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The Bracketing Guidelines for the Penn Chinese Treebank (3.0)

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The Bracketing Guidelines for the Penn Chinese Treebank (3.0)

Abstract
This document describes the bracketing guidelines for the Penn Chinese Treebank Project. The goal of the project is the creation of a 100-thousand-word corpus of Mandarin Chinese text with syntactic bracketing. The Chinese Treebank has been released via the Linguistic Data Consortium (LDC) and is available to the public.

This document can be divided into six parts. Section I discusses six fundamental grammatical relations that are represented in the Treebank. Section II introduces the bracketing tagset, which includes 23 syntactic labels, 26 functional tags, and 7 tags for null elements. Section III, IV and V specify our annotation schemata for noun phrases, verbs phrases, and other minor categories, respectively. Section VI describes our treatment for empty categories, such as trace for syntactic movement, PRO for control, and pro for argument drop. Section VII and VIII cover the coordinated clauses and subordinating clauses. Section IX, X and XI specify the way we handle punctuation, ambiguity, and some problematic cases.

Comments
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The Bracketing Guidelines for the Penn Chinese Treebank (3.0)

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Section 0: Design Issues for the Chinese Treebank.

1. Linguistic sophistication. The level of linguistic sophistication required for an annotated text corpus such as the Chinese Treebank is closely related to the purpose for the corpus. Since the purpose of this Treebank is to provide a tool to train information processing tools such as POS taggers and parsers, we strive to provide solid linguistic analysis for our selected text, based on the current research in Chinese syntax and the linguistic expertise of those involved in this project. However, it is impractical to provide the highly complex trees as are commonly found in current linguistic literature, nor can we claim that we can provide the "correct" analysis for each and every sentence in the corpus. The result is a compromise between linguistic correctness and engineering convenience.

The following tree shows a well-accepted analysis in current linguistic literature for a simple sentence 'They seem to understand'. Imagine how this can be applied to multiple-line sentences so frequently found in Xinhua newswire! Therefore, we adopt a much simplified annotation schema for our Treebank.

```
(TP (DP-1 they)
    (T' (T seem-2 s)
        (VP (DP-3 t-1)
            (V' (V t-2)
                (TP (DP-4 t-3)
                    (T' (T to)
                        (VP (DP t-4)
                            (V' understand))))))))
```

2. Consistency. Without doubt, consistency is one of the most important

considerations in designing the corpus. Ideally, an annotator should always give the same analysis when annotating the same text more than once, and when the same text is given to different annotators it should be annotated in exactly the same way. Many things can be done to ensure consistency, one of them is to make sure that the guidelines are clear, specific and consistent. That means that, when we define different linguistic structures, wherever possible, we try to provide clean, solid diagnostic tests. Asking annotators to determine the structure based on subtle or vague criteria is asking for inconsistency. We also try to ensure that the guidelines cover all the possible structures that are likely to occur in the corpus so that the annotators do not need to come up with analyses of their own. Another thing that we do to ensure consistency is to avoid ambiguity, the possibility of one sentence (or phrase) having multiple analyses. For example, in

(NP (CP e-1 (NT 昨天) e-2 (VV 来) (DEC 的))
    (NP (DT 那) (M 个) (NN 人)))

the gap (which is the subject position) can be plausibly analyzed in either e-1 or e-2 with little difference in semantics. In this case we specify that the gap should always be in e-1.

3. Challenge that is unique for Chinese. To achieve the sometimes conflicting goals of linguistic sophistication and consistency is hard enough. This task is compounded by the lack of morphological cues in Chinese. There are two major types of evidence that linguists rely on to determine the syntactic structure of a phrase or sentence in a language such as English: morphological information (such as inflections) and distributional information (such as word order). In Chinese, basically we are left with only word order. This makes ambiguity - multiple analyses for one sentence - more likely. We try to make clear what are our preferred analyses in such cases. For example, the Chinese sentence

我 请求 他 过来

can be equivalent to either of the following two sentences:

I asked him to come
I asked that he come

In English, with the help of the complementizer (that), verb morphology(-ed, to), case marker (he vs. him), the task of differentiating them is trivial. In Chinese, we specify that all other things being equal, we always choose the second analysis.

4. Theoretical neutrality. Another desired goal is theoretical neutrality. Clearly we prefer that this corpus survives the ever changing syntactic theories. However, we recognize theoretical neutrality is an ideal that is subject to different interpretations. Our approach is to try to build the corpus on the 'safe' assumptions of theoretical frameworks and theoretical constructs that have been around for a while and that have been proven to be solid, whenever possible, that is. The influence of the Government and Binding theory is obvious in our corpus,

but we try not to adopt the whole package. Instead we try to identify and adopt those assumptions of GB that are least controversial. For example, we adopted the assumption that every phrase has a head that determines its categorial status, but in general did not consider the implications of case theory for Chinese. We felt that case theory for a language like Chinese that lacks overt case markings is too subtle to be applied to any non-trivial corpus on a consistent basis.

5. Generality. Still another goal is to achieve a level of generality that will easily extend to additional data. To that end we try not to limit our purview to just the data at hand. Instead, when we try to determine an analysis for a sentence in the corpus we do not come up with an analysis just to cover that sentence. Instead we try to examine the whole paradigm of examples that are relevant to the analysis of the sentence in question. However, we understand that we can not possibly cover all the Chinese text that has ever been produced, and therefore we do not consider sentences that have no relevance at all to our work at hand.

6. Principledness. We try to guide our bracketing through the use of a limited set of fundamental grammatical relations to ensure that our corpus is principled. We stick to the rule that one bracket should represent one grammatical relation where possible. The opposite of principledness is arbitrariness. To take arbitrariness to the extreme would mean that the brackets are assigned randomly with no particular reason at all. Such a corpus would not be of much use. We also believe that principled guidelines will help consistency.

Section I Overview

1 Fundamental grammatical relations represented in the Chinese Treebank

This section presents an overview of the fundamental grammatical relations that are represented in the Chinese Treebank. The formal structural properties are represented with brackets as well as structural labels (such as NP, VP) and the functional properties are represented with functional labels (or dash tags) such as -ADV, -TMP, and -SBJ. The structural representations are the primary objective for the Treebank and constitute a syntactic analysis for the various grammatical constructions in Chinese. The functional representations can be viewed as secondary in that they help to address (function form) discrepancies and to mark the non-structural aspects of linguistic analysis such as thematic roles. As a result of this, they serve as a mechanism to differentiate the functions of the same syntactic category. For instance, a PP, depending on where it is used and what it is, may indicate location, time, extent, and so on.

Six main grammatical relations are represented in this Treebank. Complementation, adjunction and coordination are represented structurally; predication, modification and apposition are represented non-configurationally.

1.1 Grammatical relations that are represented non-configurationally with functional tags.

1.1.1 Predication

Predication is the relationship between the subject and the predicate (it can be the relationship between the topic and the comment, etc., but for the purpose of this guideline, by predication we only mean the relationship between the subject and the predicate). Predication is represented non-configurationally by attaching the functional tag -SBJ to the subject at the IP level, attaching the functional tag -PRD to the predicate when it is not a VP, and attaching functional tags indicating thematic roles to the arguments that are the complements of the verb (-OBJ, -EXT, etc.), when the predicate is a VP. Since a VP is always predicate, -PRD is assumed and no functional tag is attached to it.

1.1.1.1 The subject

In most cases the subject is an NP, although arguably they can be phrases other than NP:

```
(IP (NP-SBJ (NN 中资))
    (VP (ADVP (AD 已))
        (VP (VV 成为)
            (NP-OBJ (NP-PN (NR 澳门))
                    (CP (WHNP-1 (-NONE- *OP*))
                        (CP (IP (NP-SBJ (-NONE- *T*-1))
                                (VP (ADVP (AD 最))
                                    (VP (VA 大))))
                            (DEC 的) ))
                    (ADJP (JJ 外来))
                    (NP (NN 投资者)))))
    (PU 。))
```

1.1.1.2 The predicate

A predicate must meet the criterion that it is questionable and can be negated. This is trivially true when the predicate is a VP. When the predicate is non-verbal, however, questionability and negatability are useful tests to decide whether a specific string is a predicate or a modifier. For example, in 他家 三口人, 三口人 is a predicate rather than a modifier since it is both questionable and negatable, with the help of the copula 是.

他家 不是 三口人.

他家 是不是 三口人?

1.1.1.2.1 Non-verbal predicates:

Possible non-verbal predicates in Chinese are NPs, QPs and PPs. They occur when there is no verb present or the verb is the copula 是. When there is no verb present it is assumed that a null verb is present and it projects layer of VP external to the predicate:

```
(IP  (NP-SBJ (DP (DT 这)
                 (CLP (M 座)))
             (NP (NN 楼)))
     (VP (QP-PRD (CD 十八)
                 (CLP  (M 英尺)))))
```

In this case, the predicate is the QP. Adjuncts are attached at the VP level when the predicates are non-verbal:

```
(IP  (NP-SBJ (DP (DT 这)
                 (CLP (M 座)))
             (NP (NN 楼)))
     (VP (NP-TMP 去年)
         (VP (QP-PRD (CD 十八)
                     (CLP (M 英尺))))))
```

NP predicates:

```
(IP  (NP-SBJ (NP (PN 他))
             (NP (NN 家)))
     (VP (NP-PRD (QP (CD 三)
                     (CLP (M 口)))
                 (NP (NN 人) ))))
```

Another scenario where the VP is not the predicate is when the verb is the copula 是. In this case the post-是 NP is the predicate. The dash tag -PRD is attached to the NP predicate:

```
(IP (NP-SBJ (NR 中国))
    (VP (VC 是)
        (NP-PRD (QP (CD 一)
                    (CLP (M 个)))
                (ADJP (JJ 大))
                (NP (NN 国)))))
```

1.1.1.2.2 Verbal predicates:

When the predicate is a VP, the VP is generally formed by the verb and its arguments. We assume the lowest level of the VP is the predicate automatically and therefore do not assign to it the dash tag -PRD. However, each of the arguments of the VP receives a dash tag.

```
(IP  (NP-PN-SBJ (NR 张三))
     (VP (VV 参加)
         (AS 了)
         (NP-OBJ  (NN 会议))))
```

In cases where there are multiple (successive) layers of VP, the predicate is the lowest VP. Multiple (successive) layers of VP happen when there are modal verbs above the predicate verb:

```
(IP  (NP-PN-SBJ (NR 张三))
     (VP (VV 应该)
         (VP (VV 参加)
             (NP-OBJ  (NN 会议)))))
```

In the above example, the lowest level of VP, (VP 参加 会议) is the predicate. The following is a preview of of the possible arguments for the verb. Refer to Section IV for a more detailed specification of the type of arguments a verb can take.

Arguments of the VP predicate

In order to determine the argument structure of a predicate, we need to know:

(a) The number of arguments of the predicate. The distinction between arguments and non-arguments is that arguments are obligatory but non-arguments are optional (the difference is meaningful only with respect to a sentence, that is whether the omission of a constituent renders the sentence incomplete. However, this is sometimes not straightforward. We should be careful to distinguish a verb that has an adjunct and a verb that has more than one sense, with each sense taking different number of arguments, such as 吃. 饭 cannot be considered an adjunct of 吃 although without it the sentence is still grammatical. A rule of thumb is that post-verbal elements are generally arguments and pre-verbal elements are generally adjuncts in Chinese. We stipulate this to make it simpler for annotators to make judgments). For example,

```
(IP (NP-SBJ (NR 张三))
    (VP (NP-TMP (NT 昨天))
        (VP (VV 打)
            (AS 了)
            (NP-OBJ (NR 李四))))
    (PU .))
```

'张三' and '李四' are arguments because the sentence will be incomplete without either of them. '昨天' is not an argument in this sentence because its presence or absence does not affect the grammaticality of the sentence. (Chinese allows argument-drops, which makes the task of distinguishing arguments from adjuncts even harder.)

(b) A canonical frame in which the arguments are assigned with respect to the predicate. For the purpose of this guideline, we assume the order of

arguments in Chinese in "deep structure" is SVO, that is, in a sentence where the predicate has two arguments, the canonical order is Subject Verb Object. For example, in

```
(IP (NP-SBJ (NR 张三))
    (VP (NP-TMP (NT 昨天))
        (VP (VV 打)
            (AS 了)
            (NP-PN-OBJ (NR 李四))))
    (PU .))
```

'张三' is the subject and '李四' is the object. Although

```
(IP  (NP-TPC-1 (NR 李四))
     (NP-SBJ (NR 张三))
     (VP  (VV 打)
          (AS 了)
          (NP-OBJ (-NONE- *T*-1)))
      (PU .))
```

is a perfectly grammatical sentence in Chinese, we view this as derived from the canonical order SVO. We do not take this as evidence that Chinese is also an OSV language. Notice that the two sentences are related because they have the same underlying thematic structure. In each case ' 张三' is the agent and '李四' is the recipient (or theme). We do not consider '李四 打了 张三 ' a related sentence because the underlying thematic structure has changed. In this sentence '李四' is the agent and '张三' is the recipient. Deriving one structure from another is only meaningful if the two surface structures share the same deep structure that represents the same thematic relations (in a strict technical sense, we should not say deriving one structure from another. Rather they are two surface structures derived from the same abstract deep structure, a level of syntactic representation that encodes thematic relations).

Similarly, in some restricted environments the surface structure SOV is also allowed:

```
(IP (NP-SBJ (NR 张三))
    (VP (NP-FOC-1 (NR 作业))
        (VP (VV 做完)
            (AS 了)
            (NP-OBJ (-NONE- *T*-1))))
 (PU .))
```

In this case 做完 is understood to be the theme and '张三' the agent. The theme in this case does not map onto a postverbal object position as ' 李四' does in '张三 打了 李四 '. Rather it appears in a preverbal position. Instead of saying Chinese is also an SOV language, we take this to be derived from D-structure ' 张三 做 完了 作业'. '作业' is preposed to a preverbal (focus topic) position. In this way we are able to maintain the generalization that Chinese is essentially SVO. This also reflects the native speaker's intuition that the preposed object is

always the focus of the sentence.

To sum up, predication is represented by attaching dash tags to the subject, to the predicate when it is not a verb phrase, and to the arguments (if there is any) of the predicate when it is a verb phrase.

1.1.2 Apposition.

Apposition can only be found within an NP. Structurally it is the juxtaposition of NP-NP or S-NP.

```
(NP (NP-APP (NN 代表团)
            (NN 团长))
    (NP-PN  (NR 张三)))
```

Superficially this looks similar to noun-noun compound in which the first noun modifies the second. However, they are different in that (1) in an appositive relationship, the first NP and the second NP roughly refers to the same entity, whereas this is not the case in a noun-noun compound; (2) the modifying (first) noun in a noun-noun compound cannot project to an NP by taking an adjective modifier and therefore it is a word-level category whereas both head nouns in an appositive structure project into full phrases.

In the case where the appositive is an IP or CP, on the surface the IP-NP or CP-APP is similar to the relative construction. The appositive clause is different from a relative clause in that the latter but not the former has a gap which is related to the NP.

```
(VP (VV 制定)
    (AS 了)
    (NP-OBJ (IP-APP (NP-SBJ (-NONE- *pro*))
                    (VP (VP (VV 引进)
                            (NP-OBJ (NN 外资)))
                        (PU 、)
                        (VP (VV 加强)
                            (NP-OBJ (ADJP (JJ 横向))
                                    (NP (NN 经济)
                                        (NN 联合))))
                        (CC 和)
                        (VP (PP (P 对)
                                (NP (NN 外)))
                            (VP (VV 下放)
                                (NP-OBJ (NN 权))))))
            (QP (CD 三)
                (CLP (M 个)))
            (NP (NN 文件))))
```

```
(NP (CP-APP (IP (IP (NP-SBJ (NP (NN 沿海)
```

```
                                (NN 开放)
                                (NN 城市))
                            (PU 、)
                             (NP (NN 沿海)
                                (NN 经济)
                                (NN 开放区))
                            (PU 、)
                             (NP (NN 边境)
                                (NN 开放)
                                (NN 城镇)))
                      (VP (ADVP (AD 相))
                          (VP (VV 结合))))
                 (PU ， )
                 (IP (NP-SBJ (-NONE- *pro*))
                      (VP (PP-DIR (P 由)
                                (NP (NN 沿海)
                                   (PU 、)
                                   (NN 沿边)
                                   (PU 、)
                                   (NN 沿江)))
                          (PP-DIR (P 向)
                                  (NP (NN 腹地)))
                          (VP (VV 推进)))))
            (DEC 的))
     (DNP (NP (NP (QP (CD 多))
                  (NP (NN 领域)))
              (PU 、)
              (NP (QP (CD 多))
                  (NP (NN 层次))))
          (DEG 的))
    (IP-APP (NP-SBJ (-NONE- *pro*))
            (VP (PP (P 对)
                    (NP (NN 外)))
                (VP (VV 开放))))
     (NP (NN 总体)
        (NN 格局)))))
```

Several things to notice here. (1) Both CP and IP can be appositives of the head NP. Structurally they are non-distinct from other modifiers of the NP and can be viewed as a specific type of a modifier. (2) Although the head noun (NN 格局) does not take a complement it, plus its modifier (NN 总体), projects a layer of NP.

1.1.3 Modification

Modification is represented by attaching dash tags to the adjuncts wherever the type of modification can be clearly identified. This is done mostly at the level of VP and IP where modifiers with dash tags (such as -TMP, -SRC, -DIR) are attached:

(a) At the VP level

```
(IP (NP-SBJ (NR 张三))
    (VP (PP-MNR (VV 经过)
                (NP 努力))
        (VP (VV 做完)
            (AS 了)
            (NP-OBJ (NN 作业)))))
```

(b) At the IP-level

```
(IP (PP-PRP (P 由于)
            (NP (NP (DNP (NP (NN 技术))
                         (DEG 的))
                    (NP (NN 开发)))
                (CC 和)
                (NP (DNP (NP (NN 生产力))
                         (DEG 的))
                    (NP  (NN 提高)))))
    (PU ， )
    (NP-SBJ
         (CP-APP (IP (NP-SBJ (NR 中国))
                     (VP (PP-TMP (P 在)
                                 (LCP (DNP (NP (NT 今后))
                                           (DEG 的))
                                      (LCP (QP (CD 十余)
                                               (CLP (M 年)))
                                           (LC 间))))
                         (VP (VV 继续)
                             (VP (VV 保持)
                                 (NP-OBJ (DNP (QP (CD 百分之八)
                                                  (CC 至)
                                                  (CD 百分之十))
                                              (DEG 的))
                                         (NP (NN 经济)
                                             (NN 增长率)))))))
                 (DEC 的))
            (NP (NN 可能性)))
    (VP (ADVP (AD 很))
        (VP (VA 大))))
```

Structurally modifiers are always adjoined, but adjunction alone does not fully represent modification since appositives, subjects and other specifiers are also adjoined. Modification is represented with non-configurational dash tags on top of adjunction.

1.2 Grammatical relations that are represented configurationally with brackets and categorial labels

1.2.1 Complementation

Complementation is represented as a head-complement relationship. The head and the complement are siblings and attached at the same level and the head is a word-level category while the complements are phrases, which can, of course, have heads and complements of their own. We differentiate the head and the complement by leaving the head unbracketed and unlabeled.

Head-initial complementation

1.2.1.1 Complementation at the VP-level

The term ''complement'' as it is used here refers to:

(a) internal arguments such as NP objects, IP and quoted constituents:

```
  (IP (NP-SBJ (NN 新区)
              (NN 管委会) )
      (VP (VV 出台)
          (AS 了)
          (NP-OBJ (QP (CD 一)
                      (CLP (M 系列)))
                  (NP (NN 法规)))))


(IP (NP-SBJ (NP-PN (NR 美))
            (ADJP (JJ 驻华))
            (NP (NN 大使)))
    (VP (VV 呼吁)
        (IP-OBJ (NP-PN-SBJ (NR 美))
                (VP (VV 采取)
                    (NP-OBJ (NP (NN 建设性))
                            (PP (P 对)
                                (NP-PN (NR 华)))
                            (NP (NN 政策)))))))


(IP (NP-PN-SBJ (NR 李四))
    (VP (VV 说)
        (IP-OBJ (PU ")
                (NP-PN-SBJ (NR 张三))
                (VP (VV 来)
                    (AS 了)))
                (PU ")))
```

了 is construed as a sister of the verb unless it is clearly not, that is, when it is in the sentence-final position and there are intervening elements between the verb (if there is one) and 了.

(b) Modal verbs take VPs as their complements:

```
(IP (NP-PN-SBJ (NR 美国))
    (VP (VV 应该)
        (VP (ADVP (AD 正确))
            (VP (VV 面对)
                (NP-OBJ (DNP (NP-PN (NR 中国))
                             (DEG 的))
                        (NP (NN 崛起)))))))
```

Here we assume that '应该' is a modal verb and takes a VP as its complement.

(c) constituents tagged -IO

```
 (IP (NP-SBJ-1 (NN 新区)
               (NN 管委会) )
     (VP (VV 给)
         (NP-IO (ADJP (JJ 国有))
                (NP (NN 企业)))
         (NP-OBJ (ADJP (JJ 优惠))
                 (NP (NN 政策)))))
```

(d) constituents tagged -EXT

Postverbal elements that are tagged as -EXT. There is less consensus as to whether they are modifiers, complements or predicates so we simply stipulate that they be attached at the same level as other complements. Basically, all post-verbal elements are complements and are attached at the same level as the head.

```
  (VP (VV 利用)
      (NP-OBJ (NN 外资))
      (QP-EXT (CD 一亿)
              (CLP (M 元))))
```

```
  (VP (VV 跑)
      (AS 了)
      (QP-EXT (CD 两)
              (CLP (M 次))))
```

```
  (VP (VV 跑)
      (AS 了)
      (QP-EXT (CD 两个)
              (CLP (M 小时))))
```

1.2.1.2 Complementation at the PP-level

The NP or S complement of a preposition is placed inside the PP.

(a) NP as the complement of a preposition

```
(PP (P 随着)
    (NP (DNP (NP (NN 社会))
             (DEG 的))
        (NP (NN 进步))))
```

(b) LCP as the complement of a preposition

```
(PP-LOC (P 在)
        (LCP (NP (DNP (NP-PN (NR 西门子))
                      (DEG 的))
                 (NP (NP-PN (NR 亚太))
                     (NP (NN 发展)
                         (NN 战略))))
             (LC 中)))
```

(c) IP as the complement of a preposition

```
(PP (P 离)
    (IP (NP-SBJ (NN 奥运会))
        (VP (VV 开幕))))

(PP (P 据)
    (IP (NP-PN-SBJ (NP-PN (NR 广西)
                          (NN 壮族)
                          (NN 自治区))
                   (NP (NN 交通)
                       (NN 部门)))
        (VP (VV 透露))))
```

Head-final complementation

1.2.1.3 Complementation at the LCP-level

Due to the lack of consensus as to the categorial status of phrases headed by localizers, we refrain from making the choice between NP and PP and simply name them LCPs. LCPs are formed by localizers taking preceding NPs or IPs as their complements:

(a) NP as the complement of an LC

```
(IP (NP-SBJ (NR 中国))
    (VP (PP-LOC (P 在)
                (LCP (NP (DNP (NP-PN (NR 西门子))
                              (DEG 的))
                         (NP (NP-PN (NR 亚太))
                             (NP (NN 发展)
                                 (NN 战略))))
                     (LC 中)))
        (VP (VV 处于)
          (NP-OBJ (ADJP (JJ 重要))
                  (NP (NN 地位))))))
```

In the above example, the (NP (NR 西门子) (DEG 的) (NR 亚太) (NN 发展) (NN 战略)) is viewed as the complement to the highly abstract localizer (LC 中).

(b) IP as the complement of an LC

```
(PP (P 在)
    (LCP (IP (NP-PN-SBJ 朱榕基)
             (VP (VV 接受)
                 (NP-OBJ (NN 记者)
                         (NN 采访))
        (LC 时)))))
```

In the above example, the head is still the localizer, but the complement is an IP. The IP adds to the content of the head noun.

