AN ANNOTATED TEST SUITE FOR

THE X’ THEORY GRAMMAR

Julie A. Van Dyke

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ABSTRACT

This document provides examples of the range of sentences parsible by the X' Theory grammar described in (Van Dyke, 1991). It is an illustration of the grammar's breadth of coverage and also displays the details of the structures the grammar actually builds. I have included annotations with the parser's output in order to more completely illustrate the interaction between the grammar and the lexicon. The grammar is crucially dependent on the specifications in the lexical entries of each word and consequently, many structures seen here can not be generated without particular lexical features to license them. It is my hope that the annotations found herein will elucidate these features and thereby facilitate the creation of additional lexical entries compatible with this grammar.

Within this suite there will be some instances where the grammar generates several structures for a single sentence. These typically result from the inability of syntax alone to determine the correct interpretation of a sentence. Through these examples it will become evident where non-syntactic components such as semantics or pragmatics would come into play in a system using this grammar for natural language understanding.

Finally, this suite will also serve as an excellent tool for identifying areas in the grammar that could be improved or augmented. Toward this end, I have included a final section illustrating some of the structures the grammar does not yet handle.

CONTENTS

TEST SUITE

1 DETERMINER PHRASES

1.1 Simple article phrases

Articles include “an”, “a”, and “the” and have the feature ART in their lexical entry. They are the head of the determiner phrase (DP) when they occur. Because “a” and “an” are grammatically singular, they co-occur with singular count nouns and the grammatically singular mass and proper nouns. The grammar includes a test for this number agreement between the determiner and its complement.

```
(PARSE (QUOTE (THE MAN)) (QUOTE DP/))

(DBAR (HEAD THE)
   (COMP (NP (SPEC NIL)
          (NBAR (HEAD MAN) (NU (SG)))))))

(PARSE (QUOTE (THE MEN)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD THE)
        (COMP (NP (SPEC NIL)
             (NBAR (HEAD MEN) (NU (PL)))))))

(PARSE (QUOTE (A MAN)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD A)
        (COMP (NP (SPEC NIL)
             (NBAR (HEAD MAN) (NU (SG)))))))

(PARSE (QUOTE (A MEN)) (QUOTE DP/))

NIL
```

1.2 ZERO DET phrases and Count nouns

While singular count nouns must have a filled determiner phrase head, other nouns can occur with empty, or zero, determiner phrases. The number of the noun and its MASS, COUNT, and PROPER feature are used to generate these types of phrases.

```
(PARSE (QUOTE (TIME)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD NIL)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD TIME) (NU (SG)))))))

(PARSE (QUOTE (A TIME)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD A)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD TIME) (NU (SG)))))))

(PARSE (QUOTE (THE TIME)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD THE)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD TIME) (NU (SG)))))))

(PARSE (QUOTE (WEEK)) (QUOTE DP/))

NIL

(PARSE (QUOTE (WEEKS)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD NIL)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD WEEKS) (NU (PL)))))))
```

1.3 Mass nouns

Mass nouns often seem semantically plural (e.g. money, sugar, gasoline) but they are grammatically singular, meaning that they act like singular count nouns for determining agreement. As mentioned previously, they are different from singular count nouns in that they do not require determiner phrase heads.

```
(PARSE (QUOTE (FURNITURE)) (QUOTE DP/))
```

```
(DP (SPEC NIL)
   (DBAR (HEAD NIL)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD FURNITURE)
                  (NU (SG)))))))

(PARSE (QUOTE (A FURNITURE)) (QUOTE DP/))

NIL

(PARSE (QUOTE (THE FURNITURE)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD THE)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD FURNITURE)
                  (NU (SG)))))))
```

1.4 Proper nouns

Proper nouns are identified by the feature PROPER in their lexical entry. There are no determiner restrictions on these nouns.

```
(PARSE (QUOTE (COLORADO)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD NIL)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD COLORADO)
                  (NU (SG)))))))

(PARSE (QUOTE (ENGLISH)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD NIL)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD ENGLISH)
                  (NU (SG/PL)))))))

(PARSE (QUOTE (THE ENGLISH)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD THE)
       (COMP (NP (SPEC NIL)
              (NBAR (HEAD ENGLISH)
                  (NU (SG/PL)))))))
```

1.5 Alternate and multiple determiners

Other words which are licensed by the CENTRAL-DET or PRE-DET features may occur in determiner phrase positions. Quantifiers and cardinal numbers can also appear here when they have the QUANT and CARDINAL features. Note that the determiner-noun number agreement must also be satisfied by these alternate determiners.

If there is more than one determiner, they must all agree in number.

```
(PARSE (QUOTE (TWO COUNTRIES)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD TWO)
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD COUNTRIES)
            (NU (PL)))))))

(PARSE (QUOTE (TWO COUNTRY)) (QUOTE DP/))

NIL

(PARSE (QUOTE (TWO MARS)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD TWO)
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD MARS) (NU (SG)))))))

(PARSE (QUOTE (ALL MEN)) (QUOTE DP/))

(DP (SPEC ALL)
  (DBAR (HEAD NIL)
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD MEN) (NU (PL)))))))

(DP (SPEC NIL)
  (DBAR (HEAD (PRO ALL))
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD MEN) (NU (PL)))))))

(PARSE (QUOTE (ALL THE MAN)) (QUOTE DP/))

NIL

(PARSE (QUOTE (ALL THE MEN)) (QUOTE DP/))

(DP (SPEC ALL)
  (DBAR (HEAD THE)
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD MEN) (NU (PL)))))))

(PARSE (QUOTE (ALL MAN)) (QUOTE DP/))

NIL

(PARSE (QUOTE (ALL OF THE MEN)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD (PRO ALL))
     (COMP
      (PP (SPEC NIL)
        (PBAR (HEAD OF)
           (COMP
            (DP (SPEC NIL)
```

```
              (DBAR (HEAD THE)
                 (COMP
                  (NP (SPEC NIL)
                     (NBAR (HEAD MEN)
                        (NU (PL)))))))))))))

(PARSE (QUOTE (TWICE THE MONEY)) (QUOTE DP/))

(DP (SPEC TWICE)
   (DBAR (HEAD THE)
      (COMP (NP (SPEC NIL)
             (NBAR (HEAD MONEY) (NU (SG)))))))

(PARSE (QUOTE (MANY MEN)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD NIL)
      (COMP (NP (SPEC MANY)
             (NBAR (HEAD MEN) (NU (PL)))))))

(DP (SPEC NIL)
   (DBAR (HEAD NIL)
      (COMP
       (NP (SPEC NIL)
          (NBAR
           (ATTRIB
            (DEGP (SPEC NIL)
               (DEGBAR (HEAD NIL)
                  (COMP (AP (SPEC NIL)
                         (ABAR (HEAD MANY)))))))
           (HEAD MEN)
           (NU (PL)))))))

(PARSE (QUOTE (MANY MAN)) (QUOTE DP/))

NIL
(PARSE (QUOTE (ALL SOME MEN)) (QUOTE DP/)

NIL

(PARSE (QUOTE (ALL THE SOME MEN)) (QUOTE DP/)

NIL

(PARSE (QUOTE (ALL THE MANY MEN)) (QUOTE DP/))

(DP (SPEC ALL)
   (DBAR (HEAD THE)
      (COMP (NP (SPEC MANY)
             (NBAR (HEAD MEN) (NU (PL)))))))

(DP (SPEC ALL)
   (DBAR (HEAD THE)
      (COMP
       (NP (SPEC NIL)
          (NBAR
           (ATTRIB
            (DEGP (SPEC NIL)
               (DEGBAR (HEAD NIL)
                  (COMP (AP (SPEC NIL)
                         (ABAR (HEAD MANY)))))))
```

```
          (HEAD MEN)
          (NU (PL)))))))

(PARSE (QUOTE (ALL THE MANY MAN)) (QUOTE DP/))

NIL

(PARSE (QUOTE (ALL THE TIME)) (QUOTE DP/))

(DP (SPEC ALL)
  (DBAR (HEAD THE)
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD TIME) (NU (SG)))))))

NIL

(PARSE (QUOTE (ALL SOME TIME)) (QUOTE DP/))

NIL

(PARSE (QUOTE (ONE MAN)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD ONE)
     (COMP (NP (SPEC NIL)
          (NBAR (HEAD MAN) (NU (SG)))))))

(PARSE (QUOTE (ONE MEN)) (QUOTE DP/))

NIL
```

1.6 Pronouns

Pronouns occur in the head of DP position and in this position they must satisfy the same number agreement restrictions as discussed above. Arguments for this implementation as well as the present formulation of the values given to NU in these instances are discussed in Van Dyke, 1991.

```
(PARSE (QUOTE (I)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD (PRO I))
     (NU '(1SGPRES 1SGPAST))
        (COMP NIL)))

(PARSE (QUOTE (YOU)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD (PRO YOU))
     (NU '(2SGPRES 2PLPRES 2SGPAST 2PLPAST))
     (COMP NIL)))
```

```
(PARSE (QUOTE (WE)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD (PRO WE))
        (NU '(1PLPRES 1PLPAST))
        (COMP NIL)))

(PARSE (QUOTE (WE MEN)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD (PRO WE))
        (COMP (NP (SPEC NIL)
               (NBAR (HEAD MEN) (NU (PL)))))))

(PARSE (QUOTE (WE MAN)) (QUOTE DP/))

NIL
```

1.7 Relative Clauses

This grammar allows for two kinds of relative clauses: the restrictive (e.g. "the claim that you made") and the noun complement (e.g. "the claim that you made a mistake"). Presently there is no mechanism to tell these apart because they are both introduced by the complementizer "that". The parser will produce both interpretations for "that-relative clauses and the task of differentiating is relegated to a semantics component. noun complement relative clauses can only be introduced by "that", however restrictive relative clauses are introduced by "who", "which", and other such words with the REL feature. When these words are used only the restrictive relative clause interpretation is produced by the parser. Restrictive relative clauses can also occur without a REL-word introducing them, but only if the head of the noun phrase is different from the head of its relative clause. For example, the DP "the uncle the man saw" is allowed, but the unintroduced relative clause in the DP "the uncle seeing the man" is not recognized by the parser because both the relative clause intro-word and the be auxiliary have been omitted to form this DP.

```
(PARSE (QUOTE (THE UNCLE THAT HIT THE MAN)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE) (NU (SG))
           (RESTRICT (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD THAT)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD NIL)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD UNCLE) (NU (SG))))))))
                    (IBAR (HEAD (AGR 3SGPAST))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD HIT)
                             (COMP
                              (OBJ
                               (DP (SPEC NIL)
                                 (DBAR  (HEAD THE)
                                  (COMP
                                   (NP (SPEC NIL)
                                     (NBAR (HEAD MAN) (NU (SG))))))))))))))))))))))))

(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE) (NU (SG))
           (COMP
            (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD THAT)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD NIL)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD UNCLE) (NU (SG))))))))
                    (IBAR (HEAD (AGR 3SGPAST))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD HIT)
                             (COMP
                              (OBJ
                               (DP (SPEC NIL)
                                 (DBAR (HEAD THE)
                                  (COMP
                                   (NP (SPEC NIL)
                                     (NBAR (HEAD MAN) (NU (SG))))))))))))))))))))))))

(PARSE (QUOTE (THE UNCLE WHO THE MEN HIT)) (QUOTE DP/))
```

```
(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE)
           (NU (SG))
           (RESTRICT
            (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD WHO)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MEN)
                                (NU (PL))))))))
                    (IBAR (HEAD (AGR 3PLPRES))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD HIT)
                             (COMP
                              (OBJ
                               (NBAR
                                (HEAD UNCLE)
                                (NU (SG))))))))))))))))))))

(PARSE (QUOTE (THE UNCLE WHO IS HITTING THE MEN)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE)
           (NU (SG))
           (RESTRICT
            (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD WHO)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD NIL)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD UNCLE) (NU (SG))))))))
                    (IBAR (HEAD (AGR 3SGPRES)
                          (BE ING))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD HIT)
                             (COMP
                              (OBJ
                               (DP (SPEC NIL)
                                 (DBAR (HEAD THE)
                                  (COMP
                                   (NP (SPEC NIL)
                                     (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))))))
```

```
(PARSE (QUOTE (THE UNCLE HITTING THE MEN)) (QUOTE DP/))

NIL

(PARSE (QUOTE (THE UNCLE THE MAN IS HITTING)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE)
           (NU (SG))
           (RESTRICT
            (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD NIL)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MAN)
                                (NU (SG))))))))
                    (IBAR (HEAD (AGR 3SGPRES)
                          (BE ING))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD HIT)
                             (COMP
                              (OBJ
                               (NBAR
                                (HEAD UNCLE)
                                (NU (SG))))))))))))))))))))
```

