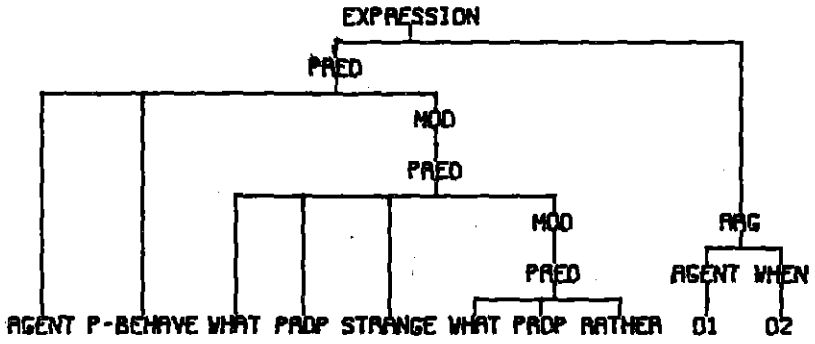
      (EXPRESSION (PRED AGENT P-BEHAVE (MOD (PRED WHAT PROP STRANGE (
MOD (PRED WHAT PROP RATHER )))))(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF ))(QUAL (PRED
AGENT P-DWELL )(ARG (AGENT O1 )(PLACE O3 ))))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))
      (O3 (PRED WHERE SPEC*PLACE ADAM )(FEAT (AND LOC 3PS SING NEUT )
))

[ 9]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        NIL
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

>>>>> SEMANTIC STRUCTURE COMPLETED NOW
      FINAL OUTPUT:

      (EXPRESSION (PRED AGENT P-BEHAVE (MOD (PRED WHAT PROP STRANGE (
MOD (PRED WHAT PROP RATHER )))))(ARG (AGENT O1 )(WHEN O2 )))
      (O1 (PRED WHO P-FAM )(FEAT (AND SING 3PS NEUT DEF ))(QUAL (PRED
AGENT P-DWELL )(ARG (AGENT O1 )(PLACE O3 ))))
      (O2 (PRED PART TIME*SEQ )(FEAT (AND DEF 3PS SING TIM MALE CONC
))(QUAL (PRED OF*WHAT P-ORDER LAST )(ARG (OF*WHAT O2 ))))
      (O3 (PRED WHERE SPEC*PLACE ADAM )(FEAT (AND LOC 3PS SING NEUT )
))
```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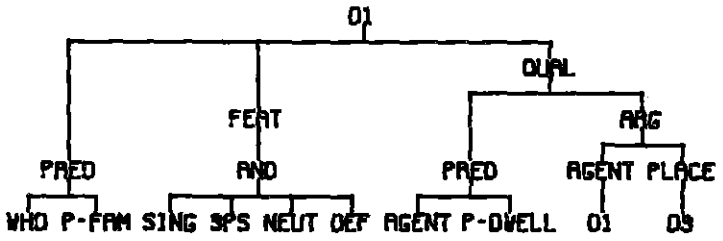
PRED
MOD
PRED
MOD
PRED
ARG
AGENT WHEN
AGENT P-BEHAVE WHAT PROP STRANGE WHAT PROP RATHER O1 O2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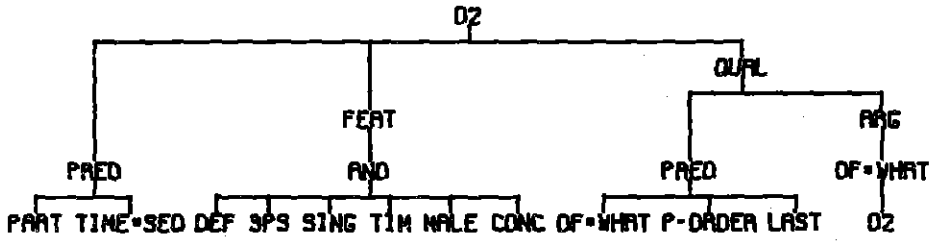
FEAT
ARG
PRED
AND
PRED
AGENT PLACE
WHO P-FAM SING 3PS NEUT DEF AGENT P-DWELL O1 O9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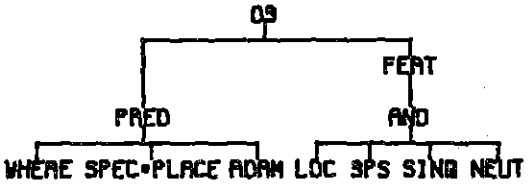
ARG
PRED
AND
PRED
OF-WHAT
PART TIME-SEQ DEF 3PS SING TIM MALE CONC OF-WHAT P-ORDER LAST O2


O9
FEAT
PRED
AND
WHERE SPEC-PLACE ADAM LOC 3PS SING NEUT