1.2.1.4 Complementation at the CP-level

We identify three different types of complementizers: (DEC 的) as used in relative clauses, and sentence particles (including 的话, but excluding 了):

```
(IP (CP-CND (ADVP (CS 如果))
            (CP (IP (NP-SBJ (DNP (LCP (NP (NN 传说))
                                      (LC 中))
                                 (DEG 的))
                            (NP (PU “) (NN 西天) (PU ” )))
                     (VP (VC 是)
                         (NP-PRD (CLP (M 个))
                                 (NP (PU “) (NN 极乐世界) (PU ” )))))
                (SP 的话))
    (ADVP (AD 那么))
    (NP-PN-SBJ (NR 文部)
               (NN 草原))
    (VP (VV 应当)
        (VP (VV 称为)
            (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
```

```
                    (CP (IP (NP-SBJ (NP (NN 当代))
                                    (NP (NR 藏族))
                                    (NP (NN 牧民)))
                            (VP (PP-LOC (-NONE- *T*-1))
                                (VP (VV 过上)
                                    (NP-OBJ (NP (NN 社会主义))
                                            (ADJP (JJ 新))
                                            (NP (NN 生活))))))
                        (DEC 的)))
          (NP (PU “) (NN 乐园) (PU ”)))))))
```

Note that (1) when (SP 的话) occurs with (CS 如果), (SP 的话) is identified as the head of the CP while (CS 如果) projects an ADVP that is adjoined to the CP. (ADVP (CS 如果)) is treated as an operator at the SPEC position of the CP on a par with relative operators in relative clauses. We do not posit a null counterpart of (ADVP (CS 如果)) when it is absent, however. (2) Similarly (DEC 的) is treated as a complementizer heading a CP and the relative operator is adjoined to the CP.

Yet another type of complementizer is sentence-final particles. The SP takes the preceding IP as its complement:

```
(CP (IP (NP-SBJ (DT 这)
                (NN 车子))
        (VP (ADVP (AD 怎么))
            (ADVP (AD 直))
            (ADVP (AD 往下))
            (VP (VV 走))))
    (SP 呢)
    (PU ？ ))
```

We attach (SP 了) to the IP, as sisters of the VP and the subject:

```
  (IP (NP-SBJ (NN 车子))
      (VP (ADVP (AD 已经))
          (VP (VC 悬)
              (PP-LOC (P 在)
                      (LCP (NP (NN 山腰))
                           (LC 间)))))
      (SP 了)
      (PU ！ ))
```

For the sake of uniformity, it is desirable to posit a null complementizer in its place when the complementizer is missing; however, doing so means most of the sentences in this corpus would have a null complementizer and will add extra burden for annotators. Therefore, we will use the following "shorthand" in the absence of complementizers:

(a) When there is some kind of operator at the Spec position while there is no

complementizer, the CP is bracketed as

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (IP (NP-SBJ 外商)
            (VP (VV 投资)
                (NP-OBJ (-NONE- *T*-1)))))
    (NP 企业))
```

(b) When there is neither an operator nor a head, the CP is NOT projected at all:

```
(IP (NP-SBJ (NN 内地)
            (NN 经济))
    (VP (ADVP (AD 长期))
        (DVP (VP (VA 稳定))
             (DEV 地))
        (VP (VV 增长))))
```

Note: In both cases the IP can be expanded automatically to a CP by attaching a null complementizer:

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ 外商)
                (VP 投资
                    (NP-OBJ (-NONE- *T*-1)))))
            (-NONE- *C*))
    (NP 企业))


(CP (IP (NP-SBJ (NN 内地)
                (NN 经济))
        (VP (ADVP (AD 长期))
            (DVP (VP (VA 稳定))
                 (DEV 地))
            (VP (VV 增长))))
    (-NONE- *C*))
```

1.2.1.5 Complementation at DNP level

DNP is headed by (DEG 的). Its complements are to its left and they can be NP, PP, LCP, QP, or ADJP. DNPs are adjoined to NP as modifiers of NPs.

NPs as complements:

```
 (VP (VV 促进)
     (AS 了)
     (NP-OBJ (DNP (NP (DP (DT 全))
                      (NP (NN 国)))
                  (DEG 的))
             (NP  (NN 政治)
                  (NN 稳定)
```

```
                    (CC 和)
                   (NN 社会)
                  (NN 稳定)))))))
```

PPs as complements:

```
  (PP (P 向)
      (NP (DNP (PP (P 在)
                   (NP-PN (NR 美国)))
               (DEG 的))
           (NP (NN 华侨)
              (PU 、)
              (NN 华人))))
```

LCPs as complements:

```
   (NP (DNP (LCP (NP (QP (CD 两))
                     (NP (NN 国)))
                  (LC 间))
             (DEG 的))
       (NP (ADJP (JJ 正常))
           (NP (NN 来往))))
```

QPs as complements:

```
   (NP (DNP (QP (ADJP (JJ 零下))
                (QP (CD ２０多) (M 摄氏度)))
             (DEG 的))
       (NP (NN 严寒)))
```

ADJPs as complements:

```
 (NP  (DNP (ADJP (JJ 原来))
           (DEG 的))
      (ADJP (JJ 反法西斯))
      (NP (NN 联盟)))
```

1.2.1.6 Complementation at the DVP level

A DVP is headed by (DEV 地) and its complement can be either a VP, an NP or an IP. DVPs are adjoined to VPs as modifiers:

VP complements:

```
  (VP (DVP (VP (VA 感慨))
           (DEV 地))
      (VP (VV 说)))
```

NP complements:

```
(VP  (DVP (NP (ADJP (JJ 大))
              (NP (NN 声)))
          (DEV 地))
     (VP (VV 说)))
```

IP complements:

```
(VP (DVP (IP  (NP-SBJ (NN 心情))
              (VP (VA 沮丧)))
         (DEV 地))
    (VP (VV 说)))
```

1.2.2 Adjunction

Phrases that are not complements are adjoined to the constituents formed by the head and its complements. Functionally the adjuncts can either be modifiers or specifiers (in the sense of the X-bar theory). This functional distinction is marked by dash tags. The modifier-modified relationship is represented as juxtaposition of two or more phrases with the modifying phrase bearing the functional labels indicating the type of modifier (unless the syntactic category speaks for itself). Exemplary specifiers are the subject (marked by -SBJ) at the IP level, the operators at the CP (such as the relative operators, adverbial phrases projected CS). In Chinese, adjuncts generally occur to the left of the modified:

1.2.2.1 Adjuncts of CPs

Specifiers:

```
(IP (CP-ADV (ADVP (CS 虽然))
            (IP (NP-SBJ (NP-PN (NR 美国))
                        (CC 和)
                        (NP-PN (NN 世界)
                               (NN 银行)))
                (VP (NP-TMP (NT 目前))
                    (PP (P 对)
                        (NP (DNP (NP-PN (NR 巴勒斯坦))
                                 (DEG 的))
                            (NP (NN 会计)
                                (NN 工作))))
                    (ADVP (AD 不))
                    (ADVP (AD 完全))
                    (VP (VA 满意)))))
    (PU ， )
    (ADVP (AD 但))
    (NP-SBJ (-NONE- *pro*))
    (VP (ADVP (AD 还是))
```

```
        (VP  (VV 同意)
             (IP-OBJ (NP-SBJ (-NONE- *pro*))
                     (VP (ADVP (AD 尽快))
                         (VP (VV 支付)
                             (NP-OBJ (NP (QP (CD 一))
                                         (NP (NN 部分)))
                                     (NP (NN 款项))))))))
```

```
 (IP (CP-PRP (ADVP (AD 仅仅) (CS 因为))
             (IP (NP-PN-SBJ (NR 张三))
                 (VP  (VV 没有)
                      (VP (VV 来)))))
     (NP-SBJ (VV 会))
     (VP (ADVP (AD 就))
         (VP (VV 没有)
             (VP (VV 开)))))
```

However, if the ADVP projected by CS occurs after the subject or topic, the ADVP is adjoined at the VP-level:

```
(IP (IP-ADV (NP-TMP (NT 现在))
            (PU ， )
            (NP-SBJ (NN 热战)
                    (CC 和)
                    (NN 冷战))
            (VP (ADVP (CS 虽))
                (ADVP (AD 已))
                (VP (VV 成为)
                    (NP-OBJ (NT 过去)))))
     (PU ， )
     (ADVP (AD 但))
     (NP-SBJ (NN 动荡)
             (CC 和)
             (NN 冲突))
     (VP (ADVP (AD 仍))
         (VP (VV 看不到)
             (NP-OBJ (NN 尽头))))
     (PU 。))
```

1.2.2.2 Adjuncts of IPs

The following are adjuncts to IPs: pre-subject PP, pre-subject temporal elements (usually headed by NTs), pre-subject adverbial clauses, fronted constituents (such as topic), and subjects.

Modifiers:

(a) Pre-subject PPs and temporal elements:

```
(IP (PP (PP 据)
        (NP (NN 介绍)))
    (NP-TMP (NT 去年))
    (NP-SBJ (NN 国民)
            (NN 经济)
            (NN 生产)
            (NN 总值))
    (VP  (VV 增长)
         (NP-EXT (QP (CD 8)
                     (CLP (M 个)))
                 (NP 百分点)))
    (PU .))
```

(b) Fronted topics are adjoined to the IP and they are co-indexed with the trace at the extraction site if some kind of movement is involved. If the topic is base-generated, there is no co-indexation, although the topic in Chinese often has a part-whole, or superset-subset relationship with an element down below in the sentence:

```
(IP (NP-PN-TPC-1  (NR 李四))
    (NP-SBJ (NR 张三))
    (VP (VV 喜欢)
        (NP-OBJ (-NONE- *T*-1)))
    (PU .))
```

```
(IP (NP-TPC (NN 水果))
    (NP-PN-SBJ (NR 张三))
    (VP (VV 喜欢)
        (NP-OBJ (NN 苹果)))
    (PU .))
```

```
(IP (IP-TPC (NP-PN-SBJ (NR 广西))
            (VP (PP (P 对)
                    (NP (NN 外)))
                (VP (VV 开放))))
    (NP-SBJ (NN 成绩))
    (VP (VV 斐然)))
```

(c) Pre-subject subordinating clause is adjoined to the IP:

```
(IP (CP-ADV (ADVP (CS 尽管))
            (IP (NP-SBJ (DP (DT 有些))
                        (NP (NN 法规)))
```

```
                (VP (ADVP (AD 还))
                    (ADVP (AD 比较))
                    (VP (VA 粗糙)))))
    (ADVP (AD 但))
    (NP-SBJ (DP (DT 这)
                (CLP (M 种)))
            (NP (NN 办法)))
    (VP (ADVP (AD 很))
        (VP (VA 有效)))
    (PU .))
```

Specifiers:

(d) The subject NP is adjoined to the IP:

```
 (IP (NP-TMP (NT 去年))
     (NP-SBJ (NP-PN (NR 中国))
             (NP (NN 国民)
                 (NN 经济)
                 (NN 总产值)))
     (VP (VV 增长)
         (QP-EXT (CD 百分之七点八))))
```

1.2.2.3 Adjuncts of NPs

Modifiers:

(a) ADJP

```
(NP (ADJP (JJ 大型))
    (NP (NN 项目)))
```

(b) QP

```
 (NP (QP (CD 十亿)
         (CLP (M 美元)))
     (NP (NN 贷款)))
```

(c) NP

```
 (NP-SBJ (NP-PN (NR 广州))
         (ADJP (JJ 私营))
         (NP (NN 经济)))
```

(d) DNP

```
(NP (DNP (QP (ADJP (JJ 零下))
```

```
            (QP (CD ２０多)
                (CLP (M 摄氏度))) )
        (DEG 的))
    (NP (NN 严寒)))
```

(e) DP

```
(NP (DP (DT 这)
        (CLP (M 个)))
    (NP (NN 岛国)))
```

(f) CP as relative clauses

```
(NP (CP (WHNP-2 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-2))
                (VP (ADVP (AD 最))
                    (VP (VA 大))))
            (DEC 的))
    (NP (NN 城市))))
```

Appositives:

(g) CP as appositive clauses

```
(NP (CP-APP (IP (NP-SBJ (NN 沿海)
                        (NN 地区))
                (VP (VV 建设)
                    (NP-OBJ (DP (DT 同)
                                (CLP (M 类)))
                                (NP (NN 电厂)))))
            (DEC 的))
    (NP (NN 样板)))
```

(h) NP as appositives

```
(NP (NP-APP (NP-PN (NR 中宣部))
            (NP (NN 部长)))
    (NP-PN (NR 王忍之)))
```

(i) IP as appositive clauses

```
(PP (PP 对)
    (NP (DP (DT 这)
            (CLP (M 次)))
        (IP-APP (NP-SBJ (NN 彗星))
                (VP (VV 撞击)
                    (NP-OBJ-PN (NR 木星))))
        (NP (NN 现象))))
```

1.2.2.4 Adjuncts of VPs

Modifiers:

Almost all elements (adverbial phrases, quantifier phrases that modify verbs, pre-verbal object NPs) that follow the subject but precede the verb are Adjoined to the VP.

(a) Adverbial phrases

```
(IP (NP-SBJ (PN 他们))
    (VP (ADVP (AD 常常))
        (VP (VV 到)
            (NP-OBJ (NN 公园))))
```

(b) Preverbal DPs or QPs

```
  (IP (NP-SBJ (NN 工厂) )
      (VP (DP-ADV (DT 每)
                  (CLP (M 年)))
          (VP (VV 创)
              (NP-OBJ (NN 产值)))
              (QP-EXT (CD 5亿)
                      (CLP (M 元)))))
```

Note that preverbal QPs are adjoined to VP but postverbal QPs are considered to be complements and are sisters of the verb head.

(c) Fronted object NPs are adjoined to VP and receives the functional tag -FOC.

```
  (IP (NP-PN-SBJ (NR 张三) )
      (VP (NP-FOC-1  (NN 作业))
          (VP (VV 完成)
              (AS 了)
               (NP-OBJ (-NONE- *T*-1)))))
```

Note that the preposed NP does not receive the functional tag -OBJ, rather it receives the functional tag -FOC.

(d) DVP

```
  (IP (NP-SBJ (NR 张三))
      (VP (DVP (VP (VA 迅速))
               (DEV 地))
          (VP (VV 做完)
              (AS 了)
              (NP-OBJ 作业))))
```

(e) PP

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (PP-MNR (P 经过)
                (NP (NN 努力)))
        (VP (VV 做完)
            (AS 了)
            (NP-OBJ 作业))))
```

1.2.2.5 Adjuncts of PPs

Modifiers:

```
(PP (ADVP (AD 仅))
    (PP (P 在)
        (NP (NT 一九九九年)))
```

1.2.2.6 Adjuncts of QPs

Modifiers:

```
(QP (ADVP (AD 大概))
    (QP (CD 六百)
        (CLP (M 个))))
```

1.2.2.7 Adjuncts of CLPs

```
(VP (VV 达到)
    (QP-OBJ (CD １０７亿)
            (CLP (NP-PN (NR 芬兰))
                 (CLP (M 马克)))))
```

```
(NP (QP (CD 三)
        (CLP (ADJP (JJ 大))
             (CLP (M 杯))))
    (NP (NN 水)))
```

1.2.2.8 Adjuncts of ADJPs

Modifiers:

```
(ADJP (ADVP (AD 极为))
      (ADJP (JJ 重要)))
```

```
(ADJP (NP (NP-PN (NR 中国))
          (NP (NN 北方)))
      (ADJP (JJ 最大)))
```

1.2.3. Coordination

Coordination is yet another way phrases can be combined. Coordination generally occur between phrases of the same syntactic categories, but there are exceptions. Coordination is represented as phrases glued together by coordinating conjunctions or punctuations. A more detailed policy is given in Section VII.

1.2.3.1 Word level coordination

Single words are assumed to coordinate at word level rather than projecting their own phrases, and only the highest level is represented. This happens:

(a) when two bare (meaning without modifiers) nouns are coordinated

```
(IP (NP-SBJ (NN 改革)
            (CC 和)
            (NN 开放))
    (VP (NP-TMP (NT 同时))
        (VP (VV 进行))))
```

If (ETC 等) occurs, it is treated as the final conjunct of the coordinate structure.

```
(NP (NP-APP (NR 北京)
            (PU ,)
            (NR 天津)
            (PU ,)
            (NR 上海)
            (ETC 等))
    (NP 地))
```

(b) when two or more intransitive verbs are coordinated

```
(VP (CC 又)
    (VA 高兴)
    (CC 又)
    (VV 担心))
```

(c) when two bare QPs are coordinated

```
(QP (CD 百分之五)
    (CC 或)
    (CD 百分之六))
```

1.2.3.2 Phrasal coordination

Coordination of phrases is represented in the annotation at the lowest level possible. The addition of adjuncts or complements generally forces a higher level of coordination:

```
 (NP (NP-PN (NR 广东省))
     (NP (NP (NN 农副产品))
         (CC 及)
          (NP (NP (PN 其))
             (NP (NN 加工品))))
     (NP (NN 出口额)))
```

```
  (NP (NP-APP (NP (NP-PN (NR 荷兰))
                  (NP (NN 郁金香)))
              (PU 、)
              (NP (NP-PN (NR 比利时))
                  (NP (NN 杜鹃)))
              (ETC 等))
      (NP (NN 西洋))
      (ADJP (JJ 娇))
      (NP (NN 花)))
```

```
(VP (VP (ADVP (AD 积极))
        (VP (VV 引进)
            (NP-OBJ (-NONE- *RNR*-1))) )
    (PU ， )
    (VP (ADVP (AD 精心))
        (VP (VV 种养)
            (NP-OBJ-1 (ADJP (JJ 优稀))
                      (ADJP (JJ 名贵))
                      (NP (NN 品种)))))
```

When clauses are coordinated, the level of coordination has the same label as the coordinated clauses.

```
  (IP (IP (NP-SBJ (NR 张三))
          (VP (VV 喜欢)
             (NP-OBJ (NR 李四))))
```

```
(CC 但)
(IP (NP-PN-SBJ (NR 王五))
    (VP (ADVP (ADV 不))
        (VP (VV 喜欢)
            (NP-OBJ (PN 他))))))
```

Clauses can be conjoined with punctuations (e.g. commas, semicolons, and 顿号):

```
(IP (NP-SBJ (DP (DT 这)
                (CLP (M 份)))
            (NP (NN 报告)))
    (VP (VV 预测)
        (PU ， )
        (IP-OBJ  (PP-TMP (P 到)
                         (NP (NT ２０１０年)))
                 (PU ， )
                 (IP (IP (NP-SBJ  (CP (WHNP-1 (-NONE- *OP*))
                                      (CP (IP (NP-SBJ (NP-PN (NR 中国))
                                                      (NP (NN 经济)))
                                              (VP (PP-LOC (P 在)
                                                          (LCP (NP (NN 世界)
                                                                   (NN 经济))
                                                               (LC 中)))
                                                  (VP (MSP 所)
                                                      (VP (VV 占)
                                                          (NP-OBJ (-NONE- *T*-1))))))

                                          (DEC 的)))
                                     (NP (NN 比率)))
                             (VP (ADVP (AD 将))
                                 (PP-DIR (P 由)
                                         (QP (DNP (NP (NT 目前))
                                                  (DEG 的))
                                             (QP (CD 百分之二点五))))
                                 (VP (VRD (VV 上升)
                                          (VV 到))
                                     (QP-OBJ (CD 百分之五)
                                             (CC 或)
                                             (CD 百分之六))))))
                 (PU ； )
                 (IP (NP-SBJ (CP (WHNP-2 (-NONE- *OP*))
                                 (CP (IP (NP-SBJ (NP-PN (NR 中国))
                                                 (NP (NN 出口)))
                                         (VP (PP-LOC (P 在)
                                                     (LCP (NP (NP (NN 世界))
                                                              (ADJP (JJ 总))
                                                              (NP (NN 出口)))
                                                          (LC 中)))
```

```
                                                (VP (MSP 所)
                                                  (VP (VV 占)
                                                      (NP-OBJ (-NONE- *T*-2))))))
                                        (DEC 的)))
                                  (NP (NN 比率)))
                          (VP (ADVP (AD 也))
                              (ADVP (AD 将))
                              (PP-SRC (P 由)
                                      (QP (DNP (NP (NT 目前))
                                              (DEG 的))
                                          (QP (CD 百分之三))))
                              (VP (VRD (VV 扩大)
                                      (VV 到))
                                  (QP-OBJ (CD 百分之十)))))))
        (PU 。))
```

1.3 Schematic representation of the six grammatical relations

1.3.1 Structural(configurational) relations

Wherever possible, we will try to make the grammatical relations uniform within the same bracket. We try to follow a one-grammatical-relation-per-bracket rule, except at the CP and IP levels where we use a 'short-hand' for the convenience of annotation. If necessary, such 'short-hand' can be easily converted to the stringent one-grammatical-relation-per-bracket format.
Our structural descriptions are unique in that no two grammatical relations are represented in exactly the same manner.

Complementation:

head-initial:

```
(XP X
    (YP)
    (ZP)
     ...)
```

head-final:

```
(XP (YP)
    (ZP)
     ...
    X)
```

Adjunction:

Adjuncts are adjoined to the left:

```
(XP (YP)
    (ZP)
    ...
    (XP))
```

Coordination:

```
(XP  {CONJ}
     (XP)
     {CONJ}
     (XP)
     ...)
```

1.3.2 Nonconfigurational relations

```
Modification: (XP (YP-i ...)
                  (XP))
```

with i belonging to the set {-TPC, -TMP, -LOC, -DIR, ...}

```
Apposition   (NP (XP-APP ...)
                 (NP ...))

Predication  (IP  (XP-SBJ)
                  (YP))
```

2 Clause types

We distinguish a number of basic clause types: IP, CP, IP-Q, CP-Q, IP-IMP. Types of clauses are represented with a combination of bracket labels and dash tags. Two bracket labels, CP and IP, are used to represent clausal categories. They are used in conjunction with two dash tags, -Q and -IMP, to indicate respectively questions and imperatives.

2.1 IP

IP is the root (in the bracketed structure) of the following types of clauses:

(a) Simple declarative sentences:

```
  (IP (NP-SBJ (NN 新区)
              (NN 管委会))
      (VP (VV 出台)
```

```
        (AS 了)
        (NP-OBJ (QP (CD 一)
                    (CLP (M 系列)))
                (NP (NN 法规) )))
    (PU .))
```

Note that no dash tag is used on IP.

(b) Passives :

We tentatively decide that the 被-construction is not the same as the English be-passive. See the section on 被-construction for more details. However we do assume limited zero passive morphology on some verbs in Chinese, as is in the 把-construction.

```
  (IP (NP-PN-SBJ (NR 张三))
      (VP (BA 把)
        (IP-OBJ (NP-PN-SBJ-1 (NR 李四))
                (VP (VV 打)
                    (AS 了)
                    (NP-OBJ-1 (-NONE- *-1))))))
```

Here we assume that 打 has a zero passive morpheme. No dash tag is used in this case. The other case where we assume passivization is when the preposition (P 由) introduces a logical subject.

```
(IP (NP-SBJ-1 (NP (NP-TTL-APP (PU 《)
                              (ADJP (JJ 新))
                              (NP-PN (NR 中东))
                              (PU 》))
                  (NP (QP (CD 一))
                      (NP (NN 书))))
              (NP (NN 中文版)))
    (VP (NP-TMP (NT 近日))
        (ADVP (AD 已))
        (PP-LGS (P 由)
                (NP-PN (NP-PN (NR 新华))
                       (NP (NN 出版社))))
        (VP (VCD (VV 出版)
                 (VV 发行))
            (NP (-NONE- *-1))))
    (PU 。))
```

(c) Infinitives:

In Chinese, there is no conclusive morphological evidence that motivates the postulation of infinitive clauses. However, it is generally assumed in the literature that verbs such as 打算 and 让 takes infinitive clauses as complements.

When the infinitive is a VP complement, the null subject of the infinitive (marked as (-NONE- *PRO*)) is coindexed as usual with its logical subject. For subject-control (object-control, resp.), the (-NONE- *PRO*) is coindexed with the subject(object, respectively) of the matrix clause. For arbitrary control, no coindexation is used.

```
(IP (NP-PN-SBJ-1 (NR 张三) )
    (VP (VV 打算)
        (IP-OBJ (NP-SBJ (-NONE- *PRO*-1))
                (VP (VV 去)
                    (NP-PN-OBJ (NR 美国))))))
```

```
(IP (NP-PN-SBJ  (NR 张三))
    (VP (VV 让)
        (NP-PN-OBJ-1 (NR 李四))
        (IP (NP-SBJ (-NONE- *PRO*-1))
            (VP (VV 打)
               (NP-PN-OBJ (NR 王五))))))
```

(d) Adverbial clauses without CS in the initial position is treated as an IP:

```
(IP (NP-TMP (NT 现在))
    (PU ， )
    (IP-ADV (NP-SBJ (NN 热战)
                    (CC 和)
                    (NN 冷战))
            (VP (ADVP (CS 虽))
                (ADVP (AD 已))
                (VP (VV 成为)
                    (NP-OBJ (NT 过去)))))
    (PU ， )
    (ADVP (AD 但))
    (NP-SBJ (NN 动荡)
            (CC 和)
            (NN 冲突))
    (VP (ADVP (AD 仍))
        (VP (VV 看不到)
            (NP-OBJ (NN 尽头)))
    (PU 。))
```

Note that no dash tag is used on the root IP in this case.

2.2 CP

CP is used for subordinating clauses such as relative clauses and root questions. There are three cases where CP is necessary: relative clauses, subordinating clauses with an initial ADVP projected by CS, and questions with question particles.