(PARSE (QUOTE (THE UNCLE WITH WHO THE MAN CHATTERED)) (QUOTE DP/))[1]

```
(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE)
           (NU (SG))
           (COMP
            (PP (SPEC NIL)
              (PBAR (HEAD WITH)
                 (COMP
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHO))(NU (SG/PL))
                       (COMP NIL))))))
           (RESTRICT
```

1. The two parses returned for this sentence show an optional attachment of the prepositional phrase. Every prepositional phrase within the DP can either be complement to the noun head or an adjunct attached to the NBAR. These parses can then be referred to a semantic processor to differentiate between the interpretations. Cf. VanDyke, 1991 and references found there for further discussion.

```
            (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD NIL)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MAN) (NU (SG))))))))
                    (IBAR (HEAD (AGR 3SGPAST))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD CHATTER)
                             (COMP
                              (OBJ
                               (NBAR (HEAD UNCLE) (NU (SG)))))))))))))))))))

(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR (HEAD UNCLE)
           (NU (SG))
           (ADJUNCT
            (PP (SPEC NIL)
              (PBAR (HEAD WITH)
                 (COMP
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHO)) (NU (SG/PL))
                       (COMP NIL)))))))
           (RESTRICT
            (REL-CLAUSE
             (CP (SPEC NIL)
               (CBAR (HEAD NIL)
                  (COMP
                   (IP
                    (SPEC
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MAN) (NU (SG))))))))
                    (IBAR (HEAD (AGR 3SGPAST))
                       (COMP
                        (VP (SPEC NIL)
                          (VBAR (HEAD CHATTER)
                             (COMP
                              (OBJ
                               (NBAR (HEAD UNCLE) (NU (SG)))))))))))))))))))
```

2.0 AUXILIARY (INFL) VERBS

Following the arguments given in VanDyke,1991, the INFL node in this implementation contains all the auxiliary verbs and agreement features which determine the inflection on the main verb. This includes an AGR features for agreement, do-support, modals, the auxiliaries have and be, and sentence negation. The AGR feature is obligatory for all grammatical sentences. Beyond this, the grammatical combinations of these sentences is derived from the schema [(Modal) (have +en) (be +ing)] where the have and be verbs require their successive verb to have the perfect and progressive, respectively, inflections. Do-support is signalled by the presence of the "do" verb and is required for Y/N questions with no other auxiliary verb. Negation is allowed only after the first verb in the sentence. The grammar checks these restrictions for all CP's.

```
(PARSE (QUOTE (THE MEN DO NOT PLAY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
         (COMP
          (IP
           (SPEC
            (DP (SPEC NIL)
               (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                        (NBAR (HEAD MEN) (NU (PL))))))))
           (IBAR (HEAD (NEG NOT)
                    (AGR 3PLPRES)
                    (DO-SUPPORT DO))
               (COMP (VP (SPEC NIL)
                       (VBAR (HEAD PLAY))))))))))

(PARSE (QUOTE (THE MEN HIT THE MAN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
         (COMP
          (IP
           (SPEC
            (DP (SPEC NIL)
               (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                        (NBAR (HEAD MEN) (NU (PL))))))))
           (IBAR (HEAD (AGR 3PLPRES))
               (COMP
                (VP (SPEC NIL)
                   (VBAR (HEAD HIT)
                        (COMP
                         (OBJ
```

```
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN) (NU (SG))))))))))))))))))

(PARSE (QUOTE (THE MAN IS HITTING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (THE MAN IS NOT HITTING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (NEG NOT)
              (AGR 3SGPRES)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))


(PARSE (QUOTE (THE MAN WOULD HIT THE MAN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPAST)
              (MODAL WILL))
           (COMP
            (VP (SPEC NIL)
```

```
                (VBAR (HEAD HIT)
                   (COMP
                    (OBJ
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MAN) (NU (SG))))))))))))))))))
```

```
(PARSE (QUOTE (THE MAN WOULD BE HITTING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPAST)
              (MODAL WILL)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))
```

```
(PARSE (QUOTE (THE MEN HAVE OPENED)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES)
              (HAVE EN))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD OPEN))))))))))
```

```
(PARSE (QUOTE (THE MEN HAVE BEEN HITTING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
```

```
        (IBAR (HEAD (AGR 3PLPRES)
                    (HAVE EN)
                    (BE ING))
              (COMP (VP (SPEC NIL)
                        (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (THE MAN WOULD NOT HAVE DECIDED)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
     (CBAR (HEAD NIL)
           (COMP
            (IP
             (SPEC
              (DP (SPEC NIL)
                  (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                             (NBAR (HEAD MAN) (NU (SG))))))))
             (IBAR (HEAD (NEG NOT)
                         (AGR 3SGPAST)
                         (MODAL WILL)
                         (HAVE EN))
                   (COMP (VP (SPEC NIL)
                             (VBAR (HEAD DECIDE))))))))))


(PARSE (QUOTE (THE MAN WOULD NOT HAVE BEEN HITTING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
     (CBAR (HEAD NIL)
           (COMP
            (IP
             (SPEC
              (DP (SPEC NIL)
                  (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                             (NBAR (HEAD MAN) (NU (SG))))))))
             (IBAR
              (HEAD (NEG NOT)
                    (AGR 3SGPAST)
                    (MODAL WILL)
                    (HAVE EN)
                    (BE ING))
              (COMP (VP (SPEC NIL)
                        (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (THE MAN WOULD HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MAN HAVE WOULD BE HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN HAVE HITTING)) (QUOTE CP/))

NIL
```

```
(PARSE (QUOTE (THE MEN WOULD OPENED)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN NOT WOULD OPEN)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN WOULD HAVE NOT OPENED)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN WOULD HAVE BEEN NOT HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN BEEN HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN HAVE BEEN OPEN)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MEN HAVE HITTING)) (QUOTE CP/))

NIL
```

3.0 VERB COMPLEMENTS

By way of illustrating the 30 verb features used to described verb complements in the grammar, I include here a sentence parse of each. In Chapter 4 of VanDyke, 1991, more attention is given to describing the taxonomy of these features.

3.1 LA

```
(PARSE (QUOTE (THE MAN IS WHITE)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD BE)
                 (COMP
```

```
(SUBJECT_COMPLEMENT
 (DEGP (SPEC NIL)
    (DEGBAR (HEAD NIL)
        (COMP
         (AP (SPEC NIL)
           (ABAR (HEAD WHITE)))))))))))))))))
```

3.2 LN

```
(PARSE (QUOTE (THE MAN IS A MAN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD BE)
                 (COMP
                  (SUBJECT_COMPLEMENT
                   (DP (SPEC NIL)
                     (DBAR (HEAD A)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN) (NU (SG))))))))))))))))))
```

3.3 I

```
(PARSE (QUOTE (THE MAN IS PLAYING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD PLAY))))))))))
```

3.4 IPR

```
(PARSE (QUOTE (THE MEN COMPLAIN ABOUT THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
```

```
    (CBAR (HEAD NIL)
       (COMP
        (IP
         (SPEC
          (DP (SPEC NIL)
            (DBAR (HEAD THE)
               (COMP
                (NP (SPEC NIL)
                  (NBAR (HEAD MEN) (NU (PL))))))))
         (IBAR (HEAD (AGR 3PLPRES))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD COMPLAIN)
                  (ADJUNCT
                   (PP (SPEC NIL)
                     (PBAR (HEAD ABOUT)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))
```

3.5 IP

```
(PARSE (QUOTE (THE MEN CHATTER AWAY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD CHATTER)
                 (ADJUNCT
                  (ADVP (SPEC NIL)
                     (ADVBAR (HEAD AWAY)
```

3.6 INPR

```
(PARSE (QUOTE (THE MEN LAST A WEEK)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
```

```
(IBAR (HEAD (AGR 3PLPRES))
      (COMP
       (VP (SPEC NIL)
         (VBAR (HEAD LAST)
               (ADJUNCT
                (DP (SPEC NIL)
                  (DBAR (HEAD A)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD WEEK) (NU (SG)))))))))))))))))
```

```
(PARSE (QUOTE (THE MEN LAST FOR A WEEK)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
         (COMP
          (IP
           (SPEC
            (DP (SPEC NIL)
              (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                       (NBAR (HEAD MEN) (NU (PL))))))))
           (IBAR (HEAD (AGR 3PLPRES))
                 (COMP
                  (VP (SPEC NIL)
                    (VBAR (HEAD LAST)
                          (ADJUNCT
                           (PP (SPEC NIL)
                             (PBAR (HEAD FOR)
                                   (COMP
                                    (DP (SPEC NIL)
                                      (DBAR (HEAD A)
                                            (COMP
                                             (NP (SPEC NIL)
                                               (NBAR (HEAD WEEK) (NU (SG))))))))))))))))))))
```

3.7 IT

```
(PARSE (QUOTE (THE MEN HESITATE TO HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
         (COMP
          (IP
           (SPEC
            (DP (SPEC NIL)
              (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                       (NBAR (HEAD MEN) (NU (PL))))))))
           (IBAR (HEAD (AGR 3PLPRES))
                 (COMP
                  (VP (SPEC NIL)
                    (VBAR (HEAD HESITATE)
                          (ADJUNCT
                           (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                                     (INFL TO)
                                     (VP (SPEC NIL)
```

```
(VBAR (HEAD HIT)
     (COMP
      (OBJ
        (DP (SPEC NIL)
          (DBAR (HEAD THE)
             (COMP
              (NP (SPEC NIL)
                 (NBAR (HEAD WOMEN)
                 (NU (PL))))))))))))))))))))))
```

3.8 TN

```
(PARSE (QUOTE (THE MEN OPEN THE MEN)) (QUOTE CP/))

(DCL
  (CP (SPEC NIL)
     (CBAR (HEAD NIL)
          (COMP
           (IP
             (SPEC
              (DP (SPEC NIL)
                 (DBAR (HEAD THE)
                      (COMP
                       (NP (SPEC NIL)
                          (NBAR (HEAD MEN)
                               (NU (PL))))))))
             (IBAR (HEAD (AGR 3PLPRES))
                 (COMP
                  (VP (SPEC NIL)
                     (VBAR (HEAD OPEN)
                          (COMP
                           (OBJ
                            (DP (SPEC NIL)
                               (DBAR (HEAD THE)
                                    (COMP
                                     (NP (SPEC NIL)
                                        (NBAR (HEAD MEN)
                                             (NU (PL))))))))))))))))))
```