```
SEMANTIC STRUCTURES FOR :
(SHE GIVES JOHN A PRESENT )
(GIVES (INP2 VERB NIL FIN NIL QUAL )(SHE (INP1 PRON.OBJ NIL NIL ((
SING SUBJ 3PS ))((PERSON ))NIL )NIL )(JOHN (INP3 NOM.OBJ NIL NIL ((
MALE 3PS SING ))((PERSON ))ADDRESSEE ))(PRESENT (INP5 NOM.OBJ NIL NIL
((UNDEF 3PS SING ))((THING ))WHAT )(A (INP4 DETERM NIL NIL NIL NIL )
NIL )))
CREATING TOP OF SEMANTIC STRUCTURE
CREATING INITIAL TASK IMAGE

[ 1]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (GIVES (INP2 VERB NIL FIN NIL QUAL )(SHE (INP1 PRON.OBJ NIL
NIL ((SING SUBJ 3PS ))((PERSON ))NIL )NIL )(JOHN (INP3 NOM.OBJ NIL
NIL ((MALE 3PS SING ))((PERSON ))ADDRESSEE ))(PRESENT (INP5 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP4 DETERM NIL NIL
NIL NIL )NIL )))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: VERB
* PRESENT WORD IS FIRST WORD IN CONFIGURATION
    STARTING TO CREATE INITIAL OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (EXPRESSION (PRED AGENT GIV ))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((PRED AGENT GIV ))
    TOP OF NODE (FOR QUAL):
        EXPRESSION
    PREDICATE NODE (FOR MOD):
        (GIV )
STARTING TO TRACE DEPENDENT WORDS
 #> DEPENDENT WORD FOUND: SHE
    FUNCTION IS: PRON.OBJ
    WORD: SHE           IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (01 (PRED PERSON NAM )(FEAT (AND SING SUBJ 3PS )))
    NOW ATTACHING OBJECT: 01     TO ARGUMENTS
      (ARG (AGENT 01 ))
    SHE          HAS NO DEPENDENT WORDS
 #> DEPENDENT WORD FOUND: JOHN
    FUNCTION IS: NOM.OBJ
    WORD: JOHN          IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (02 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
    NOW ATTACHING OBJECT: 02     TO ARGUMENTS
      (ARG (AGENT 01 )(ADDRESSEE 02 ))
    JOHN         HAS NO DEPENDENT WORDS
 #> DEPENDENT WORD FOUND: PRESENT
    FUNCTION IS: NOM.OBJ
    WORD: PRESENT       IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (03 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
    NOW ATTACHING OBJECT: 03     TO ARGUMENTS
      (ARG (AGENT 01 )(ADDRESSEE 02 )(WHAT 03 ))
    PRESENT      HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD
```

```
.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED AGENT GIV )(ARG (AGENT 01 )(ADDRESSEE 02 )(
WHAT 03 )))
      (01 (PRED PERSON NAM )(FEAT (AND SING SUBJ 3PS )))
      (02 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (03 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))