```
(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-SBJ (PN 我们))
                        (VP (VV 乘坐)
                            (NP-OBJ (-NONE- *T*-1))))
                    (DEC 的)))
            (NP (NP (NN 旅游))
                (ADJP (JJ 大))
                (NP (NN 轿车))))
    (VP (ADVP (AD 径))
        (PP-DIR (P 向)
                (NP (NP-PN (NR 富士山))
                    (NP (NN 方向))))
        (VP (VV 疾驶))))
```

Some relative clauses do not have an overt complementizer 的. We treat them as CPs for the sake of consistency. Notice, however, we do not have an empty category in the place of 的.

```
  (IP (NP-SBJ  (CP (WHNP-1 (-NONE- *OP*))
                   (IP (NP-SBJ (-NONE- *T*-1))
                       (VP (VV 清除)
                           (NP-OBJ (ADJP (JJ 不法))
                                   (NP (NN 分子))))))
              (NP (NN 办法)))
      (VP (VV 出台))))
```

Adverbial clauses with an initial ADVP projected by CS, such as 如果, are also treated as CP:

```
( (IP (CP-CND (ADVP (CS 尽管))
              (IP (NP-SBJ (DNP (NP (NN 房改))
                               (DEG 的))
                          (NP (NN 步伐)))
                  (VP (ADVP (AD 在))
                      (VP (VV 加快)))))
      (PU ， )
      (ADVP (AD 但))
      (NP-SBJ (CP-APP (IP (NP-SBJ (-NONE- *pro*))
                          (VP (NP-ADV (NN 福利))
                              (VP (VV 分)
```

```
                                    (NP-OBJ (NN 房)))))
                        (DEC 的))
                (ADJP (JJ 老))
                (NP (NN 办法)))
        (VP (ADVP (AD 仍))
            (ADVP (AD 未))
            (VP (VV 突破)))
        (PU 。)) )
```

2.3 IP-IMP

Imperatives are labeled IP and are given a null subject (NP-SBJ (-NONE- *pro*)).

```
  (IP-IMP (NP-SBJ (-NONE- *pro*))
          (VP (VV 开)
              (NP-OBJ (NN 门)))
          (PU !))
```

If the name of the addressee appears with the imperative (at either the beginning or end), it is tagged -VOC (vocative) . The vocative is NOT coindexed with the null surface subject.

```
  (IP-IMP (NP-VOC (NN 弟兄们))
          (PU ,)
          (NP-SBJ (-NONE- *pro*))
          (VP (VV 开)
              (NP-OBJ (NN 门)))
          (PU !))
```

```
  (IP-IMP (NP-SBJ (-NONE- *pro*))
          (VP (VV 开)
              (NP-OBJ (NN 门)))
          (PU ,)
          (NP-VOC (NN 弟兄们))
          (PU .))
```

2.4 IP-Q

Questions without question particles, such as 吗, 呢, 嘛 etc., are represented as IP-Q:

(a) A-not-A questions:

```
(IP-Q (NP-SBJ (PN 这))
      (VP (VNV (VC 是)
               (AD 不)
               (VC 是))
          (NP-PN-PRD (NR 天津)))
      (PU ?))
```

(b) alternative questions:

```
(IP-Q (NP-SBJ (PN 你))
      (VP (VP (VV 来))
          (CC 还是)
          (VP (ADVP (AD 不))
              (VP (VV 来))))
      (PU ?))
```

(c) wh-questions:

```
(IP-Q (NP-SBJ (PN 你))
      (VP (VV 做)
          (AS 了)
          (NP-OBJ-WH 什么))
      (PU ?))
```

Notice that the question phrase 什么 is assigned the function tag -WH.

2.5 CP-Q

Questions with question particles, such as 吗, 呢, and 嘛, however, are represented as CP-Q. In Chinese, there is no overt wh-movement nor subject-verb inversion for questions. The following is a list of different types of questions:

(a) yes-no questions with sentence-final particles:

We attach SP at the CP level, e.g.

```
(CP-Q (IP (NP-SBJ (PN 这))
          (VP (VC 是)
              (NP-PRD (NR 天津))))
      (SP 吗)
      (PU ?))
```

(b) VP-not: this type has been argued to be a special case of (a)
Currently we treat it the same way as (a).

```
(CP-Q (IP (NP-SBJ (PN 他))
          (VP (VV 来)
              (AS 了)))
      (SP 没有)
      (PU ?))
```

2.6 Clause combinations

Clauses can be combined via coordination or subordination.

2.6.1 Coordination

Clauses can be conjoined at the IP level with or without an overt coordinating conjunction.

(a) IPs conjoined with coordinating conjunctions:

```
(IP (IP (NP-SBJ (NP-PN (NR 英国))
                (NP (NN 政府)))
        (VP (VV 决定)
            (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                    (VP (BA 将)
                        (IP-OBJ (NP-SBJ (NP (PN 其))
                                        (PP (P 对)
                                            (NP (NP-PN (NR 马岛))
                                                (NP (NN 附近)
                                                    (NN 水域))))
                                        (NP (NN 管辖权)))
                                (VP (PP-DIR (P 由)
                                            (QP (CD １５０)
                                                (M 海里)))
                                    (VP (VRD (VV 扩大)
                                             (VV 到))
                                        (QP-OBJ (CD ２００)
                                                (M 海里)))))))))
    (PU ，)
    (CC 但)
    (IP (NP-SBJ (-NONE- *pro*))
        (VP (VV 遭到)
            (IP-OBJ (NP-SBJ (NN 阿方))
                    (VP (VV 反对)))))
    (PU 。))
```

(b) IPs conjoined without coordination conjunctions:

```
(IP (IP (NP-SBJ (ADJP (JJ 从业))
                (NP (NN 人员)))
         (VP (NP-PRD (QP (CD 九万七千九百六十三))
                     (NP (NN 人)))))
    (PU ， )
    (IP (NP-SBJ (NP (ADJP (JJ 私营))
                    (NP (NN 企业)))
                (NP (ADJP (JJ 注册))
                    (NP (NN 资金))))
        (VP (QP-PRD (CD 三十亿零八千多万)
                  (CLP (M 元)))))
    (PU ， )
    (IP (NP-SBJ (-NONE- *pro*))
        (VP (ADVP (AD 分别))
            (PP (P 比)
                (NP (NT 去年)
                    (NN 同期)))
            (VP (VV 增长)
               (QP-EXT (CD 一成)
                       (CC 至)
                       (CD 两成)))))
    (PU 。))
```

2.6.2 Subordination

Subordination is the use of one clause (subordinating clause, either IP or CP) within another (superordinate clause, either IP or CP) via complementation or adjunction. A detailed policy is described in Section VIII.

(a) Complementation

Complements of verbs:

```
(IP (NP-SBJ (PN 这))
    (VP (VV 意味)
        (AS 着)
        (IP-OBJ (NP-SBJ (NN 经济)
                        (NN 运行)
                        (NN 总体)
                        (NN 态势))
                (VP (ADVP (AD 将))
                    (VP (VV 保持)
                        (NP-OBJ (DNP (NP (PU “)
                                         (NP (ADJP (JJ 高))
                                             (NP (NN 增长)))
                                       (PU 、)
                                         (NP (ADJP (JJ 低))
                                             (NP (NN 通胀)))
                                         (PU ”))
                                     (DEG 的))
                                  (ADJP (JJ 良好))
```

```
                                    (NP (NN 格局)))))))
     (PU 。))
```

Complements of prepositions:

```
(IP (PP (P 随着)
        (IP (NP-SBJ (NN 经营)
                    (NN 规模))
            (VP (ADVP (AD 不断))
                (VP (VV 扩大)))))
    (PU ， )
    (NP-SBJ (NN 经济)
            (NN 效益))
    (VP (ADVP (AD 明显))
        (VP (VV 提高)))
    (PU 。))
```

Complements of localizers:

```
(LCP (IP (NP-SBJ (QP (CD 两)
                     (CLP (M 岸)))
                 (NP (NN 同胞)))
         (VP (VCD (VV 交往)
                  (VV 交流))))
    (LC 中))
```

(b) adjunction

Adjuncts of NPs:

(i) Relative clauses

```
    (IP (NP-PN-SBJ (NR 中国)
                   (NN 共产党))
        (VP (VC 是)
            (NP-PRD (CP (WHNP-1 (-NONE- *OP*))
                        (CP (IP (NP-SBJ (-NONE- *T*-1))
                                (VP (VV 坚持)
                                    (NP-OBJ (NN 实事求是)
                                            (NN 原则))))
                            (DEC 的)))
                    (NP (NN 党)))))
```

(ii) Appositive clauses

```
(PP (P 在)
    (LCP (NP (CP-APP (IP (NP-SBJ (DP (DT 全))
                                 (NP (NN 省)))
```

```
                    (VP (ADVP (AD 尚))
                        (VP (VE 有)
                            (IP-OBJ (NP-SBJ (QP (CD 四十多)
                                                (CLP (M 个)))
                                            (NP (NN 贫困县)))
                                    (VP (VV 接受)
                                        (NP-OBJ (NN 政府)
                                                (NN 财政)
                                                (NN 补助))))))
                 (DEC 的)))
            (NP (NN 情况)))
        (LC 下)))
```

Adjuncts of IPs/VPs:

Conditional, temporal, and other such adverbial clauses are attached under either IP or VP, depending on whether they precede or follow the subject of the main clause, and given the appropriate adverbial function tag.

(i) CP

If the adverbial phrase projected by CS appears before the subject of the subordinate clause, the adverbial phrase is treated as the specifier of the CP and the whole subordinate clause is treated as a CP. We adopt the working assumption that the ADVP projected by CS is an operator of some kind that either occurs at the Spec of CP position or inside the IP.

```
(IP (CP-ADV (ADVP (CS 尽管))
            (IP (NP-PN-SBJ (NR 中国))
                (VP (NP-TMP (NT 目前))
                    (VP (VV 属于)
                        (NP-OBJ (NP (ADJP (JJ 低))
                                    (NP (NN 感染)))
                                (NP (NN 地区)))))))
    (PU ， )
    (ADVP (AD 但))
    (NP-SBJ (NN 危险))
    (VP (ADVP (AD 确实))
        (VP (VV 存在)))
    (PU 。))
```

(ii) IP

When the CS occurs in a post-subject position, the subordinate clause is treated as an IP:

```
(IP (IP-ADV (NP-PN-SBJ (NR 中国))
            (VP (ADVP (CS 尽管))
               (NP-TMP (NT 目前))
                (VP (VV 属于)
```

```
                    (NP-OBJ (NP (ADJP (JJ 低))
                                (NP (NN 感染)))
                            (NP (NN 地区))))))
    (PU ， )
    (ADVP (AD 但))
    (NP-SBJ (NN 危险))
    (VP (ADVP (AD 确实))
        (VP (VV 存在)))
    (PU 。))
```

2.7 Fronted elements

Fronted elements are those dislocated from their base-generated position and moved higher up and leftwards. They include topicalized arguments, relative operator, and focused arguments. A detailed description is given in Section VI.

(a) Topicalized arguments

Topicalized arguments are those arguments that are base-generated as a VP complement and moved to a pre-subject position. They always leave a (-NONE- *T*) and are tagged -TPC. This holds whether the argument is fronted within a single clause or across more than one clause boundaries.

```
(IP (NP-TPC-2 (CP (WHNP-1 (-NONE- *OP*))
                  (CP (IP (NP-SBJ (-NONE- *T*-1))
                          (VP (VA 类似)))
                      (DEC 的)))
              (DNP (NP (NN 山岳)
                       (NN 老人))
                   (DEG 的))
              (NP (NN 面孔)))
    (NP-SBJ (PN 我))
    (VP (ADVP (AD 已))
        (VP (VRD (VV 遇到)
                 (VV 过))
            (NP-OBJ (-NONE- *T*-2)))))
```

```
(IP (IP-TPC (NP-SBJ (NN 纺织)
                    (NN 解困))
            (VP (VA 成功)
                (CC 与)
                (VV 否)))
    (PU ， )
    (NP-SBJ (NN 关键))
    (VP (VV 在于)
        (IP-OBJ (NP-SBJ (NN 下岗)
                        (NN 分流)
                        (NN 人员))
```

```
                (VP (VV 能否)
                   (VP (VV 得到)
                       (NP-OBJ (ADJP (JJ 妥善))
                               (NP (NN 安置))))))))
```

Note that not all topics are derived from movement in Chinese. Some are base-generated since there is no obvious gap inside the IP:

```
 (IP (NP-TMP (NT 去年))
     (PU ， )
     (NP-TPC (NP-PN (NR 甘肃省))
             (ADJP (JJ 国有))
             (ADJP (JJ 大中型))
             (NP (NN 企业)))
     (IP (IP (NP-SBJ (NN 效益))
             (VP (VV 开始)
                 (VP (VV 回升))))
         (PU ， )
          (IP (NP-TMP (NT-SHORT 一)
                      (P 至)
                      (NT 十月))
            (PU ， )
             (NP-SBJ (ADJP (JJ 净))
                     (NP (NN 亏损)))
             (VP (PP (P 比)
                     (NP (DP (DT 上)
                             (QP (M 年)))
                         (NP (DP (DT 同))
                             (NP (NN 期)))))
                 (VP (VV 减少)
                     (QP-EXT (CD 五千多万)
                             (CLP (M 元)))))))
     (PU 。))
```

(b) Focused arguments

Focused elements are moved from postverbal position to a preverbal yet post-subject position. Sometimes they are optionally marked by focus markers such as 连 (we do not have a category for focus markers. Instead, we mark them as adverbs and they project to ADVPs).

```
(IP (NP-SBJ (PN 他))
    (VP (NP-FOC-1 (ADVP (AD 连))
                  (NP (PN 我)))
        (ADVP (AD 都))
        (ADVP (AD 不))
        (VP (VV 认识)
            (NP-OBJ (-NONE- *T*-1)))))
```

(c) Relative operators

Relative operators are adjoined to the CP:

```
(NP (QP (CD 一)
        (M 位))
    (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-1))
                (VP (VV 会)
                    (VP (VV 操)
                        (NP-OBJ (QP (CD 5)
                                    (CLP (M 种)))
                                (NP (NP-PN (NR 欧洲))
                                    (NP (NN 语言)))))))
            (DEC 的))
    (NP (NN 女郎)))))
```

2.8 Quotations

A direct quotation is considered to be the argument of the verb such as 说.

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 说)
        (PU :)
        (IP-OBJ
          (PU ‘‘)
          (NP-PN-SBJ (NR 李四))
          (VP (VV 喜欢)
              (NP-PN-OBJ (NR 王五)))
          (PU ’’))
    (PU .)))
```

When the quotation appears before the quoting verb, it is treated as a fronted argument: the quote is adjoined to the IP level and given a -TPC tag, and a trace is shown under the VP.

```
(IP (IP-TPC-1 (PU ‘‘)
              (NP-PN-SBJ (NR 李四))
              (VP (VV 喜欢)
                  (NP-PN-OBJ (NR 王五))))

              (PU ’’))
    (PU ， )
```

```
    (NP-PN-SBJ (NR 张三))
    (VP (VV 说)
        (IP-OBJ (-NONE- *T*-1)))
    (PU .))
```

If the quotation is discontinuous, the interruptive material is annotated as a parenthetical (-PRN). Note that a trace appears under the VP in the parenthetical, but that the fronted portion is not labeled -TPC:

```
  (IP-7 (PU ``)
        (NP-PN-SBJ (PN 我们))
        (VP (VV 相信)
            (PU ``)
            (PU ，)
            (PRN (IP (NP-PN-SBJ (NR 张三))
                     (VP (VV 说)
                         (IP-OBJ (-NONE- *T*-7)))))
            (PU ，)
            (IP-OBJ (PU ``)
                    (NP-PN-SBJ  (PN 你们))
                    (VP (VV 会)
                        (VP (VV 成功)))
                    (PU `` )))
        (PU .))
```

Section II Notation

In the present corpus, each bracket is labeled with one syntactic category but may have multiple functional (dash) tags. The reason why we use functional tags is that we want to distinguish phrases that belong to the same syntactic category but have different functions. For example, the word 年 modifies the VP in 年 产 钢铁 五万 吨, and it modifies the NP in 两 年 时间. The use of a combination of structural categories and functional categories provides users of the Treebank with rich structural and non-structural categorial information.

1 Bracket labels

1.1 Clause level : IP and CP

[IP] --- Simple clause, that is, one that does not have complementizers such as 吗, 的话, or operator type of elements such as 虽然 or relative operator.

```
(IP (NP-SBJ (NN 城镇)
            (NN 职工))
    (VP (ADVP (AD 再))
        (ADVP (AD 也))
        (ADVP (AD 不))
        (VP (VV 能)
            (VP (PP (P 象)
                    (NP (NT 过去)))
                (ADVP (AD 那样))
                (PU ，)
                (PP-DIR (P 从)
                        (NP (CP (WHNP-1 (-NONE- *OP*))
                                (CP (IP (NP-SBJ (PN 他们))
                                        (VP (PP-LOC (-NONE- *T*-1))
                                            (VP (VV 工作))))
                                    (DEC 的))
                                (NP (NN 单位)))))
                (VP (VV 分得)
                    (NP-OBJ (NN 住房))))))
    (SP 了))
```

```
(IP (NP-SBJ (NN 外资)
            (NN 企业))
    (VP (VV 成为)
        (NP-OBJ  (NP (NP-PN (NR 山东))
                     (NP (NN 国民)
                         (NN 经济)))
                 (ADJP (JJ 显著))
                 (NP (NN 增长点)))))
```

[CP] --- Clause introduced by a (possibly empty) complementizer.
CP is used only
(i) when there is an overt complementizer

```
(CP (IP (NP-PN-SBJ (NR 张三))
        (VP (VV 可能)
            (VP (VV 喜欢)
                (NP-PN-OBJ (NR 李四)))))
    (SP 吗)
    (PU ？))
```

```
(NP (CP (IP (IP (NP-SBJ (NN 社会主义)
                        (NN 市场)
                        (NN 经济)
                        (NN 体制)
```

```
                    (NN 建设))
                (VP (ADVP (AD 不断))
                    (VP (VV 推进))))
            (PU ， )
            (IP (NP-SBJ (PP (P 对)
                            (NP (NN 外)))
                        (NP (NN 开放)))
                (VP (ADVP (AD 进一步))
                    (VP (VV 扩大)))))
        (DEC 的))
    (ADJP (JJ 新))
    (NP (NN 形势)))
```

(ii) when there is an (null) operator (which can either be a clause-initial adverbial phrase projected by CS, or a null relative operator (this is not conclusive when there is no overt complementizer) at the CP-level,

```
(CP (ADVP (CS 如果))
    (IP (NP-SBJ (NN 国民)
                (NN 经济))
        (VP (ADVP (AD 迅速))
            (VP (VV 增长)))))
```

(iii) both (i) and (ii)

```
(CP-ADV (ADVP (CS 如果))
        (CP (IP (NP-SBJ (DNP (LCP (NP (NN 传说))
                                  (LC 中))
                             (DEG 的))
                        (NP (PU “) (NN 西天) (PU ” )))
                (VP (VC 是)
                    (NP-PRD (QP (M 个))
                            (NP (PU “) (NN 极乐世界) (PU ” )))))
            (SP 的话)))
```

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-1))
                (VP (PP-LOC (P 在)
                            (NP-PN (NR 山东省)))
                    (VP (VV 开业))))
            (DEC 的))
      (NP (NN 外资)
          (NN 企业)))
```

1.2 Phrase level: ADJP, ADVP, CLP, DP, DNP, DVP, FRAG, LCP, LST, NP, PP, PRN, QP, UCP, VP.

[ADJP] --- Adjective phrase. Phrase headed by a JJ.

```
(ADJP (ADVP (AD 不))
      (ADJP (JJ 完全)))
```

[ADVP] --- Adverbial Phrase. Phrasal category headed by an adverb.

Examples: (ADVP (AD 非常))

[CLP] --- classifier phrase.

Examples:

```
(QP (CD 一)
    (CLP (M 系列)))

(QP (CD 一)
    (CLP (ADJP (JJ 大))
         (CLP 批)))
```

[DP] --- Determiner phrase. Used to mark the combination of a determiner and a QP. Note this is different from its use in the GB theory where NP is a complement inside a DP. For this corpus, a DP is a modifier of the NP if it occurs inside an NP. The QP inside the DP is optional.

Examples:

```
(NP (DP (DT 这)
        (QP (CD 三)
            (CLP (M 座))))
    (NP (NN 房子)))

(NP (DP (DT 任何))
    (NP (NN 人)))

(NP (DP (DT 这)
        (CLP (M 个)))
    (NP (NN 学生)))
```

[DNP] --- Phrase formed by XP plus (DEG 的) that modifies an NP. The XP can be

an ADJP:

```
(DNP (ADJP (JJ 大型))
     (DEG 的))
```

a DP:

```
(NP (DNP (DP (DT 前)
             (QP (CD 几)
                 (CLP (M 年))))
         (DEG 的))
    (ADJP (JJ 高速))
    (NP (NN 发展))))
```

```
a QP:  (NP (DNP (QP (CD 五)
                    (CLP (M 年)))
                (DEG 的))
           (NP (NN 开发)
               (NN 建设)))

an NP: (NP (DNP (NP (NN 饮食)
                    (NN 习惯))
                (DEG 的))
           (NP (NN 改善)))

a PP:  (NP (DNP (PP (P 关于)
                    (NP (NP (NP (NP-PN (NR 香港))
                                (ADJP (JJ 特别))
                                (NP (NN 行政区)))
                            (QP (OD 第一)
                                (CLP (M 届)))
                            (NP (NN 政府)
                                (CC 和)
                                (NN 立法会)))
                        (NP (NN 产生)
                            (NN 办法))))
                (DEG 的))
           (NP (NN 决定))))

an LCP: (NP (DNP (LCP (NP (NN 发展))
                      (LC 中))
                (DEG 的))
           (NP (NN 问题)))
```

[DVP] --- Phrase formed by XP plus 地 that modifies a VP

```
(DVP (IP (NP-SBJ (NN 心情))
         (VP (VA 沮丧)))
     (DEV 地))

(DVP (CLP (ADJP (JJ 大))
          (CLP (M 批)))
     (DEV 地))

(DVP (VP (VV 高兴))
     (DEV 地))

(DVP (NP (ADJP (JJ 最大))
         (NP (NN 限度)))
     (DEV 地))
```

[FRAG] --- Fragment. Used to mark fragmented elements that cannot be

built into a full structure by using null categories.

```
(FRAG (PU （)
      (VV 完)
      (PU ）))
```

[LCP] --- Used to mark phrases formed by a localizer and its complement. Examples:

```
(LCP (NP-PN (NR 皖南)
            (NN 事变))
     (LC 中))

(LCP (IP (NP-SBJ (PU “)
                 (NP-PN (NR 千岛湖))
                 (NP (NN 事件))
                 (PU ”))
         (VP (VV 发生)))
     (LC 以来))
```

[LST] --- List marker. Includes surrounding punctuation. See Section V for details.

Numbered list. Letters or numbers which identify items in a list and their surrounding punctuation (if they exist) are labeled LST. They do not project into QPs which only occur inside an NP or a DP. When the QPs do occur inside a VP it always takes a CLP as its complement. LSTs are adjoined to the constituent it precedes.