3.9 TNPR

Multiple parses are produced once again because the prepositional phrase has an optional attachment. Here, it is either the complement of the object noun, an adjunct to the NBAR of the object noun, or an adjunct on the VP. Consider the sentences below to illustrate these optional attachments:

A. The men convince the men (of the jury) with the long hair.

B. The men convince the men of the jury with the long hair of their innocence.

Sentence A illustrates the need for the adjunct PP in addition to the complement PP and sentence B shows the VP adjunct position with a semantically more appropriate PP. Cf. Radford, 1987 for a more complete discussion of the alternate PP attachments.

```
(PARSE (QUOTE (THE MEN CONVINCE THE MEN OF THE FOREST)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD CONVINCE)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MEN) (NU (PL))
                              (COMP
                               (PP (SPEC NIL)
                                 (PBAR (HEAD OF)
                                   (COMP
                                    (DP (SPEC NIL)
                                     (DBAR (HEAD THE)
                                      (COMP
                                       (NP (SPEC NIL)
                                         (NBAR (HEAD FOREST)
                                         (NU (SG)))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD CONVINCE)
                 (COMP
                  (OBJ
```

```
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN) (NU (PL))
                               (ADJUNCT
                                (PP (SPEC NIL)
                                  (PBAR (HEAD OF)
                                   (COMP
                                 (DP (SPEC NIL)
                                      (DBAR (HEAD THE)
                                        (COMP
                                         (NP (SPEC NIL)
                                           (NBAR (HEAD FOREST) (NU (SG)))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD CONVINCE)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MEN) (NU (PL))))))))))
                 (ADJUNCT
                  (PP (SPEC NIL)
                    (PBAR (HEAD OF)
                       (COMP
                        (DP (SPEC NIL)
                          (DBAR (HEAD THE)
                             (COMP
                              (NP (SPEC NIL)
                                (NBAR (HEAD FOREST) (NU (SG))))))))))))))))))))
```

3.10 TNP

```
(PARSE (QUOTE (THE MEN SHOOK THE MEN AWAY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
```

```
                (NP (SPEC NIL)
                  (NBAR (HEAD MEN) (NU (PL)))))))
          (IBAR (HEAD (AGR 3PLPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD SHAKE)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN) (NU (PL)))))))))
                  (ADJUNCT
                   (ADVP (SPEC NIL)
                      (ADVBAR (HEAD AWAY)
                         (COMP NIL))))))))))))
```

3.11 TF

```
(PARSE (QUOTE (THE MEN BELIEVE THAT THE MEN HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD BELIEVE)
                 (COMP
                  (OBJ
                   (DCL
                    (CP (SPEC NIL)
                      (CBAR (HEAD (COMPLEMENTIZER THAT))
                         (COMP
                          (IP
                           (SPEC
                            (DP (SPEC NIL)
                              (DBAR (HEAD THE)
                                 (COMP
                                  (NP
                                   (SPEC NIL)
                                   (NBAR (HEAD MEN) (NU (PL))))))))
                           (IBAR
                            (HEAD (AGR 3PLPRES))
                            (COMP
                             (VP (SPEC NIL)
                               (VBAR (HEAD HIT)
                                  (COMP
                                   (OBJ
                                   (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
```

```
(COMP
    (NP (SPEC NIL)
        (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))))))))))))
```

3.12 TW

This feature allows both the finite and infinite CP's to follow the question word. The question word is labeled IDISC to reflect its status as a signal of indirect discourse. It too, has optional attachments.

```
(PARSE (QUOTE (THE MEN DECIDED WHERE TO HIT THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD DECIDE)
                 (COMP
                  (OBJ
                   (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                             (INFL TO)
                             (VP (SPEC NIL)
                               (VBAR (HEAD HIT)
                                  (COMP
                                   (OBJ
                                 (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                     (COMP
                                       (NP (SPEC NIL)
                                         (NBAR (HEAD MEN) (NU (PL)))))))))
                                            (ADJUNCT
                                              (IDISC
                                               (DP (SPEC NIL)
                                                 (DBAR (HEAD (PRO WHERE)) (NU (SG/PL))
                                                       (COMP NIL)))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
```

```
                    (NP (SPEC NIL)
                      (NBAR (HEAD MEN)
                         (NU (PL))))))))
             (IBAR (HEAD (AGR 3PLPAST))
                (COMP
                 (VP (SPEC NIL)
                   (VBAR (HEAD DECIDE)
                      (COMP
                       (OBJ
                        (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                                  (INFL TO)
                                  (VP (SPEC NIL)
                                    (VBAR (HEAD HIT)
                                       (COMP
                                        (OBJ
                                          (DP (SPEC NIL)
                                       (DBAR (HEAD THE)
                                          (COMP
                                            (NP (SPEC NIL)
                                              (NBAR (HEAD MEN) (NU (PL))))))))))))))
                      (ADJUNCT
                       (IDISC
                        (DP (SPEC NIL)
                          (DBAR (HEAD (PRO WHERE)) (NU (SG/PL))
                             (COMP NIL))))))))))))))

(PARSE (QUOTE (THE MEN DECIDED WHERE THE MEN SHOULD HIT THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD DECIDE)
                 (COMP
                  (OBJ
                   (DCL
                    (CP (SPEC NIL)
                      (CBAR (HEAD NIL)
                         (COMP
                          (IP
                           (SPEC
                            (DP (SPEC NIL)
                              (DBAR (HEAD THE)
                                 (COMP
                                  (NP (SPEC NIL)
                                 (NBAR (HEAD MEN) (NU (PL))))))))
                           (IBAR
                            (HEAD (AGR 3PLPAST)
                               (MODAL SHALL))
                            (COMP
```

```
                              (VP (SPEC NIL)
                                (VBAR (HEAD HIT)
                                   (COMP
                                    (OBJ
                                    (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                        (COMP
                                          (NP (SPEC NIL)
                                            (NBAR (HEAD MEN) (NU (PL)))))))))
                                            (ADJUNCT
                                             (IDISC
                                                (DP (SPEC NIL)
                                                  (DBAR (HEAD (PRO WHERE)) (NU (SG/PL))
                                                        (COMP NIL))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD DECIDE)
                 (COMP
                  (OBJ
                   (DCL
                    (CP (SPEC NIL)
                      (CBAR (HEAD NIL)
                         (COMP
                          (IP
                           (SPEC
                            (DP (SPEC NIL)
                              (DBAR (HEAD THE)
                                 (COMP
                                  (NP (SPEC NIL)
                                 (NBAR (HEAD MEN) (NU (PL))))))))
                           (IBAR
                            (HEAD (AGR 3PLPAST)
                               (MODAL SHALL))
                            (COMP
                              (VP (SPEC NIL)
                                (VBAR (HEAD HIT)
                                   (COMP
                                    (OBJ
                                     (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                    (COMP
                                      (NP (SPEC NIL)
                                        (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))
                 (ADJUNCT
                  (IDISC
                   (DP (SPEC NIL)
                     (DBAR (HEAD (PRO WHERE)) (NU (SG/PL))
```

```
                    (COMP NIL))))))))))))))
```

3.13 TT

```
(PARSE (QUOTE (THE MEN HATE TO HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
     (CBAR (HEAD NIL)
           (COMP
            (IP
             (SPEC
              (DP (SPEC NIL)
                  (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                             (NBAR (HEAD MEN)
                                   (NU (PL))))))))
             (IBAR (HEAD (AGR 3PLPRES))
                   (COMP
                    (VP (SPEC NIL)
                        (VBAR (HEAD HATE)
                              (COMP
                               (OBJ
                                (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                                                    (INFL TO)
                                                    (VP (SPEC NIL)
                                                        (VBAR (HEAD HIT)
                                                              (COMP
                                                               (OBJ
                                                                 (DP (SPEC NIL)
                                                             (DBAR (HEAD THE)
                                                                  (COMP
                                                                    (NP (SPEC NIL)
                                                                       (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))))))
```

3.14 TNT

```
(PARSE (QUOTE (THE MEN EXPECT THE MEN TO HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
     (CBAR (HEAD NIL)
           (COMP
            (IP
             (SPEC
              (DP (SPEC NIL)
                  (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                             (NBAR (HEAD MEN) (NU (PL))))))))
             (IBAR (HEAD (AGR 3PLPRES))
                   (COMP
                    (VP (SPEC NIL)
                        (VBAR (HEAD EXPECT)
                              (COMP
                               (OBJ
                                (EXCEPTIONAL_CLAUSE
                                 (DP (SPEC NIL)
                                     (DBAR (HEAD THE)
                                           (COMP
```

```
                                    (NP (SPEC NIL)
                                      (NBAR (HEAD MEN) (NU (PL))))))
                              (INFL TO)
                              (VP (SPEC NIL)
                                (VBAR (HEAD HIT)
                                   (COMP
                                    (OBJ
                                     (DP (SPEC NIL)
                                       (DBAR (HEAD THE)
                                          (COMP
                                           (NP (SPEC NIL)
                                            (NBAR (HEAD WOMEN)
                                             (NU (PL)))))))))))))))))))))))
```

3.15 TG

```
(PARSE (QUOTE (THE MEN ENJOY PLAYING THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD ENJOY)
                 (COMP
                  (OBJ
                   (SMALL_CLAUSE (DP (DBAR TRACE))
                          (VP (SPEC NIL)
                            (VBAR (HEAD PLAY)
                               (COMP
                                (OBJ
                                 (DP
                                  (SPEC NIL)
                                    (DBAR (HEAD THE)
                                  (COMP
                                    (NP (SPEC NIL)
                                       (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))
```

3.16 TNG[2]

```
(PARSE (QUOTE (THE MEN SPOTTED THE MEN PLAYING IN THE FOREST)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
```

2. Once again, alternate PP attachments produce two parses for this sentence.

```
          (DP (SPEC NIL)
            (DBAR (HEAD THE)
               (COMP
                (NP (SPEC NIL)
                  (NBAR (HEAD MEN)
                     (NU (PL))))))))
         (IBAR (HEAD (AGR 3PLPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD SPOT)
                  (COMP
                   (OBJ
                    (SMALL_CLAUSE
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MEN)
                                (NU (PL)))))))
                     (VP (SPEC NIL)
                       (VBAR (HEAD PLAY)
                          (ADJUNCT
                           (PP (SPEC NIL)
                             (PBAR (HEAD IN)
                                (COMP
                                 (DP (SPEC NIL)
                                (DBAR (HEAD THE)
                                   (COMP
                                    (NP (SPEC NIL)
                                       (NBAR (HEAD FOREST) (NU (SG)))))))))))))))))))))))))
(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD SPOT)
                 (COMP
                  (OBJ
                   (SMALL_CLAUSE
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN)
                               (NU (PL)))))))
                    (VP (SPEC NIL)
                      (VBAR (HEAD PLAY))))))
                 (ADJUNCT
                  (PP (SPEC NIL)
                    (PBAR (HEAD IN)
                       (COMP
```

```
(DP (SPEC NIL)
   (DBAR (HEAD THE)
      (COMP
       (NP (SPEC NIL)
          (NBAR
           (HEAD FOREST)
           (NU (SG))))))))))))))))))))
```

3.17 TNI

```
(PARSE (QUOTE (THE MEN WATCH THE MEN HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
       (COMP
        (IP
         (SPEC
          (DP (SPEC NIL)
             (DBAR (HEAD THE)
                (COMP
                 (NP (SPEC NIL)
                    (NBAR (HEAD MEN)
                       (NU (PL))))))))
         (IBAR (HEAD (AGR 3PLPRES))
            (COMP
             (VP (SPEC NIL)
                (VBAR (HEAD WATCH)
                   (COMP
                    (OBJ
                     (SMALL_CLAUSE
                      (DP (SPEC NIL)
                         (DBAR (HEAD THE)
                            (COMP
                             (NP (SPEC NIL)
                                (NBAR (HEAD MEN) (NU (PL)))))))
                     (VP (SPEC NIL)
                         (VBAR (HEAD HIT)
                            (COMP
                             (OBJ
                              (DP (SPEC NIL)
                                 (DBAR (HEAD THE)
                                    (COMP
                                     (NP (SPEC NIL)
                                      (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))))))
```