[ 2]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (PRESENT (INP5 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))
WHAT )(A (INP4 DETERM NIL NIL NIL NIL )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND UNDEF 3PS SING )))
    TOP OF NODE (FOR QUAL):
        03
    PREDICATE NODE (FOR MOD):
        (GIV )
    READJUSTED ATTACHMENT POINT:
        ((FEAT (AND UNDEF 3PS SING )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: PRESENT      IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: A
    FUNCTION IS: DETERM
    WORD: A                IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - PDS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

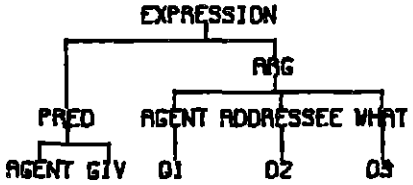
      (EXPRESSION (PRED AGENT GIV )(ARG (AGENT 01 )(ADDRESSEE 02 )(
WHAT 03 )))
      (01 (PRED PERSON NAM )(FEAT (AND SING SUBJ 3PS )))
      (02 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (03 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))

[ 3]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        NIL
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

>>>>> SEMANTIC STRUCTURE COMPLETED NOW
      FINAL OUTPUT:

      (EXPRESSION (PRED AGENT GIV )(ARG (AGENT 01 )(ADDRESSEE 02 )(
WHAT 03 )))
      (01 (PRED PERSON NAM )(FEAT (AND SING SUBJ 3PS )))
      (02 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (03 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
```


EXPRESSION
ARG
PRED
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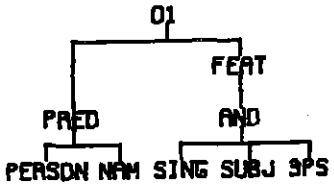
ADDRESSEE
WHAT
AGENT
GIV
01
02
03


01
FEAT
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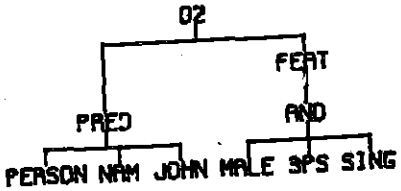
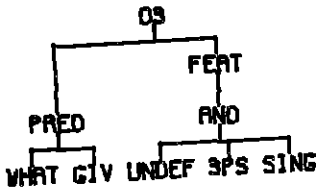
AND
PERSON
NAM
SING
SUBJ
3PS


02
FEAT
PRED
AND
PERSON
NAM
JOHN
MALE
3PS
SING


03
FEAT
PRED
AND
WHAT
GIV
UNDEF
3PS
SING

```
SEMANTIC STRUCTURES FOR :
(JOHN IS GIVEN A PRESENT BY HER )
((GIVEN (INP7 NONFIN.VERB NIL FIN ((PASS" PRES PASS ))QUAL )(IS (INP4
AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1 NOM.OBJ NIL NIL
((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT (INP10 NOM.OBJ
NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9 DETERM NIL NIL
NIL NIL )NIL ))(HER (INP12 PRON.OBJ NIL NIL ((PREP BY SING OBJ 3PS ))
((PERSON ))AGENT )(BY (INP11 CASESI NIL NIL NIL NIL )NIL )))
CREATING TOP OF SEMANTIC STRUCTURE
CREATING INITIAL TASK IMAGE

( 1)

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
        (GIVEN (INP7 NONFIN.VERB NIL FIN ((PASS" PRES PASS ))QUAL )(
IS (INP4 AFF.AUX FIN NIL ((PASS" PRES PASS ))NIL )(JOHN (INP1 NOM.OBJ
NIL NIL ((MALE 3PS SING ))((PERSON ))NIL )NIL )NIL )(PRESENT (INP10
NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))WHAT )(A (INP9 DETERM
NIL NIL NIL NIL )NIL ))(HER (INP12 PRON.OBJ NIL NIL ((PREP BY SING
OBJ 3PS ))((PERSON ))AGENT )(BY (INP11 CASESI NIL NIL NIL NIL )NIL )))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        NIL
    TOP OF NODE (FOR QUAL):
        NIL
    PREDICATE NODE (FOR MOD):
        NIL