```
    (IP (NP-SBJ (DNP (NP (NN 开发)
                         (NN 银行))
                     (DEG 的))
                 (NP (NN 资金)
                     (NN 来源)
                     (NN 渠道)))
        (VP (VP (ADVP (AD 很))
                (VP (VA 多)))
            (PU ，)
            (VP (LST (CD 一))
                (VP (VC 是)
                    (NP-PRD (CP (WHNP-1 (-NONE- *OP*))
                                (CP (IP (NP-SBJ (NN 国家)
                                                (NN 财政))
                                        (VP (VV 划拨)
                                            (NP-OBJ (-NONE- *T*-1))))
                                    (DEC 的))
                            (QP (CD 五百亿))
                            (NP (NN 注册)
```

```
                                (NN 资本))))))
            (PU ; )
            (VP (LST (CD 二))
                (VP (VC 是)
                    (IP-PRD (NP-SBJ (-NONE- *pro*))
                            (VP (PP-DIR (P 向)
                                        (NP (NN 金融)
                                            (NN 机构)))
                                (VP (VV 发行)
                                    (NP-OBJ (NN 债券))))))))
        (PU 。))
```

Non-numbered lists. Non-numbered lists such as dashes have to be determined by the context and they may occur either within one sentence or multiple sentences. When the list items, enumerated or not, occur in separate sentences, (as indicated by a period or some other kind of punctuations), treat the colon as the final punctuation and place each list item in its own set of empty outer parentheses:

```
(IP (PP (P 据)
        (NP (NN 介绍)))
    (PU ， )
    (NP-TMP (NT 一九九七年))
    (NP-SBJ (NP (NN 工业)
                (NN 生产))
            (ADJP (JJ 主要))
            (NP (NN 特点)))
    (VP (VC 是)
        (XP-PRD (-NONE- *))
        (PU ： ) ))

(IP (LST (PU ——))
    (IP (IP (NP-SBJ (NN 生产))
            (VP (ADVP (AD 稳定))
                (VP  (VV 增长))))
        (PU ， )
        (IP (NP-SBJ (NN 增速))
            (VP (PP (P 比)
                    (NP (DP (DT 上))
                        (NP (M 年))))
                (VP (VV 有所)
                    (NP-OBJ (NN 回落))))))
    (PU 。))

(IP (LST (PU ——))
    (NP-SBJ (NN 工业)
            (NN 结构)
            (NN 调整))
    (VP (VV 取得)
        (NP-OBJ (ADJP (JJ 积极))
                (NP (NN 进展))))
```

```
   (PU 。))

(IP (LST (PU ——))
    (IP (IP (NP-SBJ (NN 工业)
                    (NN 产销率))
            (VP (VV 有所)
                (NP-OBJ (NN 提高))))
        (PU ，)
        (IP (NP-SBJ (NN 出口)
                    (NN 增长))
            (VP (ADVP (AD 较))
                (VP (VA 快)))))
    (PU 。)))

(IP (LST (PU ——))
    (NP-SBJ (NN 经济)
            (NN 效益)
            (NN 水平))
    (VP (ADVP (AD 恢复性))
        (VP (VV 回升)))
    (PU 。))
```

[NP] --- Noun Phrase. Phrasal category that includes all constituents that depend on a head noun. See Section III for details.

```
Examples: (NP (QP (CD 五亿)
                  (CLP (M 美元)))
              (NP (NN 投资)))
```

[PP] --- Prepositional Phrase. Phrasal category headed by a preposition.

```
Examples: (PP (P 就)
              (NP (NN 机制)
                  (NN 问题)))
```

[PRN] --- Parenthetical. Used for interruptive material.

```
(IP-7 (PU '')
      (NP-PN-SBJ (PN 我们))
      (VP (VV 相信)
          (PU '')
          (PU ,)
          (PRN (IP (NP-PN-SBJ (NR 张三))
                   (VP (VV 说)
                       (IP-OBJ (-NONE- *T*-7)))))
          (PU ,)
          (IP-OBJ
              (PU '')
              (NP-PN-SBJ  (PN 你们))
```

```
            (VP (VV 会)
                (VP (VV 成功)))
        (PU ''))))
    (PU .))
```

[QP] --- Quantifier Phrase (i.e., complex amount/measure phrase); used within NP; for example, (QP 三 个). Under certain circumstances either the numeral or the measure word can be omitted. In such cases either the measure word or the the numeral forms the entire QP:

```
(VP (CLP-ADV (M 年))
    (VP (VV 产)
       (NP-OBJ 轿车)
       (QP-EXT (CD 五百)
               (CLP (M 辆)))))
```

[UCP] --- Unidentical coordination phrase. Used to mark a coordinating construction where the conjuncts do not belong to the same category.

```
(NP (UCP (ADJP (JJ 养老))
         (PU 、)
         (NP (NN 医疗)))
     (NP (NN 保险)))
```

```
(PP (P 随着)
     (UCP (IP (NP-SBJ (NP-PN (NR 俄罗斯))
                      (NP (NN 国内))
                      (PP (P 对)
                          (NP (NN 工业品)))
                      (NP (NN 需求)))
                 (VP (PP-DIR (P 向)
                             (NP (NN 中高档)
                                 (NN 方向)))
                     (VP (VV 发展))))
              (CC 和)
              (NP (DNP (NP (NN 国内)
                           (NN 经济)
                           (NN 形势))
                       (DEG 的))
                  (ADJP (JJ 逐步))
                  (NP (NN 稳定)))))
```

[VP] --- Verb Phrase. Phrasal category headed by a verb. See Section IV for details.

```
(VP (ADVP (AD 争相))
    (VP (VV 落户)
        (NP-PN-OBJ (NR 上海)
                   (NR 浦东))))
```

2 Function tags

2.1 Clause types: IMP, Q.

[-IMP (imperative)] --- marks an imperative sentence.

```
(IP-IMP (NP-SBJ (-NONE- *pro*))
        (VP (VV 关上)
            (NP-OBJ (NN 门)))
        (PU !))
```

[-Q (question)] --- marks a question.

```
(CP-Q (IP (NP-SBJ (PN 他))
          (VP (VV 发表)
              (NP-OBJ (NN 文章)))
          (SP 了))
      (SB 吗)
      (PU ?))

(IP-Q (NP-SBJ (PN 你))
      (VP (VNV (VV 相)
               (AD 不)
               (VV 相信))
          (NP-OBJ (PN 我)))
      (PU ?))
```

2.2 (function Form) discrepancies: ADV

[-ADV (adverbial)] --- marks a constituent other than ADVP or PP when it is used adverbially. Note that constituents that themselves are ADVPs do not get -ADV.

```
(VP  (CLP-ADV (M 年))
     (VP (VV 产)
         (NP-OBJ (NN 汽车))
         (QP-EXT (CD 五百万)
                 (CLP  (M 辆)))))
```

If there is a more specific adverbial tag available (i.e. one of the tags listed in the succeeding sections), the more specific tag is assumed to imply -ADV and is used alone. For example, in the following example, the -TMP tag on 昨天 implies -ADV.

```
(IP (NP-SBJ (PN 他))
    (VP (NP-TMP 昨天))
        (VP (VV 离开))))
```

Do not use:

```
(NP-ADV-TMP (NT 昨天))
```

Nouns such as 今天, which often behave adverbially, are labeled NP with no adverbial functional tags when they appear in an argument position.

```
(IP (NP-SBJ (NT 今天))
    (VP (VC 是)
        (NP-PRD  (NT 星期三))))
```

2.3 Grammatical role: IO, OBJ, EXT, FOC, PRD, SBJ, TPC.

[-IO (indirect object)] --- marks the indirect object of the verb, which is the first object of the verbs that take two NP objects. Note: if the verb takes one NP and one CP/IP object, mark the NP as -OBJ, not -IO.

```
(IP (PP-TMP (P 在)
            (LCP (IP (NP-PN-SBJ (NR 中国))
                     (VP (VV 加入)
                         (NP-PN-OBJ (NN 世界)
                                    (NN 贸易)
                                    (NN 组织))))
                 (LC 后)))
    (NP-PN-SBJ (NR 美国)
               (NN 国会))
    (VP (VV 应该)
        (VP (VV 给予)
            (NP-IO-PN (NR 中国))
            (NP-OBJ (DNP (ADJP (JJ 永久))
                         (DEG 的))
                    (NP (NN 最惠国)
```

```
                    (NN 待遇))))))
```

[-OBJ (direct object)] --- marks the direct object of a verb. This currently includes verbal complements other than the ones with -IO and -EXT.

```
(IP (NP-TMP (NT 一九九一年))
    (NP-PN-SBJ (NR 深圳市))
    (VP (VV 建立)
        (NP-OBJ (QP (OD 第一)
                    (CLP (M 个)))
                (ADJP (JJ 常设))
                (NP (NN 人才)
                    (NN 市场)))))
```

[-EXT (extent)] --- marks postverbal complements that describe the extent, frequency, or quantity of an activity.

```
 (VP (NP-TMP (NT 去年))
     (VP (VP (VV 完成)
             (NP-OBJ (NN 销售额))
             (QP-EXT (CD 一千二百二十一亿)
                     (CLP (M 元))))
         (PU ， )
         (VP (VV 实现)
             (NP-OBJ  (NN 利润))
             (QP-EXT (CD 五十三亿)
                     (CLP (M 元))))))
```

```
 (IP (NP-SBJ (PN 他))
     (VP (VV 走)
         (AS 了)
         (QP-EXT (CD 五)
                 (CLP (M 公里)))))
```

```
 (IP (NP-SBJ (PN 他))
     (VP (VV 来)
         (AS 了)
         (QP-EXT (CD 两)
                 (CLP (M 次)))))
```

[-FOC (focus)] --- marks an object fronted to a preverbal but post-subject position.

```
(IP (NP-SBJ (NR 张三))
    (VP (NP-FOC-1 (NN 作业))
        (VP (VV 做完)
            (AS 了)
            (NP-OBJ (-NONE- *T*-1))))
    (PU .))
```

[-PRD (predicate)] --- marks non-verbal predicates.
Non-verbal predicates occur when (i) there is no overt verb in the clause

```
(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-SBJ (-NONE- *T*-1))
                        (VP (VV 办理)
                            (NP-OBJ (NP (NN 调动)
                                        (CC 和)
                                        (NN 聘用))
                                    (NP (NN 手续)))))
                    (DEC 的))))
     (VP (NP-PRD (QP (CD 六万二千))
                 (NP (NN 人)))))
```

or (ii) when the verb is the copula 是.

```
(IP (IP-SBJ (NP-SBJ (-NONE- *pro*))
            (VP (ADVP (AD 进一步))
                (VP (VP (VV 解放)
                        (NP-OBJ (NN 思想))))
                    (VP (VV 引进)
                        (NP-OBJ (NN 人才)))))
    (VP (VC 是)
        (NP-PRD (NP-PN (NR 广东))
                (DNP (NP (NN 人才)
                         (NN 政策))
                     (DEG 的))
                (NP (NN 主导)
                    (NN 方向))))
    (PU 。))
```

[-SBJ (surface subject)] --- marks the structural surface subject of
both matrix and embedded clauses, including those with null subjects.
We assume that every clause has a subject, either overt or covert.

Examples:

```
(IP (NP-SBJ (NP-PN (NR 美))
            (ADJP (JJ 驻华))
            (NP (NN 大使)))
    (VP (VV 呼吁)
        (IP-OBJ (NP-PN-SBJ (NR 美))
                (VP (VV 采取)
```

```
                    (NP-OBJ (NP (NN 建设性))
                            (PP (P 对)
                                (NP-PN (NR 华)))
                            (NP (NN 政策)))))))
```

```
(IP (NP-SBJ (PN 这))
        (VP (VV 使)
            (NP-OBJ-1 (NN 笔者))
            (IP (NP-SBJ (-NONE- *PRO*-1))
                (VP (VV 得以)
                    (VP (VV 一睹)
                        (NP-OBJ (NP-PN (NR 富士))
                                (NP (NN 风采))))))))
```

```
(IP (NP-SBJ (-NONE- *pro*))
    (VP (VV 说)
        (PU ： )
         (NP-OBJ (QP (QP (CD ４)
                         (CLP (-NONE- *RNR*-1)))
                     (CC 至)
                     (QP (CD ７)
                         (CLP-1 (M 个))))
                 (NP (NN 钟头))))
    (PU ！ ))
```

[-TPC (''topicalized'')] --- marks elements that appear before the subject in a declarative sentence, but in two cases only:

(i) if the fronted element is associated with a (-NONE- *T*) in the position of the gap.

Examples:

```
(IP (NP-PN-TPC-13 (NR 张三))
    (PU ,)
    (NP-PN-SBJ (NR 李四))
    (VP (VV 喜欢)
        (NP-OBJ (-NONE- *T*-13)))))
```

```
(IP (IP-TPC-1 (PU “)
              (NP-SBJ-1 (PN 我))
               (VP (ADVP (AD 真))
```

```
                    (VP (VV 想)
                       (IP-OBJ (NP-SBJ (-NONE- *PRO*-1))
                               (VP (VRD (VV 跳)
                                        (VV 起来))))))
               (PU ” ))
      (PU ， )
      (NP-PN-SBJ (NR 丁豪))
                 (VP (VV 说)
                     (IP-OBJ (-NONE- *T*-1))))
```

(ii) if there is a base-generated topic that has an "aboutness" relationship with the rest of the clause.

```
   (IP (NP-PN-TPC (NR 天津)
                  (CC 与)
                  (NR 台湾))
       (IP (IP (NP-SBJ (NN 产业)
                       (NN 结构))
               (VP (VV 相似)))
           (PU ， )
           (IP (NP-SBJ (NN 技术))
               (VP (VV 相近)))))
```

NPs that are used adverbially in the beginning of the sentence are not considered topics. Those NPs generally provide temporal or spatial information and are assigned functional tags like -TMP or -LOC. They are different from topics in that the former are not related to another NP in the same sentence, that is, they do not satisfy (i) or (ii) above.

```
   (IP (NP-TMP (NT 目前))
       (PU ， )
       (IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                       (CP (IP (NP-SBJ (-NONE- *T*-1))
                               (VP (PP-LOC (P 在)
                                           (NP-PN (NR 山东省)))
                                   (VP (VV 开业))))
                           (DEC 的))
                   (NP (NN 外资)
                       (NN 企业))))
           (VP (ADVP (AD 已))
               (VP (VE 有)
                   (QP-OBJ (CD 一万余)
                           (CLP (M 家)))))))
```

2.4 Adverbials: BNF, CND, DIR, IJ, LGS, LOC, MNR, PRP, TMP, VOC

Adverbials are generally attached to VP adjuncts.

[-BNF (benefactive)] --- marks the beneficiary of an action. It always attaches to a PP.

```
(IP (NP-PN-SBJ (NR 西门子))
    (VP (PP-BNF (P 为)
                (NP (NP-PN (NR 上海))
                   (NP (NN 地铁)
                       (NN 二号线))))
        (VP (VV 提供)
            (NP-OBJ (NN 设备)
                   (CC 和)
                   (NN 服务)))))


(IP (NP-SBJ (NP (NP-PN (NR 南昆))
                (NP (NN 铁路)))
            (NP (NN 建设)))
    (VP (PP-BNF (P 给)
                (NP (NP (NN 沿海))
                    (QP (CD 四))
                    (NP (NN 市))))
        (VP (VV 带来)
           (AS 了)
            (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                        (CP (IP (NP-SBJ (-NONE- *T*-1))
                                (VP (VV 前所未有)))
                            (DEC 的)))
                    (NP (NN 发展)
                       (NN 机遇)))))
    (PU 。))
```

[-CND (condition)] --- marks conditional clause indicating necessary or sufficient condition. It is attached to CP or IP.

Examples:

```
(CP-CND (ADVP (CS 如果))
        (IP (NP-TMP (NT 那天))
            (NP-SBJ (PN 我))
            (VP (VV 登上)
               (AS 了)
                (NP-OBJ (DP (DT 这)
                            (CLP (M 个)))
                        (NP (NN 险峰))))))
```

compare to:

```
(IP-CND (NP-TMP (NT 那天))
        (NP-SBJ (PN 我))
```

```
        (VP (ADVP (CS 如果))
           (VP (VV 登上)
               (AS 了)
                (NP-OBJ (DP (DT 这)
                            (CLP (M 个)))
                        (NP (NN 险峰))))))


(CP-CND (ADVP (CS 即使))
        (IP (NP-SBJ (QP (OD 第三)
                        (CLP (M 次)))
                    (NP (NN 对接)))
            (VP (VV 失败))))
```

[-DIR (direction)] --- marks adverbials that answer the questions ''from where?'' and ''to where?'' It implies motion or change of state. Its use can be metaphorical.

Examples:

```
(VP (PP-DIR (P 向)
            (NP (DP (DT 其他))
                (NP (NN 省) (NN 市))))
    (VP (VV 输送)
        (NP-OBJ (QP (CD 部分))
                (NP (NN 商品) (NN 气)))))


(VP (PP-DIR (P 由)
            (QP (DNP (DP (DT 上)
                         (CLP (M 年)))
                     (DEG 的))
                (QP (CD 百分之三十七))))
    (VP (VRD (VV 提高)
             (VV 到))
        (QP-OBJ (CD 百分之三十九))))
```

[-IJ (interjective)] --- marks phrases that function like interjections.

```
(IP (IP (NP-SBJ (PN 我))
        (VP (VSB (VV 仰头)
                 (VV 望去))))
    (PU ， )
    (IP (NP-IJ (ADJP (JJ 好))
               (NP (NN 家伙)))
        (PU ， )
        (NP-SBJ (-NONE- *pro*))
        (VP (ADVP (AD 至少))
            (ADVP (AD 还))
```

```
            (VP (VE 有)
                (NP-OBJ (QP (CD １０００多)
                            (CLP (M 米)))
                        (NP (NN 高))))))
```

[-LGS (logical subject)] --- marks adverbial phrases that indicate the logical subject.

```
(IP (NP-SBJ-1 (DP (DT 这)
                  (CLP (M 次)))
              (NP (NN 艺术节)))
    (VP (PP-LGS (P 由)
                (NP (NP-APP (NP-PN (NP-PN (NR 中华))
                                   (NP (DP (DT 全))
                                       (NP (NN 国)))
                                   (NP (ADJP (JJ 归国))
                                       (NP (NN 华侨)))
                                   (NP (NN 联合会)))
                            (CC 与)
                            (NP-PN (NR 文化部))
                           (PU 、)
                            (NP-PN (NN 中央) (NN 电视台))
                           (PU 、)
                            (NP-PN  (NR 深圳市)
                                   (NN 文化局))
                            (CC 及)
                           (NP-PN (NR 中国)
                                  (NN 华侨)
                                  (NN 国际)
                                  (NN 文化)
                                  (NP-PN 交流)
                                  (NN 促进会))
                            (ETC 等))
                      (NP (NN 单位))))
        (ADVP (AD 联合))
        (VP (VV 主办)
           (NP-OBJ (-NONE- *-1))))
 (PU 。))
```

[-LOC (locative)] --- marks adverbials that indicate the place of the event.

```
  (VP (PP-LOC (P 在)
              (NP-PN 上海))
      (VP 工作))
```

-LOC may also indicate metaphorical location. For example, the following receive the -LOC tag:

```
(PP-LOC (P 在)
        (LCP (NP (NN 谈判))
             (LC 中间)))


(PP-LOC (P 在)
        (LCP (NP (NN 压力))
             (LC 下)))

(PP-LOC (P 在)
         (LCP (NP (NN 经济)
                  (NN 发展))
              (LC 上)))
```

There is likely to be some variation in the use of -LOC because of the different interpretations of annotators. In cases where the annotator is faced with choosing between -LOC or -TMP, the default is -LOC.

```
(PP-LOC (P 在)
        (LCP (NP (NN 面试))
             (LC 中)))
```

[-MNR (manner)] --- marks adverbials that indicate manner, including instrument phrases. It is always attached to PPs.

Examples:

```
(VP (PP-MNR (P 以)
            (NP (DNP (LCP (ADJP (JJ 年均))
                          (LCP (QP (CD 百分之三十)))
                                (LC 以上))
                     (DEG 的))
                (ADJP (JJ 高))
                (NP (NN 速度))))
    (VP (VV 增长)))


 (VP (PP-MNR (P 用)
             (NP (ADJP (JJ 小型))
                 (CP (WHNP-6 (-NONE- *OP*))
                     (CP (IP (NP-SBJ (-NONE- *T*-6))
                             (VP (VA 合适)))
                          (DEC 的)))
                 (NP (NN 天文)
                    (NN 望远镜))))
```

```
    (VP (VV 观测)))


(VP (PP-MNR (P 凭借)
            (NP (NP (PN 其))
                (ADJP (JJ 雄厚))
                (NP (NN 实力))))
    (PP-LOC (P 在)
            (LCP (NP-PN (NR 欧洲)
                        (NN 联盟))
                 (LC 中)))
    (VP (VV 独占鳌头)))
```

[-PRP (purpose or reason)] --- marks purpose or reason clauses and PPs. It is always attached to preverbal elements.

Examples:

```
(IP (PP-PRP (P 因为)
            (IP (NP-SBJ (NN 措施))
                (VP (VV 得力) )))
    (NP-SBJ (NN 国民)
            (NN 经济))
    (VP (VV 得到)
        (NP-OBJ (NN 恢复))))))
```

[-TMP (temporal)] --- marks temporal or aspectual adverbials that answer the questions 什么时候. It is attached to NP, LCP and PP which are adjoined to the IP or VP.

Examples:

At the VP-level:

```
(VP (PP-TMP (P 在)
            (NP (CP (WHNP-2 (-NONE- *OP*))
                    (CP (IP (NP-SBJ (PN 他们))
                            (VP (PP-TMP (-NONE- *T*-2))
                                (ADVP (AD 正))
                                (VP (VV 应)
                                    (VP (ADVP (AD 好好))
                                        (VP  (VV 读书))))))
                        (DEC 的)))
                    (NP (NN 时候))))
    (PU ， )
    (VP (SB 被)
        (VP (VV 耽误)
```

```
            (AS 了)
            (NP-OBJ (-NONE- *T*-1)))))


(LCP-TMP (IP (NP-SBJ (NN 国家)
                     (NN 重点)
                     (NN 实验室))
             (VP (VV 建立)
                 (QP-EXT (CD 十)
                         (CLP (M 年)))))
         (LC 来))
```

At the IP-level

```
(IP (NP-TMP (NT 今年)
            (NT ６月)
            (NT １５日))
    (PU ， )
    (NP-PN-SBJ (NR 中国))
    (VP (VV 成为)
        (NP-OBJ (NP-PN (NR 亚洲))
                (QP (OD 第一)
                    (CLP (M 个)))
                (CP (WHNP-1 (-NONE- *OP*))
                    (CP (IP (NP-SBJ (-NONE- *T*-1))
                            (VP (PP-MNR (P 以)
                                        (NP (NN 观察员)
                                            (NN 身份)))
                                (VP (VV 参加)
                                    (NP-PN-OBJ (NP-PN (NR 拉美))
                                               (NP (NN 一体化)
                                                   (NN 协会))))))
                        (DEC 的)))
                (NP (NN 国家))))
    (PU 。))
```

Note that -TMP is not used when the temporal or aspectual elements are NP heads or adjoined to NPs.

```
(NP (DNP (NP (NT 1950年))
         (DEG 的))
    (NP (NN 消息)))

(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-1))
                (VP (VV 令人难忘)))
            (DEC 的)))
    (NP (NT 一九九六年)))
```

[-VOC (vocative)] --- marks the addressee, regardless of its position in the sentence. It is not coindexed with the subject and does not get -TPC when it is in the sentence-initial position.

Examples:

```
(IP (NP-PN-VOC-1 (NR 张三))
    (PU ,)
    (NP-SBJ NP (-NONE- *pro*-1))
    (VP (VV 关)
        (NP-OBJ (NN 门))))
```

2.5 Miscellaneous: APP, HLN, PN, SHORT, TTL, WH.

[-APP (appositive)] --- mark the appositive.

```
(NP (DP (DT 这)
        (CLP (M 种)))
    (CP-APP (IP (NP-SBJ (NN 法制))
                (VP (VV 紧跟)
                    (NP-OBJ (NP (NN 经济)
                                (CC 和)
                                (NN 社会))
                            (NP (NN 活动)))))
            (DEC 的))
    (NP (NN 做法)))
```

[-HLN (headline)] --- marks headlines and datelines. Note that headlines and datelines always constitute a unit of text that is structurally independent from the following sentence.

```
(IP-HLN (NP-TPC (NP-PN (NR 中国))
                (QP (CD 十四)
                    (CLP (M 个)))
                (CP (WHNP-1 (-NONE- *OP*))
                    (IP (NP-SBJ (-NONE- *T*-1))
                        (VP (PP (P 对)
                                (NP (LC 外)))
                            (VP (VV 开放)))))
                (NP (NN 城市)))
        (NP-TMP (NT 一九九五年))
        (NP-SBJ (NN 经济)
                (NN 建设))
        (VP (VV 取得)
            (NP-OBJ (ADJP (ADJP 可喜))
                    (NP (NN 成果))))))
```

[-PN (proper nouns)] --- Used to mark NPs that are names of people, place or

organization. This can potentially lead to inconsistency when annotators do the bracketing. A lot of this will depend on the annotator's knowledge of what is an organization and what is not, or what is a name and what is not. Note that although a phrase (generally NP) labeled -PN in most cases contain a word with the POS-tag NR, what is covered with -PN does not completely overlap with what is covered under the POS tag NR. Phrases that do not contain words with NR tags can nevertheless be assigned the dash-tag -PN, such as

```
(NP-PN (NN 世界) (NN 贸易) (NN 组织))

(NP-PN (NN 国家)
       (NN 进出口)
       (NN 管理)
       (NN 委员会))

(NP-PN (NR 中国)
       (NN 国务院))

(NP-PN (NR 朱榕基))

(NP-PN (NR 天津))
```

[-SHORT (short form)] --- Used to mark that a word is a short form.