3.18 CNA

```
(PARSE (QUOTE (THE MEN KEEP THE MEN WHITE)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
       (COMP
        (IP
         (SPEC
          (DP (SPEC NIL)
             (DBAR (HEAD THE)
                (COMP
                 (NP (SPEC NIL)
                    (NBAR (HEAD MEN)
```

```
                        (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD KEEP)
                 (COMP
                  (OBJ
                   (SMALL_CLAUSE
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN) (NU (PL)))))))
                  (DEGP (SPEC NIL)
                       (DEGBAR (HEAD NIL)
                           (COMP
                            (AP (SPEC NIL)
                              (ABAR (HEAD WHITE))))))))))))))))))
```

3.19 CNN

```
(PARSE (QUOTE (THE MEN CONSIDER THE MEN A WOMAN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD CONSIDER)
                 (COMP
                  (OBJ
                   (SMALL_CLAUSE
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN) (NU (PL)))))))
                    (DP (SPEC NIL)
                      (DBAR (HEAD A)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD WOMAN) (NU (SG)))))))))))))))))))
```

3.20 CNT

```
(PARSE (QUOTE (THE MEN FORCE THE MEN TO HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
```

```
(IP
 (SPEC
  (DP (SPEC NIL)
    (DBAR (HEAD THE)
       (COMP
        (NP (SPEC NIL)
          (NBAR (HEAD MEN)
             (NU (PL))))))))
 (IBAR (HEAD (AGR 3PLPRES))
    (COMP
     (VP (SPEC NIL)
       (VBAR (HEAD FORCE)
          (COMP
           (OBJ
            (DP (SPEC NIL)
              (DBAR (HEAD THE)
                 (COMP
                  (NP (SPEC NIL)
                    (NBAR (HEAD MEN)  (NU (PL)))))))
            (OBJ_COMP
             (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                       (INFL TO)
                       (VP (SPEC NIL)
                         (VBAR
                          (HEAD HIT)
                          (COMP
                           (OBJ
                            (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                            (COMP
                              (NP (SPEC NIL)
                                (NBAR (HEAD WOMEN) (NU (PL))))))))))))))))))))))))))
```

3.21 CNG

```
(PARSE (QUOTE (THE MEN GOT THE MEN PLAYING)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD GET)
                 (COMP
                  (OBJ
                   (SMALL_CLAUSE
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN) (NU (PL)))))))
```

```
                                   (VP (SPEC NIL)
                                      (VBAR (HEAD PLAY)))))))))))))))
```

3.22 CNI

```
(PARSE (QUOTE (THE MEN LET THE MEN PLAY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
         (COMP
          (IP
           (SPEC
            (DP (SPEC NIL)
               (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                        (NBAR (HEAD MEN)
                             (NU (PL))))))))
           (IBAR (HEAD (AGR 3PLPRES))
                (COMP
                 (VP (SPEC NIL)
                    (VBAR (HEAD LET)
                         (COMP
                          (OBJ
                           (DP (SPEC NIL)
                              (DBAR (HEAD THE)
                                   (COMP
                                    (NP (SPEC NIL)
                                       (NBAR (HEAD MEN)
                                            (NU (PL)))))))
                           (OBJ_COMP
                            (SMALL_CLAUSE (DP (DBAR TRACE))
                                       (VP (SPEC NIL)
                                          (VBAR (HEAD PLAY)))))))))))))))
```

3.23 DNN[3]

```
(PARSE (QUOTE (THE MEN TAUGHT THE MEN WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
         (COMP
          (IP
           (SPEC
            (DP (SPEC NIL)
               (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                        (NBAR (HEAD MEN)
                             (NU (PL))))))))
           (IBAR (HEAD (AGR 3PLPAST))
                (COMP
                 (VP (SPEC NIL)
                    (VBAR (HEAD TEACH)
                         (COMP
```

3. The verb “taught” is both a DNN and a CNN verb and consequently, the parser produces two interpretations for this sentence.

```
                    (IOBJ
                     (DP (SPEC NIL)
                       (DBAR (HEAD THE)
                          (COMP
                           (NP (SPEC NIL)
                             (NBAR (HEAD MEN) (NU (PL)))))))
                     (OBJ
                      (DP (SPEC NIL)
                        (DBAR (HEAD NIL)
                           (COMP
                            (NP (SPEC NIL)
                              (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD TEACH)
                 (COMP
                  (OBJ
                   (SMALL_CLAUSE
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MEN) (NU (PL)))))))
                    (DP (SPEC NIL)
                      (DBAR (HEAD NIL)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))
```

3.24 DNPR[4]

```
(PARSE (QUOTE (THE MEN TAUGHT WOMEN TO THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
```

4. The fact that the direct object is in prepositional phrase form means that this sentence will also have parses where "to the men" is interpreted as a simple PP adjunct of "taught" or as a PP complement of "women". The importance of a semantic component to differentiate among these parses is obvious.

```
          (DBAR (HEAD THE)
             (COMP
              (NP (SPEC NIL)
                (NBAR (HEAD MEN) (NU (PL))))))))
       (IBAR (HEAD (AGR 3PLPAST))
          (COMP
           (VP (SPEC NIL)
             (VBAR (HEAD TEACH)
                (COMP
                 (OBJ
                  (DP (SPEC NIL)
                    (DBAR (HEAD NIL)
                       (COMP
                        (NP (SPEC NIL)
                          (NBAR (HEAD WOMEN) (NU (PL))
                             (COMP
                              (PP (SPEC NIL)
                                (PBAR (HEAD TO)
                              (COMP
                                (DP (SPEC NIL)
                                  (DBAR (HEAD THE)
                                     (COMP
                                      (NP (SPEC NIL)
                                        (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
          (DBAR (HEAD THE)
             (COMP
              (NP (SPEC NIL)
                (NBAR (HEAD MEN)
                   (NU (PL))))))))
       (IBAR (HEAD (AGR 3PLPAST))
          (COMP
           (VP (SPEC NIL)
             (VBAR (HEAD TEACH)
                (COMP
                 (OBJ
                  (DP (SPEC NIL)
                    (DBAR (HEAD NIL)
                       (COMP
                        (NP (SPEC NIL)
                          (NBAR (HEAD WOMEN) (NU (PL))
                          (ADJUNCT
                              (PP (SPEC NIL)
                                (PBAR (HEAD TO)
                               (COMP
                                 (DP (SPEC NIL)
                                  (DBAR (HEAD THE)
                                    (COMP
                                       (NP (SPEC NIL)
                                         (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
```

```
(COMP
 (IP
  (SPEC
   (DP (SPEC NIL)
     (DBAR (HEAD THE)
        (COMP
         (NP (SPEC NIL)
           (NBAR (HEAD MEN)(NU (PL))))))))
  (IBAR (HEAD (AGR 3PLPAST))
     (COMP
      (VP (SPEC NIL)
        (VBAR (HEAD TEACH)
           (COMP
            (OBJ
             (DP (SPEC NIL)
               (DBAR (HEAD NIL)
                  (COMP
                   (NP (SPEC NIL)
                     (NBAR (HEAD WOMEN) (NU (PL)))))))
             (IOBJ
              (PP (SPEC NIL)
                (PBAR (HEAD TO)
                   (COMP
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                           (NBAR (HEAD MEN)  (NU (PL))))))))))))))))))))))))
```

3.25 DNF[5]

```
(PARSE (QUOTE (THE MEN TOLD THE MAN THAT THE MEN HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD TELL)
                 (COMP
                  (IOBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN) (NU (SG)))))))
```

5. Because “that” can introduce sentence complements and also both kinds of relative clauses, there is an attachment ambiguity produced in this sentence. The parser produces all three parses and relies on semantics and pragmatics to identify the most appropriate one.

```
(OBJ
 (DCL
  (CP (SPEC NIL)
    (CBAR (HEAD (COMPLEMENTIZER THAT))
     (COMP
      (IP
       (SPEC
        (DP (SPEC NIL)
          (DBAR (HEAD THE)
             (COMP
              (NP (SPEC NIL)
               (NBAR (HEAD MEN) (NU (PL))))))))
       (IBAR (HEAD (AGR 3PLPRES))
      (COMP
          (VP (SPEC NIL)
            (VBAR (HEAD HIT)
               (COMP
                (OBJ
                 (DP (SPEC NIL)
               (DBAR (HEAD THE)
                (COMP
                  (NP (SPEC NIL)
                    (NBAR (HEAD WOMEN) (NU (PL))))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD TELL)
                 (COMP
                  (IOBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN) (NU (SG))
                          (RESTRICT (REL-CLAUSE
                            (CP (SPEC NIL)
                                 (CBAR (HEAD THAT)
                              (COMP
                                (IP
                                 (SPEC
                                   (DP (SPEC NIL)
                                     (DBAR (HEAD THE)
                                       (COMP
                                          (NP (SPEC NIL)
                                            (NBAR (HEAD MEN) (NU (PL))))))))
                                                (IBAR (HEAD (AGR 3PLPRES))
                                                  (COMP (VP (SPEC NIL)
                                                     (VBAR (HEAD HIT)
```

```
                                                                  (COMP
                                                                    (OBJ
                                                                      (NBAR (HEAD MAN)
                                                                      (NU (SG))))))))))))))))))))
                                        (OBJ
                                          (DP (SPEC NIL)
                                              (DBAR (HEAD THE)
                                                  (COMP
                                                    (NP (SPEC NIL)
                                                        (NBAR (HEAD WOMEN)
                                                         (NU (PL)))))))))))))))))))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
        (COMP
         (IP
          (SPEC
           (DP (SPEC NIL)
              (DBAR (HEAD THE)
                  (COMP
                   (NP (SPEC NIL)
                      (NBAR (HEAD MEN) (NU (PL))))))))
          (IBAR (HEAD (AGR 3PLPAST))
              (COMP
               (VP (SPEC NIL)
                  (VBAR (HEAD TELL)
                      (COMP
                       (IOBJ
                        (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                               (COMP
                                (NP (SPEC NIL)
                                   (NBAR (HEAD MAN) (NU (SG))
                                   (COMP
                                         (REL-CLAUSE
                                          (CP
                                           (SPEC NIL)
                                           (CBAR (HEAD THAT)
                                          (COMP
                                            (IP
                                             (SPEC (DP (SPEC NIL)
                                                       (DBAR (HEAD THE)
                                                           (COMP
                                                             (NP (SPEC NIL)
                                                                  (NBAR (HEAD MEN) (NU (PL))))))))
                                             (IBAR (HEAD (AGR 3PLPRES))
                                                       (COMP
                                                         (VP (SPEC NIL)
                                                            (VBAR (HEAD HIT)
                                                                 (COMP
                                                                    (OBJ (NBAR (HEAD MAN)
                                                                           (NU (SG))))))))))))))))))))))
                                   (OBJ
                                     (DP (SPEC NIL)
                                         (DBAR (HEAD THE)
                                             (COMP
                                               (NP (SPEC NIL)
                                                   (NBAR (HEAD WOMEN)
                                                        (NU (PL)))))))))))))))))))
```