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NONFIN.VERB
* PRESENT WORD IS FIRST WORD IN CONFIGURATION
    STARTING TO CREATE INITIAL OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (EXPRESSION (PRED ADDRESSEE GIV )(FEAT (AND PASS" PRES PASS )))
  CHANGING TASK IMAGE AFTER CREATION OF NODE
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
        ((FEAT (AND PASS" PRES PASS )))
    TOP OF NODE (FOR QUAL):
        EXPRESSION
    PREDICATE NODE (FOR MOD):
        (GIV )
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: IS
    FUNCTION IS: AFF.AUX
    WORD: IS              IS OF FUNCTIONWORD-TYPE
      WORD: JOHN           IS DEPENDENT FROM FUNCTIONWORD
            AND IS CONSIDERED TO TAKE ITS PLACE
    FUNCTION IS: NOM.OBJ
    WORD: JOHN            IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (O1 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
    NOW ATTACHING OBJECT: O1      TO ARGUMENTS
      (ARG (ADDRESSEE O1 ))
    JOHN          HAS NO DEPENDENT WORDS
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - PDS EMPTY
 => DEPENDENT WORD FOUND: PRESENT
    FUNCTION IS: NOM.OBJ
    WORD: PRESENT         IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (O2 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
    NOW ATTACHING OBJECT: O2      TO ARGUMENTS
      (ARG (ADDRESSEE O1 )(WHAT O2 ))
```

```
    PRESENT       HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
 =>  DEPENDENT WORD FOUND: HER
    FUNCTION IS: PRON.OBJ
    WORD: HER            IS OF OBJECT-TYPE
    STARTING TO CREATE NEW OBJECT NODE
* OBJECT NODE COMPLETED AND ATTACHED TO SEMANTIC STRUCTURE:
      (03 (PRED PERSON NAM )(FEAT (AND PREP BY SING OBJ 3PS )))
    NOW ATTACHING OBJECT: 03      TO ARGUMENTS
      (ARG (ADDRESSEE 01 )(WHAT 02 )(AGENT 03 ))
    HER           HAS DEPENDENT WORDS - PUSH NEW TASK IMAGE
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED ADDRESSEE GIV )(FEAT (AND PASS" PRES PASS ))(
ARG (ADDRESSEE 01 )(WHAT 02 )(AGENT 03 )))
      (01 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (02 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
      (03 (PRED PERSON NAM )(FEAT (AND PREP BY SING OBJ 3PS )))

[ 2]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
       (HER (INP12 PRON.OBJ NIL NIL ((PREP BY SING OBJ 3PS ))((
PERSON ))AGENT )(BY (INP11 CASESI NIL NIL NIL NIL )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
       ((FEAT (AND PREP BY SING OBJ 3PS )))
    TOP OF NODE (FOR QUAL):
       03
    PREDICATE NODE (FOR MOD):
       (NAM )
    READJUSTED ATTACHMENT POINT:
       ((FEAT (AND PREP BY SING OBJ 3PS )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: PRON.OBJ
PRESENT WORD: HER          IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: BY
    FUNCTION IS: CASESI
    WORD: BY             IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - POS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

      (EXPRESSION (PRED ADDRESSEE GIV )(FEAT (AND PASS" PRES PASS ))(
ARG (ADDRESSEE 01 )(WHAT 02 )(AGENT 03 )))
      (01 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (02 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
      (03 (PRED PERSON NAM )(FEAT (AND PREP BY SING OBJ 3PS )))