```
Ex:   (NP (NT-SHORT 一)
          (CC 至)
          (NT 二月份)))
```

[-TTL (title)] --- is attached to the top node of a title when this title appears inside running text. The internal structure of the title is bracketed as usual. The punctuations, usually 书名号 or quotation marks, are included in the phrase that is labeled -TTL. Note that the punctuations << and >> force one extra layer of bracketing in this case to anchor the functional tag -TTL.

```
(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-TMP (NT 一九九五年)
                                (NT 九月))
                        (NP-SBJ (NN 建设部)
                                (CC 和)
                                (NN 外经贸部))
                        (VP (ADVP (AD 联合))
                            (VP  (VV 发布)
                                 (NP-OBJ (-NONE- *T*-1)))))
                    (DEC 的)))
            (NP-TTL (PU <<)
                    (DNP (PP (P 关于)
                             (IP-APP (NP-SBJ (-NONE- *pro*))
                                     (VP (VV 设立)
                                         (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
```

```
                                                    (IP (NP-SBJ (NN 外商))
                                                        (VP (VV 投资)
                                                            (NP-OBJ (-NONE- *T*-1)
)))
                                                (NP (NN 建筑业)
                                                    (NN 企业)))))))
                                (DEG 的))
                            (NP (NN 规定))
                            (PU >>) ))
        (VP (VV 使)
            (NP-OBJ-2 (DNP (NP-PN (NR 中国))
                           (DEG 的))
                      (NP (NN 建筑)
                          (NN 市场)))
            (IP-OBJ  (NP-SBJ-2 (-NONE- *PRO*))
                     (VP  (VRD (VV 进入) (VV 到))
                          (IP-OBJ (NP-SBJ (-NONE- *PRO*-2))
                                  (VP (VV 允许)
                                      (NP-OBJ-4 (NN 境外)
                                                (NN 企业))
                                      (IP-OBJ (NP-SBJ (-NONE- *PRO*-4))
                                              (VP (VP (VV 到)
                                                      (NP-PN-OBJ (NR 中国)))
                                                  (VP (VV 办)
                                                      (NP-OBJ (NN 合资)
                                                              (NN 建筑)
                                                              (NN 企业)))))))))
```

[-WH (Wh-phrases)] -- is attached to PPs, NPs, VPs, or ADVPs that are generally considered to be question words: e.g.,

Examples:

```
(IP-Q (NP-SBJ-WH (PN 谁))
      (VP (VV 打)
          (AS 了)
          (NP-PN-OBJ (NR 张三)))
      (PU ?))

(IP-Q (NP-PN-SBJ (NR 张三))
      (VP (ADVP-WH (AD 为什么))
          (VP (VV 打)
              (AS 了)
              (NP-PN-OBJ (NR 李四))))
      (PU ?))

(IP-Q (NP-PN-SBJ 张三)
      (VP-WH (VV 怎么样)
             (AS 了))
      (PU ?))
```

The -WH is always attached to the highest level of the phrase of which the wh-word is the head. In Chinese, a wh-word does not always entail a wh-question. It can also mean an indefinite entity. The -WH functional tag is used only when the interrogative sense of the wh-word is used.

```
(IP-Q (NP-SBJ (DNP (NP-WH (PN 谁))
                   (DEG 的))
              (NP (NN 朋友))
      (VP (VV 打)
          (AS 了)
          (NP-PN-OBJ (NR 张三)))
      (PU ?))

(IP-Q (NP-SBJ-WH (PN 谁))
      (VP (PP (P 和)
              (NP (NR 李四)))
          (VP (VV 打)
              (AS 了)
              (NP-PN-OBJ (NR 张三)))
      (PU ?))


(CP-Q (IP (NP-PN-SBJ (NR 张三))
          (VP (VV 会)
              (VP-WH (VV 怎么样))))
      (SP 呢)
      (PU ?))
```

3 Null elements

(XP (-NONE- *T*)) --- trace of A′ -movement. Used in topicalization and object preposing constructions.

(NP (-NONE- *)) --- trace of A-movement. Used in raising and passive constructions.

(NP (-NONE- *pro*)) --- for dropped subject or object.

(NP (-NONE- *PRO*)) --- used in control structures.
The *PRO* cannot be substituted by an overt constituent.

(WHNP (-NONE- *OP*)) --- used for the empty operator in relative constructions.

(XP (-NONE- *RNR*)) --- used for right node raising.

(XP (-NONE- *?*)) -- used for other unknown empty categories.

For detailed specification of how null elements are used, refer to Section VI.

Section III The Bracketing of Noun Phrases

This section specifies how noun phrases are bracketed. The noun phrase is headed by a noun (words with POS tag NN, NT, or NR). Under our current specification, it never takes complements of any kind.

1. The lowest level of NP.

Since the noun head never takes a complement, the lowest level of NP consists entirely of the noun head. The following forms the lowest level of NP:

1.1 Single-word nouns or names

```
(VP (VV 摆脱)
    (NP-OBJ (NN 困境))


(NP-PN (NR 朱榕基))
```

1.2 noun-noun compounds.

Compounds formed by an uninterrupted sequence of words POS-tagged as NNs are bracketed together as the lowest level (word-level) of NP. In an NN1 NN2 ... NNi sequence, although in general the last NN is always the head, not all the previous NNs directly modifies the last NN. Any number of the previous NNs can form a phrase to modify the last NN. Because determining which modifies which can be very difficult, the sequence as a whole is left flat and form the lowest level of NP, which can modify or be modified by other phrases.

```
(NP (NN 纺织)
    (NN 工业))

(NP (NN 工程)
    (NN 施工)
    (NN 招投标)
    (NN 管理)
    (NN 办法))

(NP (NN 下岗)
    (NN 分流)
    (NN 人员))

(NP (NN 压锭)
    (NN 重组)
    (NN 项目))

(NP (NN 纺织品)
    (NN 出口)
    (NN 退税率))
```

```
(NP (NN 棉花)
    (NN 供应)
    (NN 办法)))

(NP (NN 省级)
    (NN 经济)
    (NN 管理)
    (NN 权限))

(NP-PN (NN 国家)
       (NN 外国)
       (NN 投资)
       (NN 管理)
       (NN 委员会)))
```

1.3 word-level coordinations

Coordinating structures formed by combining single-word nouns or names (as described in 1.1) or noun-compounds (as described in 1.2) are also treated as the lowest level of NP. However, when they modify another noun, they are treated as phrasal modifiers.

```
(NP (NP (NN 改革)
        (CC 和)
        (NN 解困))
    (NP (NN 方面)))

(NP (NP (NN 压锭)
        (NN 重组)
        (PU 、)
        (NN 兼并)
        (NN 破产)
        (PU 、)
        (NN 结构)
        (NN 调整))
    (NP (NN 工作)))

(NP (NP (NN 能源)
        (PU 、)
        (NN 通讯)
        (ETC 等))
    (NP (NN 城市)
        (NN 基础)
        (NN 设施)))
```

1.4 proper nouns formed by NR + one or more NNs

Proper nouns formed by NR+NN are treated as the lowest level of NP. This includes two kinds.

(a) organization or company names

```
(NP (NP-PN (PU “)
           (NR 深业)
           (NN 控股)
           (PU ”))
    (CC 和)
    (NP-PN (PU “)
           (NR 深圳)
           (NN 高速)
           (PU ”)))
```

```
(NP-PN (NR 一机部)
       (NR 上海)
       (NN 电器)
       (NN 科学)
       (NN 研究所))
```

```
(NP-PN (NR 中国)
       (NN 机械)
       (NN 工业)
       (NN 部))

(NP-PN (NR 中国)
       (NN 人民)
       (NN 银行))

(NP-PN (NR 中国)
       (NN 国务院))

(NP-PN (NR 马尔维纳斯)
       (NN 群岛)))
```

Note if the organization names contain elements other than NR and NN, their internal structure will be bracketed:

```
(NP-PN (NP-PN (NR 深圳))
       (NP (ADJP  (JJ 高速))
           (NP (NN 公路)))
       (NP (NN 股份))
       (ADJP (JJ 有限))
       (NP (NN 公司)))
```

Also if the NR NN do not form a proper name, the internal structure has to be bracketed:

```
(NP (NP-PN (NR 深)
           (NR 港))
    (NP (NN 经济)
        (NN 合作)
        (NN 前景)))

(NP (NP-PN (NR 深)
           (NR 港))
    (NP (NN 经济)
        (NN 合作)
        (NN 层次)))

(NP (NP-PN (NR 重庆))
    (NP (NN 科技)
        (NN 人才)
        (NN 优势)))

(NP (NP-PN (NR 国民党)
           (NN 政府))
    (NP (PU “)
        (NN 陪都)
        (PU ” )))

(NP (NP-PN (NR 中国))
    (NP (NN 民族)
        (NN 工业)))
```

In this case, the NR projects an NP and the NP modifies the NP formed by the NNs.

(b) names + title

```
(NP-PN (NR 周)
       (NN 先生))

(NP-PN (NR 夏)
       (NN 教授))

(NP-PN (NR 朱蓉基)
       (NN 总理))
```

Note this is treated differently than position + name, in which case the two are in apposition:

cf:

```
(NP (NP-APP (NP-PN (NR 一机部)
                   (NR 上海)
                   (NN 电器)
```

```
                (NN 科学)
                (NN 研究所))
          (NP (NN 副所长)))
   (NP-PN (NR 周)
          (NN 先生)))
```

1.5 Dates and places

(a) A sequence of NTs that form the dates are left flat and grouped as the lowest level of NP:

```
(NP (NT 一九九九年)
    (NT 四月)
    (NT 十九日))
```

(b) A sequence of NRs that form the name of a place will also be grouped as an NP, the internal structure of which is left flat:

```
(NP-PN (NR 山东省)
       (NR 烟台市))
```

2 NP modifiers

The following type of modifiers can be adjoined to an NP:

2.1 QPs

```
 (NP (QP (CD ３０多)
         (CLP (M 名)))
     (ADJP (JJ 主要))
     (NP (NN 负责人)))

 (NP (QP (CD 千)
         (CLP (M 里)))
     (NP (NN 荒原)))

 (NP (QP (CD ５)
         (CLP (M 间)))
     (DNP (NP (NN 土木)
              (NN 结构))
          (DEG 的))
     (NP (NN 房舍))

 (NP (QP (CD ３００多)
         (CLP (M 只)))
     (NP (NN 羊))))
```

```
(NP (QP (ADVP (AD 近))
        (QP (CD 五十)
            (CLP (M 个))))
    (NP (NN 人)))

(NP (QP (CD 许多))
    (NP (NN 人)))
```

2.2 DPs

```
(NP (DP (DT 任何))
    (NP (NN 人)))

(NP (DP (DT 全))
    (NP (NN 国)))

(NP (DP (DT 全体))
    (NP (NN 外交)
        (NN 官员)))

(NP (DP (DT 这)
        (QP (CD 五)
            (CLP (M 个))))
    (NP (NN 学生)))
```

Note that not all determiners take QPs as complements.

2.3 ADJPs

ADJPs are projected by JJs and the noun head modified by ADJPs always project to an NP.

```
(NP (NP (NN 拆迁)
        (NN 工作))
    (ADJP (JJ 若干))
    (NP (NN 规定)))

(NP (ADJP (JJ 大型))
    (NP (NN 会议)))

(NP (ADJP (ADVP (AD 不))
          (ADJP (JJ 完全)))
    (NP (NN 统计))))
```

Note in the first example the JJ + NN combination is modified by another NP and in the last example, an ADVP modifies the JJ and the ADJP in

turn modifies the NN.

2.4 NPs

An NP modifier is made necessary in the following five cases:

(a) When there are intervening ADJPs, the last NP is considered to be the head and all the preceding NPs are considered to be modifiers. Semantically such NP modifiers are often the possessor of the head noun:

```
(NP (NP (NN 城镇)
        (NN 居民))
    (ADJP (ADJP 平均))
    (NP (NN 生活费)
        (NN 收入)))


(NP (NP (NN 农民))
    (ADJP (ADJP 人均))
    (ADJP (JJ 纯))
    (NP (NN 收入)))
```

(b) When a coordinating structure marked by coordinating conjunctions or punctuations occurs.

```
(NP (NP (NP-PN (NR 中共)
               (NN 中央)
               (NN 西南局))
        (CC 和)
        (NP-PN (NN 西南)
               (NN 军政)
               (NN 委员会)))
    (NP (NN 所在地)))

(NP (NP (NN 行政)
        (PU ,)
        (NN 科研)
        (PU ,)
        (NN 管理))
    (NP (NN 人员)))

(NP (NP (NR 山东)
        (PU ,)
        (NR 四川)
        (PU ,)
        (NR 江苏)
        (ETC 等))
    (NP (NN 省份)))
```

(c) When there is NR NN sequence which does not form a proper name, the NR projects a phrase bearing the functional tag -PN and is adjoined to the noun head:

```
(NP (NP-PN (NR 深)
           (NR 港))
    (NP (NN 经济)
        (NN 合作)
        (NN 前景)))

(NP (NP-PN (NR 深)
           (NR 港))
    (NP (NN 经济)
        (NN 合作)
        (NN 层次)))

(NP (NP-PN (NR 重庆))
    (NP (NN 科技)
        (NN 人才)
        (NN 优势)))

(NP (NP-PN (NR 国民党)
           (NN 政府))
    (NP (PU “)
         (NN 陪都)
         (PU ” )))

(NP (NP-PN (NR 中国))
    (NP (NN 民族)
        (NN 工业)))
```

(d) When there is an appositive construction

```
(NP (NP-APP (NP-PN (NR 一机部)
                   (NR 上海)
                   (NN 电器)
                   (NN 科学)
                   (NN 研究所))
            (NP (NN 副所长)))
    (NP-PN (NR 周)
           (NN 先生)))
```

(e) When an ADJP (or any other modifiers) modifies a noun that is not the head of the larger noun phrase.

```
(NP (NP (ADJP (JJ 程控))
        (NP (NN 交换机)))
    (NP (NN 产品))))
```

2.5 DNPs

DNPs are formed by various phrasal categories plus the (DEG 的). They always occur in the context of NP. (DEG 的) has no content other than marking the preceding phrase as an NP modifier.

```
(NP (DNP (NP-PN (NR 张三))
         (DEG 的))
    (NP (NN 书)))

(NP (DNP (NP-PN (NR 中国)
                (NN 人民)
                (NN 银行))
         (DEG 的))
    (NP (NN 贷款)))


(NP (DNP (NP (NP-PN (NR 长江)
                    (PU 、)
                    (NR 嘉陵江))
             (NP (NN 交汇处)))
         (DEG 的))
    (NP (NN 山丘)
        (NN 坡地)))


(NP (DNP (NP-PN (NR 重庆))
         (DEG 的))
    (NP (NN 国民)
        (NN 经济)
        (CC 和)
        (NN 社会)
        (NN 事业)))


(NP (DNP (ADJP (JJ 大型))
         (DEG 的))
    (NP (NN 会议)))


(NP (DNP (LCP (NP (NN 传说))
              (LC 中))
          (DEG 的))
    (NP (PU “)
        (NN 西天)
        (PU ” )))


(NP (NP (NN 党))
    (DNP (PP (P 在)
```

```
            (LCP (NP (NN 社会)
                     (NN 基层)
                     (NN 组织))
                 (LC 中)))
        (DEG 的))
    (NP (NN 战斗)
        (NN 堡垒)))


(NP (DNP (QP (CD １３)
             (CLP (M 年)))
         (DEG 的))
    (NP (NN 开发)
        (NN 建设))))
```

2.6 Relative clauses

We recognize four types of relative clauses, based on dimensions such as the absence/presence of the complementizer (DEC 的), the absence/presence of the NP head, the category of the moved item (e.g., PP, NP).

The types of traces are shown in the following tables:

	with DEC	without DEC
with head	NP/PP	NP/PP
without head	NP	-

2.6.1 Headed relative clause with (DEC 的) and an NP trace:

```
 (NP (CP (WHNP-1 (-NONE- *OP*))
         (CP (IP (NP-PN-SBJ (NN 国家)
                            (NN 开发)
                            (NN 银行))
                 (VP (NP-TMP (NT 今年))
                     (VP (VV 发行)
                         (NP-OBJ (-NONE- *T*-1)))))
             (DEC 的)))
     (QP (CD 六百五十亿))
     (NP (NN 金融)
         (NN 债券)))
```

The gap can be in the topic position. Note also that the topic is at the IP-level instead of the CP-level to 'vacate' space for complementizers and the relative operator:

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-TPC (-NONE- *T*-1))
                (NP-SBJ (NN 总量))
                (VP (VC 为)
                    (NP-PRD (QP (CD 二十二万))
                            (NP (NN 线)))))
            (DEC 的)))
    (ADJP (JJ 程控))
    (NP (NN 交换机)
        (NN 设备)))
```

There can be multiple relative clauses for a single NP head:

```
(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-PN-SBJ (NP-PN (NR 中国))
                                   (NP (NN 电气)
                                       (NN 进出口))
                                   (ADJP (JJ 联营))
                                   (NP (NN 公司)))
                        (VP (VV 代理)
                            (NP-OBJ (-NONE- *T*-1))))
                    (DEC 的)))
            (CP (WHNP-2 (-NONE- *OP*))
                (CP (IP (NP-PN-SBJ (NR 上海)
                                   (NR 贝尔))
                        (VP (VV 生产)
                            (NP-OBJ (-NONE- *T*-2))))
                    (DEC 的)))
            (NP (ADJP (JJ 程控))
                (NP (NN 交换机)))
            (NP (NN 产品)))
    (VP (VV 中标)))
```

Relative clauses can be nested:

```
  (IP (NP-SBJ (PN 这))
      (VP (ADVP (AD 也))
          (VP (VC 是)
              (NP-PRD (CP (WHNP-2 (-NONE- *OP*))
                          (CP (IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                                              (CP (IP (NP-SBJ (NP-PN (NR 中国))
                                                              (NP (NN 国内)))
                                                      (VP (VV 生产)
                                                          (NP-OBJ (-NONE- *T*-1))))

                                              (DEC 的)))
                                          (NP (ADJP (JJ 程控))
                                              (NP (NN 交换机)))
                                          (NP (NN 产品)))
                                  (VP (VV 赢得)
```

```
                                        (NP-OBJ (-NONE- *T*-2))))
                                 (DEC 的))
                          (ADJP (JJ 重要))
                         (NP (NN 订单)
                             (NN 之一)))))
     (PU 。))
```

Note the use of the null operator as well as the trace (-NONE- *T*) that is coindexed with it.

2.6.2 Headed relative clause with 的 and a PP-trace:

Headed relative clause with PP traces are not as easily detectable as relative clauses with NP traces, since the underlying structure can possibly use a variety of phrasal and clausal categories in the position of the PP trace. PP trace is more appropriately understood as some kind of VP adjunct trace. Still, we label the trace PP to differentiate this kind of relative clause from relative clauses where the gap is an argument.

Generally, the head of this type of relative clause denotes time, location, reason, manner, etc. It differs from the relative clause with an NP trace in that the gap is not an argument position. As such it typically occupies a preverbal adjunct position in Chinese. If the VP has multiple adjuncts, the gap is stipulated to be the first position after the subject.

(a) location

```
  (NP (CP (WHPP-1 (-NONE- *OP*))
          (CP (IP (NP-SBJ (PN 他们))
                  (VP (PP-LOC (-NONE- *T*-1))
                      (VP (VV 工作))))
              (DEC 的)))
      (NP (NN 单位)))
```

```
 (NP (CP (WHPP-1 (-NONE- *OP*))
         (CP (IP (NP-SBJ (NN 职工))
                 (VP (PP-LOC (-NONE- *T*-1))
                     (VP (VV 购)
                         (NP-OBJ (NN 房)))))
             (DEC 的)))
     (NP (NN 经济)
         (NN 环境)))
```

(b) reason

```
(NP (CP (WHPP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (NN 卫星))
                (VP (PP-PRP (-NONE- *T*-1))
                    (VP (VPT (VV 进)
                             (AD 不)
                             (AS 了))
                        (NP-OBJ (ADJP (JJ 同步))
                                (NP (NN 轨道))))))
            (DEC 的)))
    (NP (NN 原因)))))))
```

(c) manner

```
(IP (NP-PN-SBJ (NR 中国)
               (NN 人民)
               (NN 银行))
    (VP (VC 是)
        (NP-PRD (CP (WHPP-1 (-NONE- *OP*))
                    (CP (IP (NP-SBJ (NN 境内)
                                    (NN 机构))
                            (VP (PP-MNR (-NONE- *T*-1))
                                (VP (VV 借用)
                                    (NP-OBJ (NN 国际)
                                            (NN 商业)
                                            (NN 货款)))))
                        (DEC 的)))
                (NP (NN 审批)
                    (NN 机关)))))
```

2.6.3 Headless relatives:

There is no overt head in a relative construction although the NP as a whole has an understood reference, either generic or implied in the context. The gap is generally in an argument position.

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-1))
                (VP  (VV 出席)
                     (NP-OBJ (NN 研讨会))))
            (DEC 的))))
```

Note that the extra layer of NP outside the CP is used to mark its nominal status.

The pseudo cleft construction in Chinese is structurally indistinct from the headless relative construction so they are treated alike, although they may

very well be different pragmatically:

```
(IP (NP-SBJ (PN 这))
    (VP (VC 是)
        (NP-PRD
          (CP (WHNP-1 (-NONE- *OP*))
              (CP (IP (NP-PN-SBJ-1 (NP-APP (NR 天津市)
                                           (NN 副市长))
                                   (NP-PN (NR 叶迪生)))
                      (VP (NP-TMP (NT 今天))
                          (PP-LOC (P 在)
                                  (LCP (IP (NP-PN-SBJ-1 (-NONE- *pro*))
                                           (VP (PP-BNF (P 为)
                                                       (NP-OBJ (NP-PN (NR 美国)
                                                                      (NR 纽约)
                                                                      (NN 大学)
                                                                      (NR 史敦)
                                                                      (NN 工商)
                                                                      (NN 管理)
                                                                      (NN 学院))))
                                                   (VP (VV 作)
                                                       (NP-OBJ (NN 投资)
                                                               (NN 专题)
                                                               (NN 报告)))))
                                       (LC 时)))
                          (VP (VV 指出)
                              (NP-OBJ (-NONE- *T*-1)))))
              (DEC 的)))))
    (PU 。))
```

2.6.4 Relative clauses without 的

Relative clauses without (DEC 的) are not as frequent as relative clauses with (DEC 的),
but they have been observed in the corpus.

(a) with NP gap

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (IP (NP-SBJ (NN 外国))
            (VP (VV 投资)
                (NP-OBJ (-NONE- *T*-1)))))
    (NP (NN 企业)))
```

(b) with PP gap

```
 (NP (CP (WHPP-3 (-NONE- *OP*))
         (IP (NP-SBJ (NN 居民))
```

```
            (VP (PP-LOC (-NONE- *T*-3))
                (VP (VA 密集)))))
    (NP (NN 地区)))
```

```
   (NP (CP (WHPP-9 (-NONE- *OP*))
           (CP (IP (NP-SBJ (NN 国家))
                   (VP (PP (-NONE- *T*-9))
                       (VP (VV 核销)
                           (NP-OBJ (NP (NN 银行))
                                   (ADJP (JJ 呆))
                                   (ADJP (JJ 坏))
                                   (NP (NN 帐))))))
       (NP (NN 准备金))))
```

2.7 Appositive constructions

Appositive constructions are always NPs. Apposition can be viewed as a special kind of modification. There are two scenarios where appositive constructions can occur. The first one is when one NP modifies another NP and the two NPs "mean or refer to the same entity". It differs from cases in which a noun modifies a noun head. In the former case, the appositive is always a phrasal category element, that is, an NP. In the latter case, the modifier is a word level category element.