3.26 DPRF

```
(PARSE (QUOTE (THE MEN ANNOUNCE TO THE MEN THAT THE MEN HIT THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD ANNOUNCE)
                 (COMP
                  (IOBJ
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD MEN) (NU (PL))))))))))))
                   (OBJ
                    (DCL
                     (CP (SPEC NIL)
                       (CBAR
                        (HEAD (COMPLEMENTIZER THAT))
                        (COMP
                         (IP
                          (SPEC
                           (DP (SPEC NIL)
                             (DBAR (HEAD THE)
                                (COMP
                                 (NP (SPEC NIL)
                                  (NBAR (HEAD MEN) (NU (PL))))))))
                       (IBAR (HEAD (AGR 3PLPRES))
                           (COMP
                            (VP (SPEC NIL)
                              (VBAR (HEAD HIT)
                                 (COMP
                                  (OBJ
                                   (DP (SPEC NIL)
                                  (DBAR (HEAD THE)
                                    (COMP
                                       (NP (SPEC NIL)
                                          (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))))))))))))))
```

3.27 DNW[6]

```
(PARSE (QUOTE (THE MEN REMINDED THE MEN WHERE TO HIT THE MEN)) (QUOTE CP/))
```

6. Like the TW sentences, this feature allows the finite and non-finite sentence complements.

```
(DCL
  (CP (SPEC NIL)
    (CBAR (HEAD NIL)
          (COMP
            (IP
              (SPEC
                (DP (SPEC NIL)
                    (DBAR (HEAD THE)
                          (COMP
                            (NP (SPEC NIL)
                                (NBAR (HEAD MEN) (NU (PL))))))))
              (IBAR (HEAD (AGR 3PLPAST))
                    (COMP
                      (VP (SPEC NIL)
                          (VBAR (HEAD REMIND)
                                (COMP
                                  (IOBJ
                                    (DP (SPEC NIL)
                                        (DBAR (HEAD THE)
                                              (COMP
                                                (NP (SPEC NIL)
                                                    (NBAR (HEAD MEN) (NU (PL)))))))
                                    (OBJ
                                      (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                                                          (INFL TO)
                                                          (VP (SPEC NIL)
                                                              (VBAR
                                                                (HEAD HIT)
                                                                (COMP
                                                                  (OBJ
                                                                    (DP (SPEC NIL)
                                                                     (DBAR (HEAD THE)
                                                                           (COMP
                                                                            (NP (SPEC NIL)
                                                                                (NBAR (HEAD MEN) (NU (PL))))))))))
                                                            (ADJUNCT
                                                                 (IDISC
                                                                    (DP (SPEC NIL)
                                                                        (DBAR (HEAD (PRO WHERE) (NU (SG/PL))
                                                                              (COMP NIL))))))))))))))))))))))

(DCL
  (CP (SPEC NIL)
    (CBAR (HEAD NIL)
          (COMP
            (IP
              (SPEC
                (DP (SPEC NIL)
                    (DBAR (HEAD THE)
                          (COMP
                            (NP (SPEC NIL)
                                (NBAR (HEAD MEN)
                                      (NU (PL))))))))
              (IBAR (HEAD (AGR 3PLPAST))
                    (COMP
                      (VP (SPEC NIL)
                          (VBAR (HEAD REMIND)
                                (COMP
                                  (IOBJ
                                    (DP (SPEC NIL)
                                        (DBAR (HEAD THE)
```

```
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MEN)
                              (NU (PL)))))))
                   (OBJ
                    (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                              (INFL TO)
                              (VP (SPEC NIL)
                                (VBAR (HEAD HIT)
                                 (COMP
                                  (OBJ
                                   (DP (SPEC NIL)
                                  (DBAR (HEAD THE)
                                   (COMP
                                     (NP (SPEC NIL)
                                        (NBAR (HEAD MEN) (NU (PL))))))))))))))
                 (ADJUNCT
                  (IDISC
                   (DP (SPEC NIL)
                     (DBAR (HEAD (PRO WHERE))
                        (NU (SG/PL))
                        (COMP NIL)))))))))))))

(PARSE (QUOTE (THE MEN REMINDED THE MEN WHERE THE MEN SHOULD HIT THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD REMIND)
                 (COMP
                  (IOBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MEN) (NU (PL)))))))
                   (OBJ
                    (DCL
                     (CP (SPEC NIL)
                       (CBAR (HEAD NIL)
                          (COMP
                           (IP
                            (SPEC
                             (DP (SPEC NIL)
                               (DBAR
                                (HEAD THE)
                                (COMP
                                 (NP (SPEC NIL)
                                  (NBAR (HEAD MEN) (NU (PL))))))))
                            (IBAR
```

```
                              (HEAD (AGR 3PLPAST)
                                 (MODAL SHALL))
                              (COMP
                               (VP (SPEC NIL)
                                 (VBAR
                                  (HEAD HIT)
                                  (COMP
                                   (OBJ
                                    (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                    (COMP
                                        (NP (SPEC NIL)
                                           (NBAR (HEAD MEN) (NU (PL)))))))))
                                            (ADJUNCT
                                              (IDISC
                                                (DP (SPEC NIL)
                                                  (DBAR (HEAD (PRO WHERE)) (NU (SG/PL))
                                                       (COMP NIL))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD REMIND)
                 (COMP
                  (IOBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MEN)
                              (NU (PL)))))))
                   (OBJ
                    (DCL
                     (CP (SPEC NIL)
                       (CBAR (HEAD NIL)
                          (COMP
                           (IP
                            (SPEC
                             (DP (SPEC NIL)
                               (DBAR
                                (HEAD THE)
                                (COMP
                                 (NP (SPEC NIL)
                                  (NBAR (HEAD MEN) (NU (PL))))))))
                            (IBAR
                             (HEAD (AGR 3PLPAST)
                                (MODAL SHALL))
                             (COMP
                              (VP (SPEC NIL)
```

```
                                    (VBAR
                                     (HEAD HIT)
                                     (COMP
                                      (OBJ
                                       (DP (SPEC NIL)
                                     (DBAR (HEAD THE)
                                       (COMP
                                         (NP (SPEC NIL)
                                           (NBAR (HEAD MEN) (NU (PL)))))))))))))))))))))
                     (ADJUNCT
                      (IDISC
                       (DP (SPEC NIL)
                         (DBAR (HEAD (PRO WHERE))
                            (NU (SG/PL))
                            (COMP NIL)))))))))))))))
```

3.28 DPRW[7]

```
(PARSE (QUOTE (THE MEN INDICATE TO THE MEN WHERE TO HIT THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD INDICATE)
                 (COMP
                  (IOBJ
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD MEN) (NU (PL))))))))))
                   (OBJ
                    (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                              (INFL TO)
                              (VP (SPEC NIL)
                                (VBAR
                                 (HEAD HIT)
                                 (COMP
                                  (OBJ
                                   (DP (SPEC NIL)
                                  (DBAR (HEAD THE)
                                     (COMP
                                       (NP (SPEC NIL)
```

7. Two types of indirect discourse sentence complements are possible here as in the TW and DNW sentences.

```
                                        (NBAR (HEAD MEN) (NU (PL))))))))
                                          (ADJUNCT
                                            (IDISC
                                              (DP (SPEC NIL)
                                               (DBAR (HEAD (PRO WHERE)) (NU (SG/PL))
                                                  (COMP NIL)))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD INDICATE)
                 (COMP
                  (IOBJ
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR
                                  (HEAD MEN)
                                  (NU (PL)))))))))))
                   (OBJ
                    (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                              (INFL TO)
                              (VP (SPEC NIL)
                                (VBAR
                                 (HEAD HIT)
                                 (COMP
                                  (OBJ
                                   (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                  (COMP
                                     (NP (SPEC NIL)
                                       (NBAR (HEAD MEN) (NU (PL)))))))))))))))
                 (ADJUNCT
                  (IDISC
                   (DP (SPEC NIL)
                     (DBAR (HEAD (PRO WHERE))
                        (NU (SG/PL))
                        (COMP NIL))))))))))))))

(PARSE (QUOTE (THE MEN INDICATE TO THE MEN WHERE THE MEN SHOULD HIT THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
```

```
        (IP
         (SPEC
          (DP (SPEC NIL)
              (DBAR (HEAD THE)
                    (COMP
                     (NP (SPEC NIL)
                         (NBAR (HEAD MEN) (NU (PL))))))))
         (IBAR (HEAD (AGR 3PLPRES))
               (COMP
                (VP (SPEC NIL)
                    (VBAR (HEAD INDICATE)
                          (COMP
                           (IOBJ
                            (PP (SPEC NIL)
                                (PBAR (HEAD TO)
                                      (COMP
                                       (DP (SPEC NIL)
                                           (DBAR (HEAD THE)
                                                 (COMP
                                                  (NP (SPEC NIL)
                                                      (NBAR (HEAD MEN) (NU (PL))))))))))))
                            (OBJ
                             (DCL
                              (CP (SPEC NIL)
                                  (CBAR (HEAD NIL)
                                        (COMP
                                         (IP
                                          (SPEC
                                           (DP (SPEC NIL)
                                               (DBAR
                                                (HEAD THE)
                                                (COMP
                                                 (NP (SPEC NIL)
                                                  (NBAR (HEAD MEN) (NU (PL))))))))
                                          (IBAR
                                           (HEAD (AGR 3PLPAST)
                                                 (MODAL SHALL))
                                           (COMP
                                            (VP (SPEC NIL)
                                                (VBAR
                                                 (HEAD HIT)
                                                 (COMP
                                                  (OBJ
                                                   (DP (SPEC NIL)
                                                  (DBAR (HEAD THE)
                                                   (COMP
                                                       (NP (SPEC NIL)
                                                           (NBAR (HEAD MEN) (NU (PL))))))))))
                                                               (ADJUNCT
                                                                   (IDISC
                                                                       (DP (SPEC NIL)
                                                                           (DBAR (HEAD (PRO WHERE))  (NU (SG/PL))
                                                                                 (COMP NIL)))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
     (CBAR (HEAD NIL)
           (COMP
            (IP
             (SPEC
              (DP (SPEC NIL)
```

```
        (DBAR (HEAD THE)
           (COMP
            (NP (SPEC NIL)
              (NBAR (HEAD MEN) (NU (PL)))))))
     (IBAR (HEAD (AGR 3PLPRES))
        (COMP
         (VP (SPEC NIL)
           (VBAR (HEAD INDICATE)
              (COMP
               (IOBJ
                (PP (SPEC NIL)
                  (PBAR (HEAD TO)
                     (COMP
                      (DP (SPEC NIL)
                        (DBAR (HEAD THE)
                           (COMP
                            (NP (SPEC NIL)
                              (NBAR (HEAD MEN) (NU (PL))))))))))
                (OBJ
                 (DCL
                  (CP (SPEC NIL)
                    (CBAR (HEAD NIL)
                       (COMP
                        (IP
                         (SPEC
                          (DP (SPEC NIL)
                            (DBAR
                             (HEAD THE)
                             (COMP
                              (NP (SPEC NIL)
                               (NBAR (HEAD MEN) (NU (PL)))))))))
                         (IBAR
                          (HEAD (AGR 3PLPAST)
                             (MODAL SHALL))
                          (COMP
                           (VP (SPEC NIL)
                             (VBAR
                              (HEAD HIT)
                              (COMP
                               (OBJ
                                (DP (SPEC NIL)
                               (DBAR (HEAD THE)
                                 (COMP
                                   (NP (SPEC NIL)
                                     (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))
              (ADJUNCT
               (IDISC
                (DP (SPEC NIL)
                  (DBAR (HEAD (PRO WHERE))
                     (NU (SG/PL))
                     (COMP NIL))))))))))))))
```