[ 3]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
       (PRESENT (INP10 NOM.OBJ NIL NIL ((UNDEF 3PS SING ))((THING ))
WHAT )(A (INP9 DETERM NIL NIL NIL NIL )NIL ))
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
       ((FEAT (AND UNDEF 3PS SING )))
    TOP OF NODE (FOR QUAL):
       02
    PREDICATE NODE (FOR MOD):
       (GIV )
    READJUSTED ATTACHMENT POINT:
```

```
      ((FEAT (AND UNDEF 3PS SING )))

.II. EXECUTION OF TASK
FUNCTION OF PRESENT WORD IS: NOM.OBJ
PRESENT WORD: PRESENT      IS OBJECT-TYPE
STARTING TO TRACE DEPENDENT WORDS
 => DEPENDENT WORD FOUND: A
    FUNCTION IS: DETERM
    WORD: A                IS OF FUNCTIONWORD-TYPE
      - NO (MORE) WORDS DEPENDENT FROM FUNCTIONWORD  - POS EMPTY
- NO (MORE) WORDS DEPENDENT FROM PRESENT WORD

.III. SEMANTIC STRUCTURE AT PRESENT STAGE:

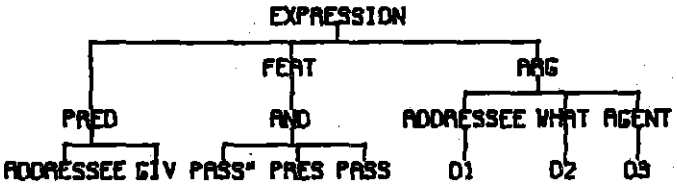
      (EXPRESSION (PRED ADDRESSEE GIV )(FEAT (AND PASS" PRES PASS ))(
ARG (ADDRESSEE 01 )(WHAT 02 )(AGENT 03 )))
      (01 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (02 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
      (03 (PRED PERSON NAM )(FEAT (AND PREP BY SING OBJ 3PS )))

[ 4]

.I. POPPING UP NEW TASK IMAGE
    PRESENT POINT IN CONFIGURATION:
      NIL
    ATTACHMENT POINT IN SEMANTIC STRUCTURE:
      NIL
    TOP OF NODE (FOR QUAL):
      NIL
    PREDICATE NODE (FOR MOD):
      NIL

>>>>> SEMANTIC STRUCTURE COMPLETED NOW
      FINAL OUTPUT:

      (EXPRESSION (PRED ADDRESSEE GIV )(FEAT (AND PASS" PRES PASS ))(
ARG (ADDRESSEE 01 )(WHAT 02 )(AGENT 03 )))
      (01 (PRED PERSON NAM JOHN )(FEAT (AND MALE 3PS SING )))
      (02 (PRED WHAT GIV )(FEAT (AND UNDEF 3PS SING )))
      (03 (PRED PERSON NAM )(FEAT (AND PREP BY SING OBJ 3PS )))
```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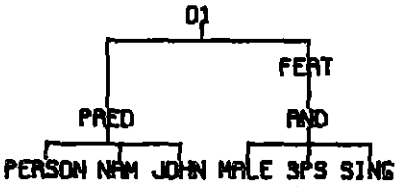
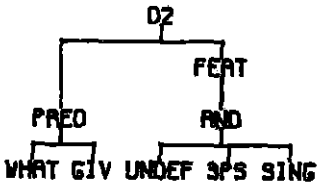
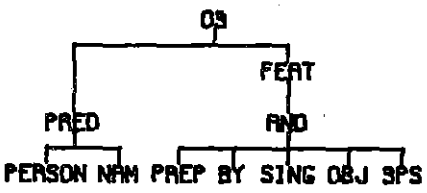
FEAT
ARG
PRED
AND
ADDRESSEE WHAT AGENT
ADDRESSEE GIV PASS* PRES PASS
01
02
03


01
FEAT
PRED
AND
PERSON NAM JOHN MALE SPS SING


02
FEAT
PRED
AND
WHAT GIV UNDEF SPS SING


03
FEAT
PRED
AND
PERSON NAM PREP BY SING OBJ SPS

§ 5. CONCLUSIONS

§ 5 CONCLUSIONS

summary of results

for § 0.

1. We organized representation constructs into a system with 3 types and two levels for each type

2. We defined a correspondence between list structures and trees

3. We showed the inadequacy of the derivationally controlled tree construction method and presented an alternative

4. We provided a new formalism for recursive transition networks

5. We studied some metatheoretical consequences of the modular grammar theory, especially as regards falsification and incompleteness

6. We discussed a method of doing experiments to support linguistic theory construction

for § 1

7. We defined a new approach to the formalisation of linguistic description systems: the theory of modular grammar

8. We defined the notion of grammatical function

9. We defined a representation construct for functional relations in the sentence

10. We introduced a typology of functions

11. We introduced the notion of a functional inference tree.

12. We recognized as a phenomenon the relational environment

13. We defined rules for taking account of this environment (function-of-head/taking-objects)

14. We recognized as a phenomenon the linear order

15. We defined rules for taking account of absolute order (position/object-position)

16. We defined systems for taking account of relative order, in particular

16.a. We defined completion networks differing from the usual finite state transition diagrams in that they only define relative order

16 b. We defined completion networks differing from recursive transition nets in that the order is relative and the recursive property is not obtained by introducing nonterminals but by call from input.

17. We studied the weak generative capacities of completion networks as regards the Chomsky hierarchy and gave some indications of the results for completion automata

18. We defined a calculus for feature complexes with an extensional and intensional formal semantics

19. We discussed the concord phenomenon

20. We defined the notion of case

21. We defined a representation construct for representing the case relations in a sequence

22. We defined the notion of viewpoint

23. We defined the notion of case frame and abstract case frame

24. We showed the relation of case frames to semantic interpretation.

25. We demonstrated how completion automata can be used to regulate the order and a priori restrictions of cases.

26. We showed how the feature complex calculus can be used to control the transitions in the surface case networks

27. We defined the structure of the lexicon

28. We defined a language for semantic representation

for § 2 /3

29. We defined the parsing problem

30. We presented a model for the parsing problem: the particle theory.

31. We formally defined particles

32. We formally defined parsing predicates based on linguistic information about the systematics of the language

33. We defined some principles underlying the parsing process

34. We defined algorithms to compute the functional, case and semantic structures from the particles

35. We constructed a library for list-processing in FORTRAN

36. We implemented the feature complex calculus and the completion automata theory

37. We constructed a set of computer programs simulating the parsing process as defined in § 2.

for § 4

38. We gave a number of examples of an empirical interpretation for modular grammars

39. We performed a number of experiments with the parser.

future research

We plan to undertake the following extensions of the presented research (no order is assumed)

1. Implementation of inference rules over the semantic representation

2. Incorporation of more factors in the grammar

3. Broad empirical studies

4. Coupling to memory processor by defining a semantic interpretation routine over the semantic representation language

5. Implementation of the production system

6. Construction of systems that learn the linguistic information necessary to support the parser automatically

7. Study of coordination

etc;

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Acknowledgement

The author thanks his students especially Luc Baert
and Koen de Smedt for the many stimulating discussions
and their share of constructing the grammar and
the program for semantic representation respectively.
More information about these aspects can be found
in their 'licentiaat' theses.

In addition he thanks H. Boley for discussion on the
representation of the state space, P. Reypens for help
in the construction of the computer programs for plotting
the list structures and L. Bamps for writing the subroutine
on storing the dictionary, Martha Palmer for proof reading
part of the manuscript, G. De Schutter for discussion on
the linguistic aspects of the system, L. Vanden Bosch
for typing part of the text.

He thanks his friends and colleagues for additional
stimulation.

He thanks the readers.

He thanks Dora De Haeck for her help in creating the circumstances
necessary to perform a work of this sort.