Appositives of this type are attached at the same level as the NPs of which they are appositives to and receive the functional tag -APP:

```
(NP (NP-APP (CP (WHNP-3 (-NONE- *OP*))
                (IP (NP-SBJ (-NONE- *T*-3))
                    (VP (VV 参加)
                        (NP-PN-OBJ (ADJP (JJ 关贸))
                                   (ADJP (JJ 总))
                                   (NP (NN 协定))))))
            (NP (NN 首席)
                (NN 谈判)
                (NN 代表))))
   (NP-PN (NR 沈觉人)))
```

The second scenario where appositives happen is when a clause other than a relative clause occurs inside an NP. No gap can be identified inside the clause. Whether there is a gap or not is a definitive test for distinguishing between a relative clause and an appositive clause; however, sometimes this is not enough, especially when the gap is an adjunct. In this case, the annotator should use the suggestive test that the appositive clause "provides the content for the noun head". The noun head and the appositive clause can be put in an equative frame like "noun head

是 appositive clause".

```
(NP  (CP-APP (IP (IP (NP-SBJ (NN 沿海)
                             (NN 开放)
                             (NN 城市)
                             (PU 、)
                              (NN 沿海)
                             (NN 经济)
                             (NN 开放区)
                             (PU 、)
                              (NN 边境)
                             (NN 开放)
                             (NN 城镇))
                        (VP (ADVP (AD 相))
                            (VP (VV 结合))))
                  (PU ，)
                   (IP (NP-SBJ (-NONE- *pro*))
                        (VP (PP-DIR (P 由)
                                    (NP (NN 沿海)
                                        (PU 、)
                                        (NN 沿边)
                                        (PU 、)
                                        (NN 沿江)))
                            (PP-DIR (P 向)
                                    (NP (NN 腹地)))
                            (VP (VV 推进)))))
                (DEC 的))
      (DNP (NP (NP (QP (CD 多))
                   (NP (NN 领域)))
               (PU 、)
               (NP (QP (CD 多))
                   (NP (NN 层次))))
           (DEG 的))
      (IP-APP (NP-SBJ (-NONE- *pro*))
               (VP (PP (P 对)
                       (NP (NN 外)))
                   (VP (VV 开放))))
      (NP (NN 总体)
          (NN 格局)))
```

```
(NP (CP-APP (IP (NP-PN-SBJ (NR 朱榕基))
                (VP (VV 访问)
                    (NP-PN-OBJ (NR 美国))))
            (DEC 的))
    (NP (NN 消息)))
```

```
(NP (IP-APP  (NP-PN-SBJ (NR 朱榕基))
             (VP (VV 访问)
                 (NP-PN-OBJ (NR 美国))))
```

```
(DP (DT 这)
    (QP (CD 一)))
(NP (NN 消息)))
```

Section IV Verb Phrases

This section specifies the policy of how verb phrases are handled. It has four parts. Subsection 1 describes what goes into the verbal head without projecting a separate layer. Subsection 2 describes a classification of verbs based on the type and the number of arguments they take. Subsection 3 describes the kind of modifiers that are adjoined to the VP. Subsection 4 deals with a number of difficult constructions in Chinese.

1. The verbal head

Verb compounds and aspect markers are handled at the word level. The verb (including verb compound) + aspect sequence forms the verbal head that takes zero or more complement to form a VP.

Note: not all of the sequences of verbs form verb compounds. For the cases where they do not form compounds, check Appendix B.

1.1 verb compounds

Although compounding is highly productive in Chinese, it is still considered to be a lexical process. Therefore compounds are treated in a similar fashion as simple monolithic verbs. The challenge is to clearly identify compounds and distinguish them from situations where a phrasal projection is necessary. Due to the lack of a clear standard between compounds and phrases in Chinese, we will adopt the following working criteria for verb compounds where there is a sequence of verbs: (1) they share the argument structure, (2) they share aspect markers, (3) they share modifiers, (4) they do not fall into the clearly defined raising or control structures. No claim is made here with respect to the distinction between phrases and words in Chinese.

The following is a classification of verbal compounds with examples illustrating how they are bracketed. This is an area that is likely to cause inter-annotator inconsistencies.

(a) Coordinated verb compounds (VCD)

The verbs have the same subcategorization frames and share the arguments in the context. If they are followed by objects, the annotation can be seen as a short-hand of

```
 (VP (VP V1
         (NP-OBJ (-NONE- *RNR*-1)))
     (VP V2
         (NP-OBJ ..)))
```

Examples:

```
(VP (VCD (VV 开发)
         (VV 建设))
    (NP-OBJ (PU “)
            (VE 无)
            (NN 人)
            (NN 区)
            (PU ”))))
```

More examples:

```
(VP (VCD (VV 回国)
         (VV 就职)))

(VP (VCD (VV 开发)
         (VV 建设)))

(VP (VCD (VV 贯彻)
         (VV 执行)))

(VP (VCD (VV 登记)
         (VV 注册))

(VP (VCD (VV 勘探)
         (VV 开发)))
```

(b) Verb-resultative and verb-directional compounds (VRD):

In general, verb compounds of the category fall into two distinctive constituents with the second constituent indicating the direction result of the first constituent.

Examples:

```
(VP (VRD (VV 研制)
         (VA 成功))
    (NP-OBJ (NP (NN 数字))
            (ADJP (JJ 程控))
            (NP (NN 交换机))))
```

More examples:

```
(VP (VRD (VV 降)
         (VV 下来)))
```

```
(VP (VRD (VV 下降)
         (VV 到)))

(VP (VRD (VV 建立)
         (VV 起)))

(VP (VRD (VV 体会)
         (VV 到)))

(VP (VRD (VV 提取)
         (VV 出)))

(VP (VRD (VV 武装)
         (VV 成为)))

(VP (VRD (VV 表达)
         (VV 出)))

(VP (VRD (VV 联合)
         (VV 起来)))
```

(c) Verb compounds forming a modifier + head relationship (VSB)

In this case the first constituent necessarily is intransitive and there can be no adjuncts or aspect markers between them.

Examples:

```
(VP (VSB (VV 驱车)
         (VV 行程))
    (QP-EXT (CD ８００多)
            (CLP (M 公里))))

(VP (VSB (VV 拿来)
         (VV 支付)))

(VP (VSB (VV 仰头)
         (VV 望去)))

(VP (VSB (VV 争)
         (VV 吃)))
```

(d) Verb compounds formed by VV + VC (VCP):

Example:

```
(VP (VCP (VV 看作)
         (VC 是)))
```

1.2 verb (compound) + aspect marker/得

Aspect markers (e.g. 了, 着, 过) are not bracketed together with the preceding verb. The verb, the aspect marker are placed at the same level. 得 is bracketed in a similar manner:

```
(VP (VV 分析)
    (AS 了)
    (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-SBJ (QP (CD 两)
                                    (CLP (M 次)))
                                (NP (NN 对接)))
                        (VP (PP-PRP (-NONE- *T*-1))
                            (VV 失败)))
                    (DEC 的)))
            (NP (NN 原因))))
```

(VV 坚持) (AS 了)

(VV 冒) (AS 着)

(VV 意味) (AS 着)

(VV 参加) (AS 过)

(VV 做) (DER 得)

(VV 写) (DER 得)

If the preceding string is a compound it is also placed at the same level as the aspect marker:

(VCD (VV 培养) (VV 造就)) (AS 了)

(VRD (VA 紧张) (VV 起来)) (SP 了)

(VRD (VV 移交) (VV 给)) (AS 了)

1.3 A-not-A, A-one-A,

In this case, the A-not-A is treated as a word-level category and labeled as VNV:

```
(IP (NP-PN-SBJ (NR 中国))
    (VP (VNV  (VV 能)
              (AD 不)
              (VV 能))
        (VP (VRD (VV 研制)
                 (VV 成功))
            (NP-OBJ (NP (NN 数字))
```

```
                    (ADJP (JJ 程控))
                   (NP (NN 交换机))))))
```

Examples:

```
(VNV (VV 能)
     (AD 不)
     (VV 能))
```

1.4 Potential forms V-bu-V, V-de-V

The potential form is treated as a word-level category and labeled as VPT. bu/de are considered to be infixes:

```
(VP (VPT (VV 打)
         (AD 不)
         (VV 赢))
    (NP-OBJ (DP (DT 这)
                (CLP (M 场)))
            (NP (NN 战争))))
```

It is important to note that this is different from V-de construction in that in the V-de construction the de is followed by either a VP or an IP whereas the potential form can be either transitive or intransitive.

1.5 Types 1.1-1.4 can be combined to form more complicated "compounds".

The table shows the types that can be combined.
A(i,j) = if the type j can be applied AFTER type i is applied.
"?" means the result is marginal.

	VCD	VRD	V-ASP	V-not-V	V-one-V
VCD	yes*	yes	yes	?	no
VRD	yes	no	yes	?	no
V-ASP	yes	no	yes**	no	no
V-not-V	yes	?	no	no	no
V-one-V	yes	no	no	no	no

*: VCD + VCD is the same as VCD.
**: V-ASP + V-ASP works only for V-过-了.

Examples:

```
VCD + VRD:   (VRD (VCD (VV 开发) (VV 建设))
                  (VV 出))
```

```
 VCD + V-ASP: (VCD (VV 培养) (VV 造就))
              (AS 了)

 VRD + V-ASP: (VRD (VA 紧张) (VV 起来))
              (AS 了)

              (VRD (VV 移交) (VV 给))
              (AS 了)
```

1.6 coordination with conjunctions

(a) without complements

```
(VP (ADVP (AD 都))
    (PP (P 与)
        (NP (NP-PN (NR 德国))
                   (NP (NN 始祖鸟))))
    (VP (VA 相近)
        (CC 和)
        (VA 相似)))
```

(b) with complements

```
(VP (ADVP (AD 不断))
    (VP (VP (VV 影响)
            (NP-OBJ (-NONE- *RNR*-1)))
        (PU 、)
        (VP (VV 辐射)
            (NP-OBJ (-NONE- *RNR*-1)))
        (CC 和)
        (VP (VV 带动)
            (NP-OBJ-1 (DNP (NP (NP (NN 农村))
                               (NP (PU “)
                                   (QP (CD 两)
                                       (CLP (M 个)))
                                   (NP (NN 文明))
                                   (PU ”))
                               (NP (NN 建设)))
                           (DEG 的))
                      (NP (NN 发展))))))
```

Examples:

```
(VV 继承) (CC 和) (VV 发扬)
(VV 解释) (CC 并) (VV 回答)
(VV 丰富) (CC 和) (VV 完善)
(VV 拓展) (CC 与) (VV 变革)
```

1.7 null verbal heads

In some cases the predicate is non-verbal (e.g., NP or QP). In those cases, we assume that the NP or QP predicate projects to a VP.

```
(IP (NP-SBJ (ADJP (JJ 从业))
            (NP (NN 人员)))
    (VP (NP-PRD (QP (CD 九万七千九百六十三))
                (NP (NN 人)))))
```

2 Classification of verbs

Since predicates are primarily verbs, a classification of verbs based on the number and type of arguments that a verb takes helps to determine the underlying structure of a clause. The argument structure of a predicate provides clues as to whether there are missing arguments and if there are, where their null counterparts should be.

2.1 One-place predicate

One place predicate generally has a surface subject and no object. It includes the following:

2.1.1 Adjectival verbs. These are the verbs that are tagged as VA in the POS tagging phase (e.g., 顺利, 勇敢, 好, 头疼).

```
(IP (IP-SBJ (NP-SBJ (-NONE- *pro*))
            (VP (VCD (VV 登报)
                     (VV 揭露))))
    (VP (ADVP (AD 就))
        (ADVP (AD 很))
        (VP (VA 有效))))
```

```
  (IP (NP-PN-SBJ (NR 张三))
      (VP (PP (P 对)
              (NP-PN (PN 李四)))
          (ADVP (AD 很))
          (VP (VA 仁慈))))
```

Note that we treat the PP 对李四 as an adjunct.

2.1.2 Intransitive action verbs (e.g., 飞, 唱歌, 散步)

```
(IP (NP-SBJ (NP (NN 旅游))
            (ADJP (JJ 大))
            (NP (NN 轿车)))
   (VP (ADVP (AD 径))
       (PP-DIR (P 向)
               (NP (NP  (NN 西南))
                  (PRN  (PU ———)
                        (NP (NP-PN (NR 富士山))
                            (NP (NN 方向))))
       (VP (VV 疾驶))))
```

2.1.3 Ergative verbs (e.g., 开, 锁, 丢, 沉). Although it has been argued in the literature that the surface subject is base-generated in the post-verbal position, we do not represent this derivation here.

```
(IP (NP-SBJ (NN 门))
    (VP (VV 开)
        (AS 了)))
```

2.1.4 Weather verbs. (e.g., 下雨, 打雷, 起风).

```
(IP (NP-SBJ (DP (DT 那)
                (CLP (M 个)))
            (NP (NN 地方)))
    (VP (ADVP (AD 经常))
        (VP (VV 下雨))))
```

2.1.5 Raising predicates (e.g. 看起来, 好象).

```
(IP  (NP-SBJ (-NONE- *pro*))
     (VP (VV 好象)
         (IP (NP-SBJ (PN 他))
             (VP (ADVP (AD 很))
                 (VP (VV 高兴)))))
```

2.2 Two place predicates

2.2.1 Subject + nominal complement

2.2.1.1 Action verbs (e.g., 投资, 负责, 拜访)

```
(VP (DVP (NP (ADJP (JJ 最大))
             (NP (NN 限度)))
         (DEV 地))
```

```
(VP (VV 利用)
    (NP-OBJ (DP (DT 这)
                (CLP (M 颗)))
            (NP (NN 卫星)))))
```

2.2.1.2 Experiential verbs (e.g., 喜欢, 想念)

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 喜欢)
        (NP-PN-OBJ 李四)))
```

2.2.1.3 Locative-subject + Noun complements (e.g., 挂, 贴)

```
(IP (LCP-SBJ (NP (NN 墙))
             (LC 上))
    (VP (VV 挂)
        (AS 了)
        (NP-OBJ (QP (CD 一)
                    (CLP (M 幅)))
                (NP (NN 画)))))
```

2.2.1.4 Copula verbs, which are tagged as VC (e.g., 是, 为)

```
(IP (IP-SBJ (NP-SBJ (-NONE- *pro*))
            (VP (VV 坚持)
                (NP-OBJ (NN 新闻)
                        (NN 真实性)
                        (NN 原则))))
    (PU ，)
    (VP (VC 是)
        (NP-PRD (DNP (NP (DNP (NP (NN 党))
                              (DEG 的))
                         (NP (NN 新闻)
                             (NN 事业)))
                     (DEG 的))
                (ADJP (JJ 优良))
                (NP (NN 传统)))))

 (IP (ADVP (AD 无怪乎))
     (NP-SBJ (NN 日本人))
     (VP (VP (VV 视)
             (IP-OBJ (NP-SBJ (PN 之))
                     (VP (VC 为)
                         (NP-PRD (DNP (NP (NN 大自然))
                                      (DEG 的))
                                 (NP (NN 馈赠)))))))
```

2.2.1.5 Measure verbs (e.g., 值, 重, 长, 宽, 达)

```
(IP (NP-SBJ (DP (DT 这)
                (CLP (M 艘)))
            (NP (NN 船)))
    (VP (VA 长)
        (QP-EXT (CD 一百)
                (CLP (M 米)))))
```

2.2.1.6 Existential verbs (e.g., 有)

```
(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-SBJ (-NONE- *T*-1))
                        (VP (VV 出席)
                            (NP-OBJ (NN 仪式)))))
                  (DEC 的)))
    (VP (VE 有)
        (NP-OBJ (NP (NP-APP (NN 代表)
                            (NN 委员会)
                            (NN 主席))
                    (NP-PN (NR 比利亚塞尼奥尔)))
                (PU ，)
                (NP (NP-PN (NP-PN (NR 拉美))
                           (NP (NN 一体化)
                               (NN 协会)))
                    (NP (ADJP (JJ 正))
                    (PU 、)
                    (NP (NN 副秘书长))))
                (PU ，)
                (NP (NP (NN 成员国)
                        (NN 代表))
                    (CC 和)
                    (NP (DNP (NP (DP (DT 其他))
                                 (NP (NN 国家)))
                             (DEG 的))
                        (ADJP (JJ 常驻))
                        (NP (NN 观察员)))))))
```

```
(IP (PP (P 据)
        (NP (NN 了解)))
    (NP-SBJ (-NONE- *pro*))
    (PU ，)
    (VP (ADVP (AD 将))
        (VP (VE 有)
            (IP-OBJ (NP-SBJ (QP (CD 六百亿))
                            (NP (NN 资金)))
                    (VP (VV 用)
```

```
                    (PP (P 于)
                       (NP (QP (CD 三百四十五)
                               (CLP (M 个)))
                           (ADJP (JJ 大中型))
                           (NP (NN 基建)
                              (NN 项目)))))))))
```

Note that in the second example (VE 有) takes a sentential argument.

2.2.2 Subject + sentential complement.

2.2.2.1 Psychological verbs like (e.g., 相信, 认为)

```
 (IP (NP-PN-SBJ (NR 明石康))
     (VP (VV 认为)
         (PU ， )
          (IP-OBJ (NP-SBJ (DP (DT 这)
                              (CLP (M 次)))
                          (NP (NN 会谈)))
                  (VP (VC 是)
                      (NP-PRD (PU “)
                              (CP (WHNP-1 (-NONE- *OP*))
                                  (CP (IP (NP-SBJ (-NONE- *T*-1))
                                          (VP (ADVP (AD 十分))
                                              (VP (VA 积极))))
                                      (DEC 的)))
                              (PU ” )))))
     (PU 。))
```

Due to the across-the-board lack of overt complementizers and other CP level elements when the clause is a complement of the verb, we do not posit a null complementizer and as a result we do not have a CP level. The verb takes IP as its complement.

2.2.2.2 Subject control verbs (e.g., 试图, 要)

```
    (IP (PP (P 对)
            (NP (PN 此)))
        (PU ， )
        (NP-SBJ (NP-PN (NR 英国))
                (NP (NN 政府)))
         (VP (ADVP (AD 遂))
             (VP (VV 决定)
                 (IP-OBJ (NP-SBJ (-NONE- *PRO*))
```

```
(VP (BA 将)
   (IP-OBJ (NP-SBJ (NP (PN 其))
                   (PP (P 对)
                       (NP (NP-PN (NR 马岛))
                           (NP (NN 附近)
                               (NN 水域))))
                   (NP (NN 管辖权)))
           (VP (PP (P 由)
                   (QP (CD １５０)
                       (CLP (M 海里))))
               (VP (VRD (VV 扩大)
                        (VV 到))
                        (QP-OBJ (CD ２００)
                                (CLP (M 海里))))))))))
```

A subject control verb takes an IP as its complement and the subject of the IP is always empty. The empty subject is a (-NONE- *PRO*).

Superficially the structures of a two-place subject-control verb and a raising verb are very similar. Both have the sequence "NP1 V1 VP", V1 being the verb in question. But they are different in that raising verbs can take a bei-construction as its complement while the subject-control verbs can not:

control verb: * 张三 试图 被 抢 了.

vs.

raising verb: 张三 好象 被 抢 了.

In general raising verbs do not have selectional restrictions for their sentential complements but control verbs do.

2.2.3 Verbs that take VP

2.2.3.1 Modal verbs.

Modal verbs in Chinese are very much like raising verbs syntactically. However, not all modal verbs can occur in the sentence-initial position. When they occur in the sentence-initial position they are treated on a par with raising verbs:

```
(IP (NP-SBJ (-NONE- *pro*))
    (VV (VV 应该)
        (IP-OBJ (NP-SBJ (PN 他))
                (VP (VV 去)))))
```

```
(IP (NP-SBJ (LCP-SBJ-1 (NP-PN (NR 美)
                              (NR 中))
                       (LC 之间))
            (VP (VV 建立)
                (NP-OBJ (NP (NN 电子))
                        (ADJP (JJ 高速))
                        (NP (NN 信息)
                            (NN 公路)))))
     (PU ， )
     (VP (VV 使)
         (NP-OBJ (NP-PN (NR 纽约)
                        (NN 股票)
                        (NN 交易所))
                 (CC 与)
                 (NP-PN (NR 上海)
                        (NN 证券)
                        (NN 交易所)))
         (IP (NP-SBJ (-NONE- *PRO*-1))
            (VP (VV 能)
                (VP (ADVP (AD 早日))
                    (VP (VV 实现)
                        (NP-OBJ (NN 交易)
                                (CC 及)
                                (NN 信息)
                                (NN 交流)))))))
```

2.2.3.2 Aspectual verbs

(a) V1+V2:

V1 is an aspectual verb, auxiliary verb (including modal verb), or "passivized" verbs such as 预计/(is estimated), 相信/(is believed).

The NP before V1 is the logic subject of V2, rather than the logic subject of V1.

We project V2 to VP which is a sister of V1.

Examples:

```
(IP (NP-SBJ (NN 产值))
    (VP (VV 继续)
        (VP (VV 增长))))
```

More examples:

aspectual verbs:

```
(VP (VV 继续)
    (VP (VV 努力)))
```

"passivized" verbs:

```
(VP (VV 预计)
    (VP (VV 下降)))
```

auxiliary verbs:

```
(VP (VV 是否)
    (VP (VE 有)))

(VP (VV 没有)
    (VP (VV 屈服)))
```

(b) V1+V2: V+VP

V1 is 来 or 去.

Project V2 to VP, which is a sister of V1.

```
(VP (VV 去)
    (VP (VV 踢球)))
```

2.2.3.3 是 for emphasis

```
(IP (NP-PN-SBJ  (NR 四川省)
                (CC 和)
                (NR 安徽省))
    (VP (VC 是)
        (VP (ADVP (AD 首次))
            (VP (VV 参加))))
    (PU 。))
```

2.4 Three-place predicates

2.4.1 Subject + Object1 + Object2 (e.g., 给, 还, 送, 欠, 罚, 骗, 教, 问)

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 送)
        (NP-PN-IO (NR 李四))
        (NP-OBJ (QP (CD 一)
                    (CLP (M 件)))
                (NP (NN 礼物)))))

(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 欠)
        (NP-PN-IO (NR 李四))
        (QP-OBJ (CD 一万)
                (CLP (M 元)))))
```

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 帮)
        (AS 了)
        (NP-PN-IO (NR 李四))
        (NP-OBJ (QP (CD 一)
                    (CLP (M 个)))
                (NP (NN 忙)))))
```

2.4.2 Subject + Object NP + clausal complement

2.4.2.1 Verbs such as 告诉, 通知.

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 告诉)
        (NP-PN-OBJ (NR 李四))
        (IP (NP-PN-SBJ (NR 王五))
            (VP (VV 来)
                (AS 了)))))
```

Note that verbs of this category take two complements, an NP and an IP. This is different from the object control verbs in that the subject of the complement clause does not have to be a null category. When the subject is a null category, it does not have to, although it can, be coreferential with the object of the matrix clause. For that matter it does not have to be coreferential with the subject either, which makes it different from a three-place subject control verb.

2.4.2.2 Subject control verbs (e.g., 答应)

```
(IP (NP-PN-SBJ-1 (NR 张三))
    (VP (VV 答应)
        (NP-PN-OBJ  (NR 李四))
        (IP-OBJ (NP-SBJ (-NONE- *PRO*-1))
                (VP (NP-TMP (NT 明天))
                    (VP (VV 来))))))
```

Note that the verbs in this category takes two complements, an NP and an IP. The subject of the complement IP is co-referential with the subject of the matrix clause.

2.4.2.3 Object control verbs (e.g., 劝, 逼, 使, 引诱, 原谅)

```
(IP (NP-SBJ (NN 导游))
    (VP (VV 命令)
        (NP-OBJ (NN 车子))
        (IP (NP-SBJ (-NONE- *PRO*))
            (VP (VV 停下)))))
```

```
(IP (NP-PN-SBJ (NR 海协))
    (VP (ADVP (AD 一再))
        (VP (VV 要求)
            (NP-OBJ-1 (QP (CD 两))
                      (NP (NN 会)))
            (IP (NP-SBJ (-NONE- *PRO*-1))
                (VP (VV 应)
                    (VP (PP (P 就)
                            (NP (IP-APP (ADVP (AD 近年来))
                                        (NP-SBJ (NP-PN (NR 台湾))
                                                (NP (NN 军方)))
                                        (VP (VP (VCD (VV 打死)
                                                     (VV 打伤))
                                                (NP-OBJ (NN 大陆)
                                                        (NN 沿海)
                                                        (NN 渔民)))
                                        (PU 、)
                                        (VP (VV 造成)
                                            (NP-OBJ (ADJP (JJ 严重))
                                                    (NP (NN 生命)
                                                        (NN 财产)
                                                        (NN 损失))))))
                                (NP (NN 问题))))
                        (VP (VV 进行)
                            (NP-OBJ (NN 协商))))))
    (PU 。))
```

```
(IP (NP-PN-SBJ (NR 国务院))
    (VP (VV 批准)
        (NP-OBJ-1 (DP (DT 这些))
                  (NP (NN 城市)))
        (IP (NP-SBJ (-NONE- *PRO*-1))
            (VP (VV 设立)
                (NP-OBJ (NN 边境)
                        (NN 经济)
                        (NN 合作区))))))
```

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 逼)
        (NP-PN-OBJ-1 (NR 李四))
        (IP (NP-SBJ (-NONE- *PRO*-1))
            (VP (VV 抢)
                (NP-OBJ (NN 银行))))))
```

Verbs of this category take two complements, an NP and an IP. The subject of the complement clause is coreferential with the object of the matrix clause.

Superficially, three-place subject-control verbs and object-control verbs are similar to psychological verbs that take a clausal complement. All have the pattern "NP1 V1 NP2 VP". However, they are different in that

(1) the psychological verbs can take an existential construction as its complement, but the control verbs can not:

psychological verbs: 张三 相信 李四 有 才能

control verb: * 张三 答应 李四 有 才能
* 张三 逼 李四 有 才能

(2) the psychological verbs can take idioms, which are generally stative, but control verbs can not:

psychological verbs: 张三 相信 李四 杞人忧天

control verb: * 张三 答应 李四 杞人忧天
* 张三 逼 李四 杞人忧天

(3) the psychological verbs can take bei-constructions but control verbs cannot:

psychological verbs: 张三 相信 李四 被 打了

control verb: * 张三 答应 李四 被 打了
* 张三 逼 李四 被 打了

(4) the psychological verbs take a clause with a topic but the control verbs do not:

psychological verbs: 张三 相信 李四 王五 喜欢

control verb: * 张三 答应 李四 王五 喜欢
* 张三 逼 李四 王五 喜欢

(5) the psychological verbs take a clause with aspect markers 了(perfective), 过(experiential) while control verbs normally cannot.

psychological verbs: 张三 相信 王五 看见 了/过 李四

control verb: * 张三 答应 王五 看见 了/过 李四
* 张三 逼 王五 看见 了/过 李四

2.5. Secondary predicates

QPs and certain NPs generally occur in postverbal positions to indicate extent, degree, or quantity. Notably ADVPs rarely appear at this position. The fact

that these elements do not pattern exactly with ADVPs may be some indication that they are not modifiers but secondary predicates (See James Huang's work) and we represent the functional tag -EXT and treat it as one of the complements of the verb. It can co-occur with another NP bearing the -OBJ tag.