3.29 DNT

```
(PARSE (QUOTE (THE MEN WARN THE MEN TO HATE THE WOMEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
```

```
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN)
                    (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD WARN)
                 (COMP
                  (IOBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MEN) (NU (PL))))))))
                   (OBJ
                    (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
                              (INFL TO)
                              (VP (SPEC NIL)
                                (VBAR
                                 (HEAD HATE)
                                 (COMP
                                  (OBJ
                                   (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                     (COMP
                                       (NP (SPEC NIL)
                                         (NBAR (HEAD WOMEN) (NU (PL)))))))))))))))))))))))))
```

3.30 DPRT

```
(PARSE (QUOTE (THE MEN SIGNAL TO THE WOMEN TO HATE THE MEN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD SIGNAL)
                 (COMP
                  (IOBJ
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD WOMEN) (NU (PL))))))))))
```

```
(OBJ
 (EXCEPTIONAL_CLAUSE (DP (DBAR PRO))
           (INFL TO)
           (VP (SPEC NIL)
             (VBAR
              (HEAD HATE)
              (COMP
               (OBJ
                (DP (SPEC NIL)
              (DBAR (HEAD THE)
                (COMP
                  (NP (SPEC NIL)
                     (NBAR (HEAD MEN) (NU (PL))))))))))))))))))))))))
```

4 WH-QUESTIONS

Wh-questions are introduced by words that have the feature WH in their lexical entry. The grammar replaces this WH-word into the grammatical position that is being queried. If the grammar identifies more than one position for this WH word to fill, the parser returns all of these parses so that pragmatic and semantic factors can be used to identify the appropriate one.

```
(PARSE (QUOTE (WHO IS THE MAN)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD (PRO WHO))
              (NU (SG/PL))
              (COMP NIL))))
        (IBAR (HEAD (AGR 3SGPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD BE)
                 (COMP
                  (SUBJECT_COMPLEMENT
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN)
                              (NU (SG))))))))))))))))))

(PARSE (QUOTE (WHO IS HITTING THE MAN)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
```

```
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD (PRO WHO))
              (NU (SG/PL))
              (COMP NIL))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN)
                              (NU (SG))))))))))))))))))

(PARSE (QUOTE (WHO IS THE MAN HITTING)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN)
                    (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD (PRO WHO))
                        (NU (SG/PL))
                        (COMP NIL))))))))))))))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN)
                    (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
```

```
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (ADJUNCT
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHO))
                       (NU (SG/PL))
                       (COMP NIL)))))))))))))

(PARSE (QUOTE (WHAT IS HITTING THE MAN)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD (PRO WHAT))
              (NU (SG/PL))
              (COMP NIL))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN)
                              (NU (SG))))))))))))))))))
         (DP (SPEC NIL)
           (DBAR (HEAD (PRO WHICH))
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN)
                    (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (WHICH FOREST IS THE MAN HITTING)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN)
                    (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
```

```
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD (PRO WHICH))
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD FOREST)
                              (NU (SG)))))))))))))))))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN)
                    (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (ADJUNCT
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHICH))
                       (COMP
                        (NP (SPEC NIL)
                          (NBAR (HEAD FOREST)
                             (NU (SG))))))))))))))))
                           (NBAR (HEAD MAN)
                              (NU (SG)))))))))))))))))
                 (ADJUNCT
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHO))
                       (NU (SG/PL))
                       (COMP NIL)))))))))))))

                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MAN)
                               (NU (SG)))))))
                    (VP (SPEC NIL)
                      (VBAR (HEAD OPEN)))))))))))))))

(PARSE (QUOTE (WHO DID THE MAN HIT)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
```

```
        (DP (SPEC NIL)
          (DBAR (HEAD THE)
             (COMP
              (NP (SPEC NIL)
                (NBAR (HEAD MAN)
                   (NU (SG))))))))
       (IBAR (HEAD (DO-SUPPORT DID)
             (AGR 3SGPAST))
          (COMP
           (VP (SPEC NIL)
             (VBAR (HEAD HIT)
                (COMP
                 (OBJ
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHO)) (NU (SG/PL))
                       (COMP NIL))))))))))))))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN)
                    (NU (SG))))))))
        (IBAR (HEAD (DO-SUPPORT DID)
              (AGR 3SGPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (ADJUNCT
                  (DP (SPEC NIL)
                    (DBAR (HEAD (PRO WHO))  (NU (SG/PL))
                       (COMP NIL)))))))))))))

(PARSE (QUOTE (WHO CHATTERED)) (QUOTE CP/))

(WH-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD (PRO WHO))
              (NU (SG/PL))
              (COMP NIL))))
        (IBAR (HEAD (AGR 1SGPRES))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD CHATTER))))))))))
```

5 Y-N QUESTIONS

Y-N Questions are formed like ordinary sentences following the auxiliary word order described in section 2 above. The question is formed by fronting the first auxiliary in the sentence. This grammar replaces that fronted auxiliary into its original position and signals this move with a label of Y-N-Q on the parse.

```
(PARSE (QUOTE (DO NOT THE MEN PLAY)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (NEG NOT)
                    (DO-SUPPORT DO)
                    (AGR 3PLPRES))
              (COMP (VP (SPEC NIL)
                     (VBAR (HEAD PLAY)))))))))

(PARSE (QUOTE (DO THE MEN HIT THE MAN)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (DO-SUPPORT DO)
                    (AGR 3PLPRES))
              (COMP
               (VP (SPEC NIL)
                 (VBAR (HEAD HIT)
                    (COMP
                     (OBJ
                      (DP (SPEC NIL)
                        (DBAR (HEAD THE)
                           (COMP
                            (NP (SPEC NIL)
                              (NBAR (HEAD MAN) (NU (SG))))))))))))))))))
```

```
(PARSE (QUOTE (IS THE MAN HITTING)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (IS NOT THE MAN HITTING)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (NEG NOT)
              (AGR 3SGPRES)
              (BE ING))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (WOULD THE MAN HIT THE MAN)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (MODAL WILL)
              (AGR 3SGPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIT)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
```

```
                              (NBAR (HEAD MAN) (NU (SG))))))))))))))))))

(PARSE (QUOTE (WOULD NOT THE MAN HAVE BEEN HITTING)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR
         (HEAD (NEG NOT)
            (MODAL WILL)
            (AGR 3SGPAST)
            (HAVE EN)
            (BE ING))
         (COMP (VP (SPEC NIL)
              (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (WOULD THE MAN HAVE OPENED THE MAN)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (MODAL WILL)
              (AGR 3SGPAST)
              (HAVE EN))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD OPEN)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN) (NU (SG))))))))))))))))))

(PARSE (QUOTE (HAVE THE MEN BEEN HITTING)) (QUOTE CP/))

(Y-N-Q
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
```

```
                  (COMP
                    (NP (SPEC NIL)
                        (NBAR (HEAD MEN) (NU (PL))))))))
            (IBAR (HEAD (HAVE EN)
                  (AGR 3PLPRES)
                  (BE ING))
               (COMP (VP (SPEC NIL)
                      (VBAR (HEAD HIT))))))))))
```

```
(PARSE (QUOTE (HAS THE MAN HITTING THE MAN)) (QUOTE CP/))

NIL


(PARSE (QUOTE (WOULD THE MAN HITTING THE MAN)) (QUOTE CP/))

NIL

(PARSE (QUOTE (HAVE THE MAN WOULD BE HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (WOULD THE MAN HAVE NOT OPENED)) (QUOTE CP/))

NIL

(PARSE (QUOTE (BEEN THE MAN HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (BE THE MAN HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (HAS HIT THE MAN BEEN)) (QUOTE CP/))

NIL

(PARSE (QUOTE (DID THE MAN HITTING)) (QUOTE CP/))

NIL

(PARSE (QUOTE (DO THE MEN BE HITTING)) (QUOTE CP/))

NIL
```

6 NOUN-VERB AGREEMENT

```
(PARSE (QUOTE (THE MAN HITS)) (QUOTE CP/))

(DCL
  (CP (SPEC NIL)
     (CBAR (HEAD NIL)
          (COMP
            (IP
              (SPEC
                (DP (SPEC NIL)
                   (DBAR (HEAD THE)
                        (COMP
                          (NP (SPEC NIL)
```

```
                (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (THE MEN HIT)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MEN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPRES))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD HIT))))))))))

(PARSE (QUOTE (THE MEN HITS)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE MAN WALKED)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPAST))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD WALK))))))))))

(PARSE (QUOTE (THE MAN WALKS)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES))
           (COMP (VP (SPEC NIL)
                (VBAR (HEAD WALK))))))))))

(PARSE (QUOTE (THE MAN WALK)) (QUOTE CP/))
```

```
NIL

(PARSE (QUOTE (BOYS WALKS)) (QUOTE CP/))

NIL

(PARSE (QUOTE (BOY WALKS)) (QUOTE CP/))

NIL

(PARSE (QUOTE (I WORK)) (QUOTE CP/))

(DCL
  (CP (SPEC NIL)
      (CBAR (HEAD NIL)
            (COMP
             (IP
               (SPEC
                 (DP (SPEC NIL)
                     (DBAR (HEAD (PRO I))
                           (NU '(1SGPRES 1SGPAST))
                           (COMP NIL))))
               (IBAR (HEAD (AGR 1SGPRES))
                     (COMP (VP (SPEC NIL)
                               (VBAR (HEAD WORK)))))))))

(PARSE (QUOTE (I WORKS)) (QUOTE CP/))

NIL

(PARSE (QUOTE (YOU WORK)) (QUOTE CP/))

(DCL
  (CP (SPEC NIL)
      (CBAR (HEAD NIL)
            (COMP
             (IP
               (SPEC
                 (DP (SPEC NIL)
                     (DBAR (HEAD (PRO YOU))
                           (NU '(2SGPRES 2PLPRES
                                  2SGPAST
                                  2PLPAST))
                           (COMP NIL))))
               (IBAR (HEAD (AGR 2SGPRES))
                     (COMP (VP (SPEC NIL)
                               (VBAR (HEAD WORK)))))))))

(PARSE (QUOTE (YOU WORKS)) (QUOTE CP/))

NIL

(PARSE (QUOTE (WE WORKS)) (QUOTE CP/))

NIL

(PARSE (QUOTE (WE WORK)) (QUOTE CP/))

(DCL
  (CP (SPEC NIL)
```

```
(CBAR (HEAD NIL)
   (COMP
    (IP
     (SPEC
      (DP (SPEC NIL)
        (DBAR (HEAD (PRO WE))
           (NU '(1PLPRES 1PLPAST))
           (COMP NIL))))
     (IBAR (HEAD (AGR 1PLPRES))
        (COMP (VP (SPEC NIL)
              (VBAR (HEAD WORK)))))))))
```

7 PASSIVES

The grammar detects passive sentences from the inflection on the contents of INFL and the main verb. When a passive sentence is found, the parser constructs the active sentence which it believes underlies the passive surface sentence and labels the sentence as having passive MOOD. If there is no subject found in a "by-phrase" it inserts the indeterminate "SOMEONE" into subject position. Because it also views these by-phrases as prepositional phrases, several possible parses are given for all passive sentences and non-syntactic factors must be used to identify the proper construction. For example, consider the sentences:

A. The man was hired by the woman.
B. The man was hired by the hour.

The parser has no way of knowing that "the hour" is not an appropriate subject of hired while "the woman" is and therefore will produce parses like those below for both of these sentences.

```
(PARSE (QUOTE (THE MAN WAS HIRED BY THE WOMAN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
```

```
               (NP (SPEC NIL)
                 (NBAR (HEAD WOMAN)
                    (NU (SG))))))))
        (IBAR (HEAD (MOOD PASSIVE)
                   (AGR 3SGPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD HIRE)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD MAN) (NU (SG))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
               (AGR 3SGPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD HIRE)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD MAN) (NU (SG)))))))))
                 (ADJUNCT
                   (PP (SPEC NIL)
                     (PBAR (HEAD BY)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR
                                  (HEAD WOMAN) (NU (SG))))))))))))))))))))

(PARSE (QUOTE (THE MAN WAS HIRED)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
               (AGR 3SGPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD HIRE)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD THE)
                         (COMP
```

```
                                   (NP (SPEC NIL)
                                      (NBAR (HEAD MAN) (NU (SG))))))))))))))))))

(PARSE (QUOTE (A STORY WAS READ TO THE CHILDREN BY THE WOMAN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
        (COMP
         (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
            (IBAR (HEAD (MOOD PASSIVE)
                     (AGR 3SGPAST))
                (COMP
                 (VP (SPEC NIL)
                    (VBAR (HEAD READ)
                        (COMP
                         (OBJ
                          (DP (SPEC NIL)
                             (DBAR (HEAD A)
                                 (COMP
                                  (NP (SPEC NIL)
                                     (NBAR (HEAD STORY) (NU (SG)))))))
                          (IOBJ
                           (PP (SPEC NIL)
                              (PBAR (HEAD TO)
                                  (COMP
                                   (DP (SPEC NIL)
                                      (DBAR (HEAD THE)
                                          (COMP
                                           (NP (SPEC NIL)
                                            (NBAR (HEAD CHILDREN) (NU (PL))
                                             (COMP
                                             (PP (SPEC NIL)
                                              (PBAR (HEAD BY)
                                                  (COMP
                                                     (DP (SPEC NIL)
                                                        (DBAR (HEAD THE)
                                                           (COMP
                                                              (NP (SPEC NIL)
                                                                 (NBAR (HEAD WOMAN)
                                                                 (NU (SG)))))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
    (CBAR (HEAD NIL)
        (COMP
         (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
            (IBAR (HEAD (MOOD PASSIVE)
                     (AGR 3SGPAST))
                (COMP
                 (VP (SPEC NIL)
                    (VBAR (HEAD READ)
                        (COMP
                         (OBJ
                          (DP (SPEC NIL)
                             (DBAR (HEAD A)
                                 (COMP
                                  (NP (SPEC NIL)
                                     (NBAR (HEAD STORY) (NU (SG)))))))
                          (IOBJ
                           (PP (SPEC NIL)
```

```
                        (PBAR (HEAD TO)
                           (COMP
                            (DP (SPEC NIL)
                              (DBAR (HEAD THE)
                                 (COMP
                                  (NP
                                   (SPEC NIL)
                                   (NBAR (HEAD CHILDREN) (NU (PL))
                                     (ADJUNCT
                                      (PP (SPEC NIL)
                                        (PBAR (HEAD BY)
                                           (COMP
                                            (DP (SPEC NIL)
                                              (DBAR (HEAD THE)
                                                 (COMP
                                                  (NP (SPEC NIL)
                                                    (NBAR (HEAD WOMAN)
                                                       (NU (SG)))))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD WOMAN) (NU (SG))))))))
        (IBAR (HEAD (MOOD PASSIVE)
                   (AGR 3SGPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD READ)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD A)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD STORY) (NU (SG)))))))
                   (IOBJ
                    (PP (SPEC NIL)
                      (PBAR (HEAD TO)
                         (COMP
                          (DP (SPEC NIL)
                            (DBAR (HEAD THE)
                               (COMP
                                (NP
                                 (SPEC NIL)
                                 (NBAR (HEAD CHILDREN)
                                  (NU (PL))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
                   (AGR 3SGPAST))
```

```
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD READ)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD A)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD STORY) (NU (SG)))))))
                    (IOBJ
                     (PP (SPEC NIL)
                       (PBAR (HEAD TO)
                          (COMP
                           (DP (SPEC NIL)
                             (DBAR (HEAD THE)
                                (COMP
                                 (NP
                                  (SPEC NIL)
                                  (NBAR (HEAD CHILDREN)
                                   (NU (PL)))))))))))))
                  (ADJUNCT
                   (PP (SPEC NIL)
                     (PBAR (HEAD BY)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD WOMAN)
                                  (NU (SG))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
                (AGR 3SGPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD READ)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD A)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD STORY) (NU (SG)))))))))
                  (ADJUNCT
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD CHILDREN) (NU (PL))
                                  (COMP
                                   (PP (SPEC NIL)
                                 (PBAR (HEAD BY)
```

```
                                   (COMP
                                      (DP (SPEC NIL)
                                        (DBAR (HEAD THE)
                                           (COMP
                                              (NP (SPEC NIL)
                                                (NBAR (HEAD WOMAN) (NU (SG)))))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
               (AGR 3SGPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD READ)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD A)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD STORY) (NU (SG))))))))))
                  (ADJUNCT
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD THE)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD CHILDREN) (NU (PL))
                               (ADJUNCT
                                    (PP (SPEC NIL)
                                      (PBAR (HEAD BY)
                                         (COMP
                                          (DP (SPEC NIL)
                                            (DBAR (HEAD THE)
                                               (COMP
                                                (NP (SPEC NIL)
                                                  (NBAR (HEAD WOMAN)
                                                     (NU (SG)))))))))))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
               (AGR 3SGPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD READ)
                  (COMP
                   (OBJ
                    (DP (SPEC NIL)
                      (DBAR (HEAD A)
                         (COMP
                          (NP (SPEC NIL)
                            (NBAR (HEAD STORY) (NU (SG))))))))))
```

```
                (ADJUNCT
                 (PP (SPEC NIL)
                   (PBAR (HEAD TO)
                      (COMP
                       (DP (SPEC NIL)
                         (DBAR (HEAD THE)
                            (COMP
                             (NP (SPEC NIL)
                               (NBAR (HEAD CHILDREN) (NU (PL)))))))))))
              (ADJUNCT
                 (PP (SPEC NIL)
                   (PBAR (HEAD BY)
                      (COMP
                       (DP (SPEC NIL)
                         (DBAR (HEAD THE)
                            (COMP
                             (NP (SPEC NIL)
                               (NBAR (HEAD WOMAN)
                                (NU (SG))))))))))))))))))))

(PARSE (QUOTE (THE MAN WHO THE WOMAN WAS HIT BY WAS UGLY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))
                    (RESTRICT (REL-CLAUSE
                      (CP (SPEC NIL)
                        (CBAR (HEAD WHO)
                           (COMP
                            (IP
                             (SPEC
                            (NBAR (HEAD MAN) (NU (SG))))
                             (IBAR
                              (HEAD (MOOD PASSIVE)
                                  (AGR 3SGPAST))
                              (COMP
                               (VP (SPEC NIL)
                                 (VBAR
                                  (HEAD HIT)
                                  (COMP
                                   (OBJ
                                 (DP (SPEC NIL)
                                   (DBAR (HEAD THE)
                                     (COMP
                                       (NP (SPEC NIL)
                                         (NBAR (HEAD WOMAN) (NU (SG))))))))))))))))))))))))
        (IBAR (HEAD (AGR 3SGPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD BE)
                 (COMP
                  (SUBJECT_COMPLEMENT
                   (DEGP (SPEC NIL)
```

```
                     (DEGBAR (HEAD NIL)
                         (COMP
                          (AP (SPEC NIL)
                            (ABAR (HEAD UGLY)))))))))))))))))

(PARSE (QUOTE (THE MAN WHO WAS HIT BY THE WOMAN WENT AWAY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD MAN) (NU (SG))
                    (RESTRICT (REL-CLAUSE
                      (CP (SPEC NIL)
                        (CBAR (HEAD WHO)
                           (COMP
                            (IP
                             (SPEC
                            (DP (SPEC NIL)
                                (DBAR (HEAD THE)
                                (COMP
                                 (NP (SPEC NIL)
                                  (NBAR (HEAD WOMAN) (NU (SG))))))))
                             (IBAR
                              (HEAD (MOOD PASSIVE)
                                  (AGR 3SGPAST))
                              (COMP
                               (VP (SPEC NIL)
                                 (VBAR
                                  (HEAD HIT)
                                  (COMP
                                   (OBJ
                                  (DP (SPEC NIL)
                                    (DBAR (HEAD NIL)
                                      (COMP
                                       (NP (SPEC NIL)
                                         (NBAR (HEAD MAN)  (NU (SG)))))))))))))))))))))))))))
      (IBAR (HEAD (AGR 3SGPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD GO)
                 (ADJUNCT
                  (ADVP (SPEC NIL)
                     (ADVBAR (HEAD AWAY)
                         (COMP NIL)))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
```

```
                (NP (SPEC NIL)
                  (NBAR (HEAD MAN) (NU (SG))
                     (RESTRICT (REL-CLAUSE
                       (CP (SPEC NIL)
                         (CBAR (HEAD WHO)
                            (COMP
                             (IP
                              (SPEC
                               (DP (DBAR (HEAD SOMEONE))))
                              (IBAR(HEAD (MOOD PASSIVE)
                                      (AGR 3SGPAST))
                               (COMP
                                (VP (SPEC NIL)
                                  (VBAR
                                   (HEAD HIT)
                                   (COMP
                                    (OBJ
                                   (DP (SPEC NIL)
                                     (DBAR (HEAD NIL)
                                      (COMP
                                        (NP (SPEC NIL)
                                          (NBAR (HEAD MAN)  (NU (SG)))))))))
                                           (ADJUNCT
                                             (PP (SPEC NIL)
                                               (PBAR (HEAD BY)
                                                 (COMP
                                                  (DP (SPEC NIL)
                                                    (DBAR (HEAD THE)
                                                      (COMP
                                                       (NP (SPEC NIL)
                                                         (NBAR (HEAD WOMAN)
                                                           (NU (SG))))))))))))))))))))))))))
         (IBAR (HEAD (AGR 3SGPAST))
            (COMP
             (VP (SPEC NIL)
               (VBAR (HEAD GO)
                  (ADJUNCT
                   (ADVP (SPEC NIL)
                      (ADVBAR (HEAD AWAY)
                          (COMP NIL)))))))))))))
```