```
 (VP (ADVP (AD 年))
     (VP (VV 产)
         (NP-OBJ (ADJP (JJ 漂白))
                 (NP (NN 商品)
                     (NN 木浆)))
          (QP-EXT (CD 六十万)
                  (CLP (M 吨)))))
```

```
(IP (NP-TMP (NT 去年))
    (PU ， )
    (IP (IP (NP-SBJ (PP (P 对)
                        (NP-PN (NR 日)))
                    (ADJP (JJ 初级))
                    (NP (NN 产品)))
            (VP (VV 出口)
                (QP-EXT (CD 八十亿)
                        (CLP (M 美元)))))
        (PU ， )
        (IP (NP-SBJ (-NONE- *pro*))
            (VP (PP (P 比)
                    (DP (DT 上)
                        (CLP (M 年))))
                (VP (VV 增长)
                    (QP-EXT (CD 百分之十点九)))))
        (PU ， )
        (IP (NP-SBJ (ADJP (JJ 初级))
                    (NP (NN 产品)))
            (VP (VV 进口)
                (QP-EXT (CD 十亿)
                        (CLP (M 美元)))))
        (PU ， )
        (IP (NP-SBJ (-NONE- *pro*))
            (VP (VV 增长)
                (QP-EXT (CD 百分之四点四)))))
   (PU 。))
```

3. VP Adjuncts

VP adjuncts generally occur in preverbal positions. They are adjuncts since they are not subcategorized for by the verb, and do not participate in the argument structure of the verb.

ADVPs, temporal and spatial NPs, QP, PPs, CPs, IPs, DVPs, and LCPs can be pre-verbal modifiers.

3.1.1 ADVP

```
(IP (NP-PN-SBJ (NR 西门子))
    (VP (ADVP (AD 将))
        (ADVP (AD 努力))
        (VP (VV 参与)
           (NP-OBJ (DNP (NP-PN (NR 中国))
                        (DEG 的))
                   (NP (NP-PN (NR 三峡))
                       (NP (NN 工程)))
                   (NP (NN 建设))))))
```

3.1.2 NP (location time)

```
(IP (NP-SBJ-1 (NP-APP (NP-PN (NP-PN (NR 西门子))
                             (ADJP (JJ 有限))
                             (NP (NN 公司)))
                      (NP (NN 总裁)))
              (NP-PN (NR 柯赫男)))
   (VP (NP-TMP (NT 日前))
       (PP-TMP (P 在)
               (LCP (IP (NP-SBJ (-NONE- *pro*-1))
                        (VP (VV 接受)
                           (IP-OBJ (NP-SBJ (NN 记者))
                                   (VP (VV 采访)))))
                    (LC 时)))
       (VP (VV 做)
           (NP-OBJ (ADJP (JJ 上述))
                   (NP (NN 表示))))))
```

Occasionally other types of NPs can be VP modifiers too.

```
 (VP (NP-ADV (ADJP (JJ 低))
                   (NP (NN 成本)))
     (VP (VV 扩张)))
```

3.1.3 QP

```
(IP (NP-PN (NR 日本))
    (VP (ADVP (AD 已))
        (QP-ADV (ADVP (ADVP 连续))
                (QP (CD 四)
                    (CLP (M 年))))
        (VP (VV 高居)
           (NP-OBJ (DNP (NP (NP-PN (NR 中国))
                            (NP (PP (P 对)
```

```
                                    (NP (NN 外)))
                                (NP (NN 贸易)))
                            (NP (NN 伙伴国)))
                        (DEG 的))
                    (NP (NN 首位))))))
```

3.1.4 PP

```
(IP (NP-SBJ (NP-APP (NP-PN (NR 美国))
                    (CP (WHNP-1 (-NONE- *OP*))
                        (IP (NP-SBJ (-NONE- *T*-1))
                            (VP (VV 驻)
                                (NP-OBJ (NR 中国)))))
                    (NP (NN 大使)))
            (NP-PN (NR 尚慕杰)))
    (PP-LOC (P 在)
            (LCP (NP (CP (WHNP-1 (-NONE- *OP*))
                         (CP (IP (NP-PN-SBJ (NP-PN (NR 纽约))
                                            (NP (NP-PN (NR 美)
                                                       (NR 中))
                                                (NP (NN 关系)))
                                            (NP (DP (DT 全))
                                                (NN (NN 国)))
                                            (NP (NN 委员会)))
                                 (VP (VV 举行)
                                     (NP-OBJ (-NONE- *T*-1))))
                             (DEC 的)))
                     (NP (NN 午餐会)))
                 (LC 上)))
     (VP (VV 发表)
         (NP-OBJ (NN 演讲))))))
```

3.1.5 CP

```
(IP (NP-SBJ (DNP (NP-PN (NR 欧洲))
                 (DEG 的))
            (NP (NN 安全)
                (CC 和)
                (NN 幸福)))
    (VP (CP-CND (ADVP (CS 只有))
                (IP (NP-SBJ (-NONE- *pro*))
                    (VP (PP (P 同)
                            (NP-PN (NR 俄罗斯)))
                        (VP (VV 进行)
                            (NP-OBJ (ADJP (JJ 密切))
                                    (NP (NN 合作))))))
        (VP (ADVP (AD 才))
            (VP (VV 会)
                (VP (VE 有)
                    (NP-OBJ (NN 保障))))))
```

3.1.6 IP

```
(IP  (NP-PN-SBJ (NR 巴国甫))
     (VP (IP-ADV (NP-SBJ (NN 小孩))
                 (VP (VV 生病)))
          (ADVP (AD 急))
          (VP (VV 需)
              (VP (VV 用)
                  (NP-OBJ (NN 钱))))))
```

3.1.7 DVP

```
(IP (NP-SBJ (PN 他))
    (VP (DVP (IP (NP-SBJ 心情)
                 (VP  (VV 愉快)))
             (DEV 地))
        (VP (VV 走进)
            (NP-OBJ (NN 办公室)))))
```

```
(VP (VV 能)
    (VP (DVP (NP (ADJP (JJ 最大))
                 (NP (NN 限度)))
             (DEV 地))
         (VP (VV 利用)
             (NP-OBJ (DP (DT 这)
                         (CLP (M 颗)))
                     (NP (NN 卫星))))))
```

3.1.8 LCP

```
 (VP (LCP-TMP (IP (NP-SBJ (DNP (NP (NT 今年))
                               (DEG 的))
                          (QP (CD 六百五十亿))
                          (NP (NN 金融) (NN 债券)))
                  (VP (VV 到位)))
              (LC 后))
     (PU ， )
     (ADVP (AD 将))
     (VP (VE 有)
         (IP-OBJ (NP-SBJ (NP (QP (CD 六百亿))
                             (NP (NN 资金))))
                 (VP (VV 用)
                     (PP (P 于)
                         (NP (QP (CD 三百四十五)
                                 (CLP (M 个)))
                             (ADJP (JJ 大中型))
```

```
                    (NP (NN 基建)
                      (NN 项目))))))))
```

4. Some Difficult Grammatical Constructions in Chinese

Constructions listed in this section have been the subject of numerous linguistic research. However, there is yet to be a clear consensus as to how they should be analyzed. Our proposed analysis here is not necessarily the only "correct" analysis or even a "correct" analysis. Our approach is to choose the analysis that is simple and fits in with our overall framework.

4.1. Existential construction

Pattern: (LCP/NP0} + V + NP1 + {XP}

Examples of V: 有, 挂, 站

We assume LCP/NP0 is in the subject position.
When XP is present, we assume NP1 and XP form an IP.

```
(IP  (NP-PN-SBJ (NR 天津))
     (VP (ADVP (AD 已))
         (VP (VE 有)
             (IP-OBJ (NP-SBJ (QP (CD 十多)
                                 (CLP (M 家)))
                             (NP (NN 企业)))
                     (VP (PP-LOC (P 在)
                                 (NP-PN (NR 俄)))
                         (VP (VV 开设)
                             (AS 了)
                             (NP-OBJ (NN 公司)
                                     (CC 或)
                                     (NN 代表处))))))))
```

When the initial NP is missing, a (-NONE- *pro*) is assumed:

```
(IP (NP-SBJ (-NONE- *pro*))
    (VP (ADVP (AD 总共))
        (VP (VE 有)
            (IP-OBJ (NP-SBJ (QP (ADVP (AD 近))
                                (QP (CD ３０００)))
                            (NP (NN 人)))
                    (VP (ADVP (AD 将))
                        (PP-PRP (P 为)
```

```
                                    (NP (DNP (NP (NN 锦标赛))
                                             (DEG 的))
                                        (NP (NN 成功))))
                            (VP (MSP 而)
                                (VP (VV 努力)))))))
     (PU 。))
```

4.2 把-construction

Pattern: NP0 + 把/将 + NP1 + VP

把 is treated as a verb and it takes a sentential complement formed by NP1 and VP. A 把-construction can be understood as "NP0 causes NP1 to maintain a state or to change to a new state."

```
    (IP (PP-LOC (P 在)
                (NP (NN 东边)))
        (PU ，)
        (NP-PN-SBJ (NR 苏联))
        (VP (VP (VV 组建)
                (NP-PN-OBJ (NR 华约)
                           (NN 集团)))
            (PU ，)
            (VP (BA 把)
                (IP-OBJ (NP-PN-SBJ (NR 东德))
                        (VP (VV 建成)
                            (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                                        (CP (IP (NP-SBJ (-NONE- *T*-1))
                                                (VP (VV 对付)
                                                    (NP-OBJ (NN 西方))))
                                            (DEC 的)))
                                    (NP (NN 桥头堡)))))))
        (PU 。))
```

```
(IP (NP-PN-SBJ (NR 狩野))
    (VP (BA 把)
        (IP-OBJ (NP-SBJ (DNP (NP (NP-PN (NR 日本))
                                 (NP (NN 代表团)))
                             (DEG 的))
                        (NP (NN 团旗)))
                (VP (VV 授给)
                    (AS 了)
                    (NP-OBJ (NP-APP (NN 团长))
                            (PU 、)
```

```
                                (NP-APP (NP-PN (NP-PN (NR 东京都))
                                               (NP (NN 残疾人))
                                               (ADJP (JJ 综合))
                                               (NP (NN 体育)
                                                   (NN 中心)))
                                        (NP (NN 主任))))
                                (NP-PN (NR 伴敏彦))))))
```

```
(VP (ADVP (AD 更))
    (VP  (BA 把)
         (IP-OBJ (NP-SBJ (PN 大家))
                 (VP (VV 带进)
                     (AS 了)
                     (NP-OBJ (QP (CD 一)
                                 (CLP (M 个)))
                             (CP-APP (IP (NP-SBJ (NN 声)
                                                 (PU 、)
                                                 (NN 光)
                                                 (PU 、)
                                                 (NN 色))
                                         (VP (VV 交融))))
                             (CP (WHNP-1 (-NONE- *OP*))
                                 (CP (IP (NP-SBJ (-NONE- *T*-1))
                                         (VP (VA 奇妙无比)))
                                     (DEC 的)))
                             (NP (NN 境界)))))))
```

```
(VP (ADVP (AD 立即))
    (VP  (BA 将)
         (IP-OBJ (NP-SBJ (NN 集训)
                         (NN 队员))
                 (VP (VV 拉到)
                     (NP-PN-OBJ (NR 昆明))))))
```

```
(IP (NP-SBJ (QP (CD 一)
                (CLP (M 座)))
            (ADJP (JJ 跨运河))
            (ADJP (JJ 大))
            (NP (NN 桥)))
    (PU ，)
    (VP (BA 把)
        (IP (NP-SBJ (NP (ADJP (JJ 新))
                        (NP (NN 厂)))
                    (PU 、)
                    (NP (ADJP (JJ 老))
                        (NP (NN 厂))))
            (VP (VV 连为)
```

```
                    (NP-OBJ (NN 一体))))))
```

When the VP of the complement clause is headed by an action verb it is "passivized" to satisfy the selectional restriction of 把. However, no passivization morphology is visible as it is in English.

```
 (VP (ADVP (AD 现))
     (ADVP (AD 已))
     (VP (BA 将)
         (IP-OBJ (NP-SBJ-1 (QP (CD 三)
                               (CLP (M 名)))
                           (ADJP (JJ 涉嫌))
                           (NP (NN 犯罪)
                               (NN 分子)))
                 (VP (VV 逮捕)
                     (NP-OBJ (-NONE- *-1))))))
```

A complicated example:

```
(IP (NP-SBJ (NN 塞方))
    (VP (BA 将)
        (IP-OBJ (NP-SBJ-2 (ADJP (JJ 重))
                          (NP (NN 武器)))
                (VP (ADVP (AD 直接))
                    (VP (VV 交给)
                        (NP-PN-OBJ-1 (NP-PN (NR 联合国))
                                     (ADJP (JJ 维和))
                                     (NP (NN 部队)))
                        (IP (NP-SBJ-1 (-NONE- *PRO*))
                            (VP (VV 保管)
                                (NP-OBJ (-NONE- *-2)))))))))
```

4.3 bei-construction

Patterns:
  long 被-construction: NP0 + 被 + NP1 + VP
  short 被-construction: NP0 + 被 + VP

4.3.1. long 被-construction:

We treat 被 as a verb, which takes the NP0 as the subject and NP1+VP as a sentential complement. Long 被-construction can be interpreted as "NP0 undergoes a change of state indicated by the sentential complement".

```
(IP (NP-SBJ (QP-PN (PU “)
                   (NP (NN 菊花))
                    (QP (CD ６)
                       (CLP (M 号)))
                    (PU ”))
            (NP (NN 卫星)))
   (VP (PP-TMP (P 在)
               (NP (NT ８月)
                  (NT ２８日)
                  (NT 下午)))
       (VP (LB 被)
           (IP-OBJ (NP-SBJ (QP (PU “)
                               (CD Ｈ２－２)
                               (PU ”)
                                (CLP (M 号)))
                            (NP (NN 火箭)))
                    (VP (VV 送上)
                        (NP-OBJ (NN 椭圆形)
                                (NN 轨道)))))))
```

```
  (VP (LB 被)
      (IP-OBJ (LCP-SBJ (NP (NN 国际))
                       (LC 上))
              (VP (VV 誉为)
                  (NP-OBJ (DNP (NP (NN 大气)
                                   (NN 科学))
                               (DEG 的))
                          (NP (NN 理论)
                              (NN 名著))))))
```

As a special case of bei-construction, when the subject of the matrix clause happens to co-refer with the object of the complement clause, an operator is assumed. However, we do not co-index the subject of the matrix clause with the object of the complement clause. Instead, we co-index the object of the complement clause with the *OP* in the same clause.

```
(IP (DP-TMP (DT 这)
            (QP (CD 一)
              (CLP (M 年))))
   (NP-SBJ (PN 他))
   (VP (LB 被)
       (CP-OBJ (WHNP-2 (-NONE- *OP*))
               (IP (NP-SBJ (NN 福利院))
                   (VP (VV 收养)
                       (NP-OBJ (-NONE- *T*-2)))))))
```

```
(VP (LB 被)
    (CP-OBJ (WHNP-2 (-NONE- *OP*))
            (IP (NP-SBJ (NN 左脚踝)
                        (NN 关节)
                        (NN 伤痛))
                (VP (VV 困扰)
                   (AS 了)
                    (NP-OBJ (-NONE- *T*-2))
                    (NP-EXT (QP (CD 一)
                                (CLP (M 个))
                                (ADVP (AD 多)))
                            (NP (NN 月)))))))
```

```
 (IP  (NP-PN-SBJ (NR 张三))
      (VP (LB 被)
          (CP-OBJ (WHNP-1 (-NONE- *OP*))
                  (IP (NP-PN-SBJ (NR 李四))
                      (VP (VV 派)
                          (NP-PN-OBJ (NR 王五))
                          (IP (NP-SBJ (-NONE- *PRO*))
                              (VP (VV 打)
                                  (AS 了)
                                  (NP-OBJ (-NONE- *T*-1)))))))))
```

Note that 被 takes an open clause as its complement. We treat this as a case of Wh-movement (See Huang 1999).

4.3.2 short 被-construction

Short 被 is treated on a par with modal verbs in that it takes a VP complement:

```
(VP (ADVP (AD 已))
    (VP (VE 有)
        (IP-OBJ (NP-SBJ (QP (CD 四百一十)
                            (CLP (M 家)))
                            (NP (NN 企业)))
                (PU ，)
                (VP (SB 被)
                    (VP (VCP (VV 认定) (VC 为))
                        (NP-OBJ (NP (ADJP (JJ 高))
                                    (ADJP (JJ 新))
                                    (NP (NN 技术)))
                                (NP (NN 产业))))))))
```

```
(IP (NP-SBJ-1 (NP (NP-PN (NR 美国))
                  (NP (PP (P 对)
```

```
                        (NP-PN (NR 华)))
                     (NP (NN 贸易))))
                  (NP (NN 逆差)))
    (VP (SB 被)
        (VP (ADVP (AD 严重))
            (VP (VV 夸大)
               (NP-OBJ (-NONE- *-1))))))
```

Note in the second example, we have an instance of NP-movement, which can be considered to be a special case of short 被-construction.

4.4 V-得 construction

Patterns:
descriptive V-de: NP1 + V1 + 得 + VP2
causative/resultative V-de: NP1 + V1 + 得 + {NP2} + VP2

V-得 construction can have either descriptive or resultative readings.

4.4.1. descriptive V-de:

When the V-得 construction gets a descriptive reading, an overt subject for the VP is impossible. To distinguish descriptive V-de from causative/resultative V-de, we do not expand the VP2 into an IP in descriptive V-de.

```
 (IP (ADVP (AD 即))
     (NP-SBJ (DNP (NP (QP (CD 一些))
                      (NP (NN 作品)))
                  (DEG 的))
             (NP (NN 字)))
     (VP (VV 写)
         (DER 得)
          (VP-EXT (ADVP (AD 的确))
                  (VP (VA 不错)))))
```

```
 (VP (BA 把)
     (IP-OBJ (NP-SBJ (NP (NN 海关))
                     (DP (DT 各)
                         (CLP (M 项)))
                     (NP (NN 工作)))
             (VP (VV 做)
                (DER 得)
                 (VP-EXT (ADVP (AD 更))
                         (VP (VA 好))))))
```

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 跑)
        (DER 得)
        (VP-EXT (VA 快)))))
```

```
(IP (NP-PN-SBJ (NR 李四))
    (NP-FOC (NN 球))
    (VP (VV 打)
        (DER 得)
        (VP-EXT 漂亮)))
```

4.4.2: causative/resultative V-de:

If the V-得 construction gets a causative/resultative reading, the post-得 constituent is an IP and it also receives a functional category -EXT:

```
(VP (ADVP (AD 却))
    (VP (SB 被)
       (VP (VV 烫)
           (DER 得)
            (IP-EXT (NP-SBJ (-NONE- *PRO*))
                    (VP (ADVP (AD 尖声))
                        (VP (VV 怪叫)))))))
```

```
(IP  (NP-PN-SBJ (NR 张三))
     (VP (VV 哭)
         (DER 得)
         (IP-EXT (NP-SBJ (NN 手帕))
                 (VP (ADVP 都)
                     (VP (VA 湿)
                         (AS 了))))))
```

4.5 Serial verb constructions

Pattern: NP1 + VP1 + VP2, VP1 and VP2 share the same subject.

We recognize at least two types of serial verb constructions.

The first type of the serial verb construction can be viewed as a succession of two or more actions that share the subject.

```
(IP (NP-SBJ (ADJP (JJ 大))
            (NP (NN 通道)
               (NN 建设)))
    (VP (VP (VV 搞活)
            (AS 了)
            (NP-OBJ (DNP (NP (NR 大西南))
                             (DEG 的))
                    (NP (NN 物流)
                       (PU 、)
                       (NN 人流))
                       (PU 、)
                       (NN 信息流)))
        (PU ， )
        (VP (VV 促进)
           (AS 了)
            (NP-OBJ (DNP (NP (NN 沿海)
                             (NN 港口)
                             (NN 城市)
                             (NN 经济))
                         (DEG 的))
                    (NP (NN 发展)))))
    (PU 。))
```

```
(IP (NP-PN-SBJ  (NR 张三))
    (VP  (VP (VV 买)
             (NP-OBJ (NN 菜)))
         (VP (VV 做)
             (NP-OBJ (NN 饭)))))
```

```
(IP (NP-PN-SBJ  (NR 张三))
    (VP  (VP (VV 起床))
         (VP (VV 洗)
             (NP-OBJ (NN 脸)))
         (VP (VV 刷)
             (NP-OBJ (NN 牙)))
         (VP (MSP 去)
             (VP (VV 上班)))))
```

Note that in this case, the number of VPs can be arbitrarily many and we can see them as a conjunction of VPs without an overt coordinating conjunction.

The second type of serial verb construction is marked by a succession of two VPs sharing the same subject. The total number of VPs can not exceed two. The second VP is used to indicate the purpose of the first VP and it arguably has an obligatory null object which refers to the object of VP1:

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VP (VV 买)
            (NP-1 (NN 书))
        (VP-PRP (VV 看)
                (NP (-NONE- *-1))))))
```

Note that in this case the second VP receives an functional tag -PRP. The difference between these two types of serial verb construction is: in the first type, the object of VP2 can be overt and it does not have to co-refer with the object of VP1.