8 ADVERBS

```
(PARSE (QUOTE (THE CHILDREN WENT TO SCHOOL SLOWLY)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD CHILDREN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD GO)
```

```
                  (ADJUNCT
                   (PP (SPEC NIL)
                     (PBAR (HEAD TO)
                        (COMP
                         (DP (SPEC NIL)
                           (DBAR (HEAD NIL)
                              (COMP
                               (NP (SPEC NIL)
                                 (NBAR (HEAD SCHOOL) (NU (SG)))))))))))
                  (ADJUNCT
                   (ADVP (SPEC NIL)
                      (ADVBAR (HEAD SLOWLY)
                          (COMP NIL)))))))))))))


(PARSE (QUOTE (THE CHILDREN SLOWLY WENT TO SCHOOL)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD CHILDREN) (NU (PL))))))))
        (IBAR (HEAD (AGR 3PLPAST))
           (COMP
            (VP
             (SPEC
              (DEGP (SPEC NIL)
                 (DEGBAR (HEAD NIL)
                     (COMP
                      (ADVP (SPEC NIL)
                         (ADVBAR (HEAD SLOWLY)
                             (COMP NIL)))))))
             (VBAR (HEAD GO)
                (ADJUNCT
                 (PP (SPEC NIL)
                   (PBAR (HEAD TO)
                      (COMP
                       (DP (SPEC NIL)
                         (DBAR (HEAD NIL)
                            (COMP
                             (NP (SPEC NIL)
                               (NBAR (HEAD SCHOOL)
                                (NU (SG)))))))))))))))))))))))

(PARSE (QUOTE (SLOWLY THE CHILDREN WENT TO SCHOOL)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE STORY WAS QUICKLY READ TO THE CHILDREN)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
```

```
         (IBAR (HEAD (MOOD PASSIVE)
               (AGR 3SGPAST))
            (COMP
             (VP
              (SPEC
               (DEGP (SPEC NIL)
                  (DEGBAR (HEAD NIL)
                      (COMP
                       (ADVP (SPEC NIL)
                          (ADVBAR (HEAD QUICKLY)
                              (COMP NIL)))))))
              (VBAR (HEAD READ)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD STORY) (NU (SG)))))))
                   (IOBJ
                    (PP (SPEC NIL)
                      (PBAR (HEAD TO)
                         (COMP
                          (DP (SPEC NIL)
                            (DBAR (HEAD THE)
                               (COMP
                                (NP (SPEC NIL)
                                 (NBAR (HEAD CHILDREN)
                                  (NU (PL))))))))))))))))))))))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP (SPEC (DP (DBAR (HEAD SOMEONE))))
         (IBAR (HEAD (MOOD PASSIVE)
               (AGR 3SGPAST))
            (COMP
             (VP
              (SPEC
               (DEGP (SPEC NIL)
                  (DEGBAR (HEAD NIL)
                      (COMP
                       (ADVP (SPEC NIL)
                          (ADVBAR (HEAD QUICKLY)
                              (COMP NIL)))))))
              (VBAR (HEAD READ)
                 (COMP
                  (OBJ
                   (DP (SPEC NIL)
                     (DBAR (HEAD THE)
                        (COMP
                         (NP (SPEC NIL)
                           (NBAR (HEAD STORY)
                              (NU (SG)))))))))
                 (ADJUNCT
                  (PP (SPEC NIL)
                    (PBAR (HEAD TO)
                       (COMP
                        (DP (SPEC NIL)
                          (DBAR (HEAD THE)
```

```
(COMP
 (NP (SPEC NIL)
   (NBAR (HEAD CHILDREN)
    (NU (PL))))))))))))))))))))
```

```
(PARSE (QUOTE (THE WOMAN READ THE STORY QUICKLY TO THE CHILDREN)) (QUOTE CP/))

NIL
```

9 ADJECTIVES

As discussed in Van Dyke, 1991, adjectives are parsed as the head of a degree phrase and consequently, when there is more than one adjective in the determiner phrase, multiple degree phrases are constructed to accommodate them. The number of degree phrases within a determiner phrase is unrestricted, however the zones of the adjectives must be in ascending order. This explains way a phrase like “a good very friend” is ungrammatical: the adjective “good” has a zone of 2 while “very” has a zone of 1. For words like “wavy” which have two zones (i.e. 2 and 4), there is a greater variety of positions for that adjective to occur in. However, each time an adjective with one zone only occurs the base zone for all subsequent adjective s is set. For example, if the previous adjective is “brown”, having a zone of 3, and the new adjective is “wavy”, having a zone of 2 and 4, then “wavy” is allowed to follow “brown” but all adjectives after “wavy” must have zones greater than that of “brown”. This restriction rules out phrases like “brown wavy long hair” where the sequence of zones is “(3) (2 4) (2)”: while “brown wavy” and “wavy long” are acceptable adjective sequences, the three adjectives in this order is not acceptable because the zones are not in ascending order.

A different restriction on adjective occurrence is implemented for those adjective carrying the PRED feature in their lexical entries. Words like “ablaze” are allowed to occur in predicate positions following the same zone restrictions described above, however they can not occur as noun modifiers within the determiner phrase.

```
(PARSE (QUOTE (A GOOD FRIEND)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD A)
        (COMP
         (NP (SPEC NIL)
            (NBAR
             (ATTRIB
              (DEGP (SPEC NIL)
                   (DEGBAR (HEAD NIL)
                          (COMP (AP (SPEC NIL)
                                  (ABAR (HEAD (GOOD))))))))
             (HEAD FRIEND)
             (NU (SG)))))))

(PARSE (QUOTE (A VERY GOOD FRIEND)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD A)
        (COMP
         (NP (SPEC NIL)
            (NBAR
             (ATTRIB
              (DEGP (SPEC NIL)
                   (DEGBAR (HEAD NIL)
                          (COMP (AP (SPEC NIL)
                                  (ABAR (HEAD (VERY))))))))
             (ATTRIB
              (DEGP (SPEC NIL)
                   (DEGBAR (HEAD NIL)
                          (COMP
                            (AP (SPEC NIL)
                               (ABAR (HEAD (GOOD))))))))
             (HEAD FRIEND)
             (NU (SG)))))))

(PARSE (QUOTE (A GOOD VERY FRIEND)) (QUOTE DP/))

NIL

(PARSE (QUOTE (THE OLD WOMAN WITH LONG HAIR)) (QUOTE DP/))

(DP (SPEC NIL)
   (DBAR (HEAD THE)
        (COMP
         (NP (SPEC NIL)
            (NBAR
             (ATTRIB
              (DEGP (SPEC NIL)
                   (DEGBAR (HEAD NIL)
                          (COMP (AP (SPEC NIL)
                                  (ABAR (HEAD (OLD))))))))
             (HEAD WOMAN) (NU (SG))
             (COMP
              (PP (SPEC NIL)
```

```
            (PBAR (HEAD WITH)
               (COMP
                (DP (SPEC NIL)
                  (DBAR (HEAD NIL)
                     (COMP
                      (NP (SPEC NIL)
                        (NBAR
                         (ATTRIB
                          (DEGP (SPEC NIL)
                             (DEGBAR (HEAD NIL)
                                 (COMP
                                  (AP
                                   (SPEC NIL)
                                   (ABAR
                                   (HEAD
                                   (LONG))))))))
                         (HEAD HAIR) (NU (SG/PL))))))))))))))))

(DP (SPEC NIL)
  (DBAR (HEAD THE)
     (COMP
      (NP (SPEC NIL)
        (NBAR
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP (AP (SPEC NIL)
                      (ABAR (HEAD (OLD))))))))
         (HEAD WOMAN) (NU (SG))
         (ADJUNCT
          (PP (SPEC NIL)
            (PBAR (HEAD WITH)
               (COMP
                (DP (SPEC NIL)
                  (DBAR (HEAD NIL)
                     (COMP
                      (NP (SPEC NIL)
                        (NBAR
                         (ATTRIB
                          (DEGP (SPEC NIL)
                             (DEGBAR (HEAD NIL)
                                 (COMP
                                  (AP
                                   (SPEC NIL)
                                   (ABAR
                                   (HEAD
                                   (LONG))))))))
                         (HEAD HAIR) (NU (SG/PL))))))))))))))))

(PARSE (QUOTE (LONG BROWN WAVY HAIR)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD NIL)
     (COMP
      (NP (SPEC NIL)
        (NBAR
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP (AP (SPEC NIL)
                      (ABAR (HEAD (LONG))))))))
```

```
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP
                  (AP (SPEC NIL)
                    (ABAR (HEAD (BROWN))))))))
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP
                  (AP (SPEC NIL)
                    (ABAR (HEAD (WAVY))))))))
         (HEAD HAIR) (NU (SG/PL)))))))

(PARSE (QUOTE (LONG WAVY BROWN HAIR)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD NIL)
     (COMP
      (NP (SPEC NIL)
        (NBAR
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP (AP (SPEC NIL)
                      (ABAR (HEAD (LONG))))))))
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP
                  (AP (SPEC NIL)
                    (ABAR (HEAD (WAVY))))))))
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP
                  (AP (SPEC NIL)
                    (ABAR (HEAD (BROWN))))))))
         (HEAD HAIR) (NU (SG/PL)))))))

(PARSE (QUOTE (WAVY LONG BROWN HAIR)) (QUOTE DP/))

(DP (SPEC NIL)
  (DBAR (HEAD NIL)
     (COMP
      (NP (SPEC NIL)
        (NBAR
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP (AP (SPEC NIL)
                      (ABAR (HEAD (WAVY))))))))
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
                 (COMP
                  (AP (SPEC NIL)
                    (ABAR (HEAD (LONG))))))))
         (ATTRIB
          (DEGP (SPEC NIL)
             (DEGBAR (HEAD NIL)
```

```
                (COMP
                 (AP (SPEC NIL)
                   (ABAR (HEAD (BROWN))))))))
        (HEAD HAIR) (NU (SG/PL)))))))

(PARSE (QUOTE (BROWN WAVY LONG HAIR)) (QUOTE DP/))

NIL

(PARSE (QUOTE (THE FOREST IS ABLAZE)) (QUOTE CP/))

(DCL
 (CP (SPEC NIL)
   (CBAR (HEAD NIL)
      (COMP
       (IP
        (SPEC
         (DP (SPEC NIL)
           (DBAR (HEAD THE)
              (COMP
               (NP (SPEC NIL)
                 (NBAR (HEAD FOREST)
                    (NU (SG))))))))
        (IBAR (HEAD (AGR 3SGPRES))
           (COMP
            (VP (SPEC NIL)
              (VBAR (HEAD BE)
                 (COMP
                  (SUBJECT_COMPLEMENT
                   (DEGP (SPEC NIL)
                      (DEGBAR (HEAD NIL)
                          (COMP
                           (AP (SPEC NIL)
                             (ABAR
                              (HEAD (ABLAZE)))))))))))))))))))

(PARSE (QUOTE (THE ABLAZE FOREST IS BURNING)) (QUOTE CP/))

NIL
```

10 FUTURE DIRECTIONS

The following sections illustrate some of the constructions that the grammar is presently unequipped to handle. These should be viewed as areas for the future development of this grammar. It should be recognized that the present structure of the grammar lends itself easily to the accommodation of new structures like these. I do not wish to suggest that these are the only structures that the grammar does not handle, only that considerations inherent in these are a natural next step for this grammar.

10.1 Choice Questions- Coordination

```
(PARSE (QUOTE (DID THE MOTHER OR THE FATHER PICK UP THE CHILDREN FROM SCHOOL)) (QUOTE CP/))

NIL

(PARSE (QUOTE (WERE THE CHILDREN PICKED UP FROM SCHOOL OR DID THEY RIDE THE BUS)) (QUOTE CP/
))

NIL
```

10.2 Ellipsis

```
(PARSE (QUOTE (THE CHILDREN LIKE THE CLOWN MORE THAN THE MAN DOES)) (QUOTE CP/))

NIL

(PARSE (QUOTE (THE CHILDREN NEED MORE SLEEP THAN DO THE ADULTS)) (QUOTE CP/))

NIL
```

10.3 Coordination

```
(PARSE (QUOTE (THE MAN IS A TEACHER AND THE WOMAN IS A LAWYER)) (QUOTE CP/))

NIL

(PARSE (QUOTE (BOTH THE MAN AND THE WOMAN ARE TEACHERS)) (QUOTE CP/))

NIL
```

10.4 Conditionals

```
(PARSE (QUOTE (IF THE CHILDREN ARE LATE FOR SCHOOL THEY WILL MISS THE TEST)) (QUOTE CP/))

NIL

(PARSE (QUOTE (IF THE TRAIN IS ON TIME THEN THEY WILL MEET SOON)) (QUOTE CP/))

NIL
```

REFERENCES

Flickinger, D., Friedman, M., Gawron, M., Nerbonne, J., Pollard, C., Pullum, G., Sag, I., & Wasow. T. (April 3, 1990). *HP-NL Test Suite*. Hewlett Packard Labs.

Van Dyke, J. (1991). *Word Prediction for Disabled Users: Applying Natural Language Processing to Enhance Communication.* Honors BA Thesis, University of Delaware.