```
(IP (NP-PN-SBJ  (NR 张三))
    (VP  (VP (VV 借)
             (NP-OBJ (NN 钱)))
         (VP-PRP (MSP 来)
                 (VP (VV 买)
                     (NP-OBJ 书))))))
```

4.6. Verb Copying

Pattern: NP1 + V1 + NP2 + V2 + XP, V1 and V2 are the same lexical items.

We treat verb copying as a special case of serial verb construction, e.g.

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VP (VV 做)
            (NP-OBJ (NN 饭)))
       (VP (VV 做)
           (AS 了)
           (NP-EXT (QP (CD 三)
                       (CLP (M 个)))
                   (NP (NN 钟头))))))
```

4.7 由-construction

What is unique about this construction is that the subject comes from the direct object of the verb and the logical subject is introduced by 由.

```
(IP (PP (P 按)
        (NP (NN 协议)))
    (PU ，)
    (NP-SBJ-2 (CP (WHNP-1 (-NONE- *OP*))
                  (CP (IP (NP-SBJ (NN 电厂))
                          (VP (VV 使用)
                              (NP-OBJ (-NONE- *T*-1))))
                      (DEC 的)))
```

```
            (NP (NN 天然气)
                (NN 货源)))
    (VP (PP-LGS (P 由)
                (NP-PN (NR 威尔)
                       (NN 集团)))
        (VP (VV 负责)
            (IP-OBJ (NP-SBJ (-NONE- *PRO*-1))
                    (VP (PP-LOC (P 在)
                                (LCP (NP (NN 国际)
                                         (NN 市场))
                                     (LC 上)))
                        (VP (VV 组织)
                            (NP-OBJ (-NONE- *-2)))))))
    (PU 。))
```

4.8 MSP

There is a class of words which have been tagged as MSP in the tagging phase and they have very distinctive distributional properties. They occur in the pattern "VP1/PP MSP VP2". They are 而, 所, 来, 以, and 去. They are treated as some functional head taking a VP complement. The MSP and the VP project another layer of VP. Here are some examples:

(MSP 以)

(MSP 以) takes a VP as its complement and in this respect it is similar to raising predicates. Unlike raising verbs however it can not occur in the matrix clause. It and its VP complement project another layer of VP which receives a functional tag -PRP.

```
 (VP (VP (ADVP (AD 积极))
         (VP (VV 调整)
             (NP-OBJ (NN 信贷)
                     (NN 结构))))
    (PU ， )
    (VP-PRP (MSP 以)
            (VP (VV 确保)
                (NP-OBJ (DNP (NP (NP-APP (NN 农牧业)
                                         (NN 生产)
                                         (ETC 等))
                                 (NP (NN 重点)
                                     (NN 产业)))
                             (DEG 的))
                        (NP (NN 投入))))))
```

(VP-PRP (MSP 以)

```
        (VP (VP (ADVP (AD 进一步))
                (VP (VV 提高)
                    (NP-OBJ (NN 人们)
                            (NN 认识)))
            (PU ，)
            (VP (VV 增强)
                (NP-OBJ (IP-APP (NP-SBJ (NN 公众))
                                (VP (ADVP (AD 自我))
                                    (VP (VV 保护))))
                        (NP (NN 能力)))))))
```

(MSP 所)

(MSP 所) is treated as a clitic-like element that attaches to a verb that follows it. There are two scenarios in which (MSP 所) occur. In the first scenario, it is followed by a transitive verb and together they form a nominal phrase. In this case we treat the whole thing as an NP.

```
 (NP (MSP 所)
     (VP (VV 恢复)
         (CC 和)
         (VV 改善)))
```

In the second scenario (MSP 所) occurs before a VP inside a relative clause. In this case we treat it as a clitic-like element that is adjoined to the VP:

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (PN 他))
                (VP (MSP 所)
                    (VP (VV 写)
                        (NP-OBJ (-NONE- *T*-1)))))
            (DEC 的)))
    (NP (NN 书)))
```

(MSP 而)

(MSP 而) is tagged MSP in cases where it occurs between a preceding PP and a following verb. It is different from a coordinating conjunction (CC 而) in that the latter but not the former connects two VPs. Although the two uses are likely related because the propositions are historically derived from verbs, we treat them differently. We treat (MSP 而) as a clitic-like element that is attached to the verb that follows it.

```
    (IP (NP-SBJ (CP (WHNP-2 (-NONE- *OP*))
                    (CP (IP (NP-PN-SBJ (NR 扬州市))
                            (VP (PP-LOC (PP 傍)
                                        (NP (NN 河)))
```

```
                                (VP (MSP 而)
                                  (VP (VV 建)
                                     (NP-OBJ (-NONE- *T*-2))))))
                        (DEC 的)))
                 (DP (DT 各)
                      (CLP (M 类)))
                 (NP (NN 企业))))
        (VP (QP-PRD (CD 一百三十余)
                  (CLP (M 家)))))
```

Section V: Minor categories

The phrase categories covered in this section are not as prominent as NP and VP. However, they deserve a more detailed specification than the brief references in Sections I and II. This section is not exhaustive since for most categories the description in the first two sections is sufficient.

1. LST (list)

1.1 Characters, letters, punctuations and numbers which identify items in list, and their surrounding punctuation, are labeled LST:

(LST (CD 一)) , (LST (PU ——)), (LST (FW a)), (LST (CD 1))

1.2 Numbered list. If the list marker is a number, it does not project into a QP. LSTs are adjoined to the constituent that it precedes. When they occur in one sentence they are conjoined:

```
 (IP (NP-SBJ (PN 他))
     (VP (VP (PP-BNF (P 为)
                  (NP (NN 群众)))
             (VP (VV 办事)))
         (PU ， )
         (VP (LST (CD 一))
             (ADVP (AD 不))
             (VP (VV 怕)
                 (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                         (VP (VV 吃亏)))))
```

```
        (PU ， )
        (VP (LST (CD 二))
            (ADVP (AD 不))
            (VP (VV 怕)
                (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                        (VP (VV 吃苦)))))
        (PU ， )
        (VP (LST (CD 三))
            (ADVP (AD 不))
            (VP (VV 怕)
                (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                        (VP (VV 受)
                            (NP-OBJ (NN 委屈)))))))
    (PU 。))


(IP (IP (NP-SBJ (DNP (NP (NN 开发)
                         (NN 银行))
                     (DEG 的))
                 (NP (NN 资金)
                     (NN 来源)
                     (NN 渠道)))
        (VP (VP (ADVP (AD 很))
                (VP (VA 多))))
           (PU ， )
           (VP (LST (CD 一))
                (VP (VC 是)
                    (NP-PRD (CP (WHNP-1 (-NONE- *OP*))
                                (CP (IP (NP-SBJ (NN 国家)
                                                (NN 财政))
                                        (VP (VV 划拨)
                                            (NP-OBJ (-NONE- *T*-1))))
                                    (DEC 的))
                            (QP (CD 五百亿))
                            (NP (NN 注册)
                                (NN 资本))))))
           (PU ； )
           (VP (LST (CD 二))
               (VP (VC 是)
                    (IP-PRD (NP-SBJ (-NONE- *pro*))
                            (VP (PP-DIR (P 向)
                                        (NP (NN 金融)
                                            (NN 机构)))
                                (VP (VV 发行)
                                    (NP-OBJ (NN 债券)))))))
           (PU ； )
           (VP (LST (CD 三))
                (VP (VC 是)
                    (IP-PRD (NP-SBJ (-NONE- *pro*))
                           (VP (VP (VP (PP-DIR (P 向)
                                               (NP (NN 国外)))
                                       (VP (VV 发行)
```

```
                                        (NP-OBJ (NN 债券))))
                                   (VP (MSP 以)
                                      (VP (VV 吸引)
                                           (NP-OBJ (NN 外资)))))
                              (PU ， )
                              (CC 或)
                              (VP (PP-DIR (P 向)
                                           (NP (NN 国外)
                                              (NN 商业)
                                              (NN 银行)))
                                   (VP (VV 贷款)))))))
          (PU ； )
          (VP (LST (CD 四))
              (VP (VC 是)
                  (NP-PRD (DNP (NP-PN (NN 人民)
                                      (NN 银行))
                               (DEG 的))
                          (NP (NN 拨款))))))
     (PU 。))
```

When the enumerated items occur in separate sentences (i.e., each list item ends with a period or some other kind of final punctuation), treat the colon as final punctuation and place each list item in its own set of empty outer parenthesis:

```
((IP (NP-PN-SBJ (NR 石万鹏))
     (VP (VV 说)
         (PU ， )
          (IP-OBJ  (PP-PRP (P 为了)
                           (IP (NP-SBJ (-NONE- *pro*))
                               (VP (VV 使)
                                   (NP-OBJ (NN 纺织)
                                           (NN 行业))
                                   (IP-OBJ
                                      (NP-SBJ (-NONE- *PRO*))
                                       (VP (PP-LOC (P 在)
                                                   (NP (NP (NN 改革)
                                                           (CC 和)
                                                           (NN 解困))
                                                       (NP (NN 方面))))
                                            (VP (VV 取得)
                                                (NP-OBJ (CP (WHNP-7 (-NONE- *OP*))
                                                            (CP (IP (NP-SBJ (-NONE- *
T*-7))
                                                                    (VP (VA 大)))
                                                                (DEC 的)))
                                                        (NP (NN 突破)))))))))
                 (PU ， )
                 (NP-SBJ (NP-PN (NN 国务院))
```

```
                    (CC 及)
                   (NP (ADJP (JJ 有关))
                       (NP (NN 部门))))
            (VP (ADVP (AD 先后))
                (VP (VV 确定)
                  (AS 了)
                   (NP-OBJ  (QP (CD 一)
                                (CLP (M 系列)))
                            (CP (WHNP-8 (-NONE- *OP*))
                                (CP (IP (NP-SBJ (-NONE- *T*-8))
                                        (VP (VA 有力)))
                                    (DEC 的)))
                            (NP (NN 政策)
                               (NN 措施)))))))
            (PU ： )))


(IP (LST (CD 一))
    (PU 、)
    (IP (IP (NP-SBJ (-NONE- *pro*))
            (VP (PP-PRP (P 为)
                        (IP (NP-SBJ (-NONE- *pro*))
                            (VP (VV 搞好)
                                (NP-OBJ (IP-APP (NP-SBJ (-NONE- *pro*))
                                                (VP (VCD (VV 压缩)
                                                         (VV 淘汰))
                                                    (NP-OBJ (ADJP (JJ 落后))
                                                            (NP (NN 棉纺锭)))))
                                        (NP (NN 工作)))))))
                (PU ， )
                (IP-ADV (NP-SBJ (-NONE- *pro*))
                        (VP (ADVP (AD 每))
                            (VP (VV 压)
                                (QP-OBJ (CD 一万)
                                        (CLP (M 锭))))))

                (VP (VV 给予)
                    (NP-OBJ (QP (CD 三百万)
                                (CLP (M 元)))
                            (NP (NN 补贴)))))
         (PU ， )
         (IP (NP-SBJ  (NP (NN 中央)
                          (CC 和)
                          (NN 地方))
                      (NP (NN 财政)))
             (VP (VP (ADVP (AD 各))
                     (VP (VV 承担)
                       (QP-OBJ (CD 一半))))
                (PU ， )
                (VP (VV 提供)
                    (NP-OBJ (QP (CD 二百万)
                                (CLP (M 元)))
```

```
                                (NP (NN 贴息)
                                  (NN 贷款)))))
        (PU ， )
         (IP (NP-SBJ-1 (NN 贴息))
             (VP (PP-LGS (P 由)
                         (NP (NN 地方)
                            (NN 财政)))
                 (VP (VV 承担)
                    (NP-OBJ (-NONE- *-1)))))))
   (PU 。))

(IP (LST (CD 二))
    (PU 、)
    (IP (IP (NP-SBJ (CP (WHNP-9 (-NONE- *OP*))
                        (IP (NP-TMP (NT 一九九八年))
                           (NP-SBJ (NN 国家))
                            (VP (PP (-NONE- *T*-9))
                                (VP (VV 核销)
                                    (NP-OBJ (NP (NN 银行))
                                            (ADJP (JJ 呆))
                                            (ADJP (JJ 坏))
                                            (NP (NN 帐)))))))
                            (NP (NN 准备金)))
             (VP (ADVP (AD 将))
                 (ADVP (AD 重点))
                 (PP-DIR (P 向)
                         (NP (NN 纺织)
                            (NN 行业)))
                 (VP (VV 倾斜)))
        (PU ， )
         (IP (NP-SBJ (CP (WHNP-10 (-NONE- *OP*))
                         (CP (IP (NP-SBJ (-NONE- *pro*))
                                 (VP (VV 新增)
                                     (NP-OBJ (-NONE- *T*-1*OP*)))
                                (DEC 的)))
                       (QP (CD 一百亿)
                           (CLP (M 元)))
                       (NP (NN 规模))))
             (VP (ADVP (AD 主要))
                 (VP (VV 用)
                     (PP (P 于)
                         (IP (NP-SBJ (-NONE- *pro*))
                            (VP (VV 解决)
                                (NP-OBJ (DNP (NP (NN 棉纺织)
                                                 (NN 企业))
                                             (DEG 的))
                                        (NP (NN 压锭)
                                            (NN 重组)
                                            (NN 项目)))))))))))
   (PU 。))
```

```
(IP (LST (CD 三))
    (PU 、)
    (NP-SBJ (-NONE- *pro*))
    (VP (VV 保证)
        (NP-OBJ (NP (NP (NN 下岗)
                        (NN 职工))
                    (ADJP (JJ 基本))
                   (NP (NN 生活费)))
                (CC 和)
                (NP (DNP (NP (UCP (ADJP (JJ 养老))
                                  (PU 、)
                                   (NP (NN 医疗)))
                             (NP (NN 保险)))
                         (DEG 的))
                    (NP (NN 支付)))))
    (PU 。))
```

Note that in the example below, even if the first sentence is not complete, the colon is still treated as a final punctuation since other listed items are marked by final punctuations:

```
(IP (NP-SBJ (NR 海协))
    (VP (VV 认为)
        (IP-OBJ (NP-SBJ (CP-APP (IP (NP-SBJ (-NONE- *pro*))
                                    (VP (VV 交换)
                                        (NP-OBJ (NN 意见))))
                                (DEC 的))
                        (NN 内容))
                (VP (VV 应)
                    (VP (VV 包括)))
                (PU ： ))))
```

```
(IP (LST (CD 一))
    (PU 、)
    (NP-SBJ (-NONE- *pro*))
    (VP (PP (P 就)
            (NP (NP (NP (QP (CD 两)
                            (CLP (M 岸)))
                        (NP (NN 旅游)
                            (NN 交往)))
                    (NP (NN 问题)))
                (PU ， )
                 (PRN (PP (P 包括)
                          (NP (DNP (LCP (NP (NP (NP (QP (CD 两))
                                                    (NP (NN ( 岸)))
                                                (NP (NN 同胞))))
                                            (NP (NN 旅行)))
```

```
                                        (LC 中))
                                    (DEG 的))
                                (NP (NN 安全)
                                  (NN 问题)))))))
            (VP (VV 交换)
                (NP-OBJ (NN 意见))))
    (PU 。))


  (IP (LST (CD 二))
      (PU 、)
      (NP-PN-SBJ (NR 海协))
      (VP (ADVP (AD 一再))
          (VP (VV 要求)
              (IP-OBJ (NP-SBJ (CD 两) (NN 会))
                      (VP (VV 应)
                          (VP (PP (P 就)
                                  (NP (IP-APP (ADVP (AD 近年来))
                                              (NP-SBJ (NP-PN (NR 台湾))
                                                      (NP (NN 军方)))
                                              (VP (VP (VCD (VV 打死)
                                                           (VV 打伤))
                                                      (NP-OBJ (NN 大陆)
                                                              (NN 沿海)
                                                              (NN 渔民)))
                                                (PU 、)
                                                (VP (VV 造成)
                                                    (NP-OBJ (ADJP (JJ 严重))
                                                            (NP (NN 生命)
                                                                (NN 财产)
                                                                (NN 损失))))))
                                      (NP (NN 问题)))
                                (VP (VV 进行)
                                    (NP-OBJ (NN 协商)))))))))
    (PU 。))
```

1.2 Non-numbered lists. Unnumbered lists such as dashes have to be determined by the context and they may occur either within one sentence or multiple sentences. When the list items, enumerated or not, occur in separate sentences, (as indicated by a period or some other kind of punctuations), treat the colon as the final punctuation and treat each list item as a separate sentence.

```
(IP (PP (P 据)
        (NP (NN 介绍)))
    (PU ，)
    (NP-TMP (NT 一九九七年))
    (NP-SBJ (NP (NN 工业)
                (NN 生产))
```

```
            (ADJP (JJ 主要))
            (NP (NN 特点)))
    (VP (VC 是))
    (PU ： ))


(IP (LST (PU ——))
    (IP (IP (NP-SBJ (NN 生产))
            (VP (ADVP (AD 稳定))
                (VP (VV 增长))))
        (PU ， )
         (IP (NP-SBJ (NN 增速))
             (VP (PP (P 比)
                     (DP (DT 上))
                         (CLP (M 年)))
                 (VP (VV 有所)
                    (NP-OBJ (NN 回落))))))
    (PU 。 ))


(IP (LST (PU ——))
    (NP-SBJ (NN 工业)
            (NN 结构)
            (NN 调整))
    (VP (VV 取得)
         (NP-OBJ (ADJP (JJ 积极))
                 (NP (NN 进展))))
    (PU 。 ))


(IP (LST (PU ——))
    (IP (IP (NP-SBJ (NN 工业)
                    (NN 产销率))
             (VP (VV 有所)
                (NP-OBJ (NN 提高))))
        (PU ， )
         (IP (NP-SBJ (NN 出口)
                     (NN 增长))
             (VP (ADVP (AD 较))
                 (VP (VA 快)))))
    (PU 。 ))


(IP (LST (PU ——))
    (NP-SBJ (NN 经济)
            (NN 效益)
            (NN 水平))
    (VP (ADVP (AD 恢复性))
        (VP (VV 回升)))
    (PU 。 ))
```

```
(IP (IP (NP-SBJ (NN 内地)
                (NN 经济))
        (VP (DVP (ADJP (ADVP (AD 长期))
                       (ADJP (VA 稳定)))
                 (DEV 地))
            (VP (VV 增长))))
    (PU ， )
    (IP (NP-SBJ (NP-PN (NR 香港))
                (NP (NN 经济)))
        (VP (ADVP (AD 将))
            (PP (P 从)
               (LCP (NP (CP (WHNP-1 (-NONE- *OP*))
                            (CP (IP (NP-SBJ (-NONE- *T*-1))
                                    (VP (VV 充满)
                                        (NP-OBJ (NN 活力))))
                                (DEC 的)))
                         (NP (NN 内地)
                             (NN 经济)))
                     (LC 中)))
            (VP (VV 获益))))
    (PU 。))

(IP (LST (PU ——))
    (NP-SBJ (-NONE- *pro*))
    (VP (VV 可以)
        (VP (PP-BNF (P 为)
                    (NP-PN (NR 香港)))
            (VP (VV 提供)
                (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                            (CP (IP (NP-SBJ (-NONE- *T*-1))
                                    (VP (ADVP (AD 更))
                                        (VP (VA 多))))
                                (DEC 的)))
                    (NP (NN 商业)
                        (NN 机会)))))
    (PU 。))

(IP (LST (PU ——))
    (NP-SBJ (-NONE- *pro*))
    (VP (VV 有利)
        (IP-OBJ (NP-SBJ (-NONE- *pro*))
                (VP (VV 巩固)
                    (NP-OBJ (DNP (NP-PN (NR 香港))
                                 (DEG 的))
                            (NP (NP (NN 贸易)
```

```
                                    (CC 和)
                                    (NN 航运))
                                (NP (NN 中心)))))))
    (PU 。))


(IP (LST (PU ——))
    (NP-SBJ (-NONE- *pro*))
    (VP (ADVP (AD 进一步))
        (VP (VV 推动)
            (NP-OBJ (DNP (NP (NP-PN (NR 香港))
                             (NP (NN 金融)
                                 (NN 市场)))
                         (DEG 的))
                    (NP (NN 发展)))))
    (PU 。))


(IP (LST (PU ——))
    (NP-SBJ (-NONE- *pro*))
    (VP (VV 有利)
        (IP-OBJ (NP-SBJ (-NONE- *pro*))
                (VP (VV 增强)
                    (NP-OBJ (DNP (NP (NP-PN (NR 香港))
                                     (NP (NN 产品)))
                                 (DEG 的))
                            (NP (NN 国际)
                                (NN 竞争力))))))
    (PU 。))
```

2 PRN (Parenthetical)

Parenthetical elements are dominated by a node labeled PRN. Punctuation marks that set off a parenthetical (i.e., commas, dashes, parentheses (-LRB- and -RRB-)) are contained within the PRN node.

The following is a list of situations where PRN is possible:

```
(IP (NP-SBJ (DP 这
                (CLP 次))
            (NP 会议)
            (PRN (PU ---)
                 (NP (NP (NP (NP-PN (NN 世界)
```

```
                                    (NN 贸易)
                                    (NN 组织))
                              (CC 与)
                              (NP (NP-PN (NR 中国))
                                 (NP (NN 服务)
                                     (NN 贸易))))
                     (NP (NN 研讨会))))
                  (PU ---)) )
    (VP (ADVP (AD 将))
        (PP-TMP (P 于)
                (NP (NT 四月)
                   (NT 十九日)))
        (PP-LOC (P 在)
                (NP-PN (NR 上海)))
        (VP (VV 召开))))
```

```
(VP (BA 将)
    (IP-OBJ (NP-SBJ (NP (NP-PN (NR 马尔维纳斯)
                               (NN 群岛))
                        (PRN (PU --LRB--)
                             (VV 简称)
                             (NR 马岛)
                             (PU --RRB--)))
                     (NP (NN 主权)
                         (NN 条款)))
            (VP (VV 列入)
                (NP-OBJ (ADJP (JJ 新))
                        (NP (NN 宪法))))))
```

```
(VP (VE 有)
   (NP-OBJ (QP (CD １３５０)
               (CLP (M 名)))
           (NP (NN 运动员)
           (PRN (PU --LRB--)
                (NN 游泳)
                (CD ６６１)
                (M 名)
                (PU 、)
                (NN 跳水)
                (CD １３７)
                (M 名)
                (PU 、)
                (NN 水球)
                (CD ３３４)
                (M 名)
                (PU 、)
                (JJ 花样)
                (NN 游泳)
                (CD ２１８)
```

```
                (M 名)
                (PU --RRB--)))))


(VP (PP (P 与)
        (NP (IP-APP (NP-SBJ (-NONE- *pro*))
                    (VP (NP-TMP (NT 当时))
                        (VP (PU “)
                            (VV 孔雀东南飞)
                            (PU ”))
                            (PRN (PU -LRB-)
                                (IP (NP-SBJ (NP (DP (DT 各))
                                                (NP (NN 地)))
                                            (NP (NN 人才)))
                                    (VP (ADVP (AD 纷纷))
                                        (VP (VV 赴)
                                            (NP-PN-OBJ (NR 粤)))))
                                (PU -RRB-))))
            (NP (NN 形势))))
    (VP (VA 密不可分)))


(IP (NP-TMP (NP (PU “) (NT 八五) (PU ”))
            (NN 期间)
            (PRN (PU -LRB-)
                 (NT 一九九０年)
                 (PU —)
                 (NT 一九九五年)
                 (PU -RRB-)) )
    (PU ， )
    (NP-SBJ-1 (DNP (NP (NP-PN (NR 中国))
                       (NP (NN 外商)
                           (NN 投资)
                           (NN 企业)))
                   (DEG 的))
              (NP (NN 进出口)))
    (VP (VV 呈)
        (NP-OBJ (CP-APP (IP (NP-SBJ (-NONE- *))
                            (VP (ADVP (AD 直线))
                                (VP (VV 上升))))
                        (DEC 之))
                (NP (NN 势)))))


(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-SBJ (-NONE- *T*-1))
                        (VP (DP-TMP (DT 前)
                                    (QP (CD 几)
                                        (CLP (M 年))))
```

```
                                (VP (VV 抑制)
                                   (NP-OBJ (NN 经济)
                                           (NN 增长)))))
                        (DEC 的)))
                (ADJP (JJ 主要))
                (NP (NN 障碍))
                (PRN (PU ——)
                     (NP (NP (NN 通货膨胀)
                             (CC 和)
                             (NN 基础)
                            (NN 产业))
                         (NP (PU “) (NN 瓶颈) (PU ”)))))
        (VP (ADVP (AD 均))
            (ADVP (AD 已))
             (ADVP (AD 明显))
             (VP (VV 缓解))))


( (IP (NP-TMP (NT 今天))
      (PU ， )
      (NP-TPC (CP (WHNP-1 (-NONE- *OP*))
                  (CP (IP (NP-PN-SBJ (NR 中国))
                          (VP (VV 发现)
                              (NP-OBJ (-NONE- *T*-1))))
                         (DEC 的)))
                 (NP (NN 始祖鸟类)
                    (NN 化石)))
        (PU ， )
        (NP-SBJ (NP (PN 其))
                (NP (NN 时代)
                   (CC 和)
                   (NN 形态)
                   (NN 构造)))
        (VP (ADVP (AD 都))
            (PP (P 与)
                (NP (NP-PN (NR 德国))
                        (NP (NN 始祖鸟))))
            (VP (VA 相近)
                (CC 和)
                (VA 相似))))
        (PRN (PU ——)
            (IP (NP-SBJ (PN 它))
                 (VP (VP (QP-PRD (ADVP (AD 距今))
                                 (ADVP (AD 约))
                                 (QP (CD 一亿四千二百五十多万)
                                    (CLP (M 年)))))
                         (PU ， )
                     (VP (VV 属)
                         (NP-PN-OBJ (NR 中生代)
                                    (NR 晚侏罗世)))))
            (PU ； )
            (IP (NP-SBJ (NP (PN 其))
```

```
                    (NP (NN 材料)))
            (VP (VA 丰富)))
        (PU ， )
        (IP (NP-SBJ (-NONE- *pro*))
            (VP (VP (ADVP (AD 不仅))
                          (VP (VE 有)
                              (NP-OBJ (CP (WHNP-2 (-NONE- *OP*))
                                          (CP (IP (NP-SBJ (-NONE- *T*-2))
                                                  (VP (VRD (VV 保存)
                                                           (VA 完整))))
                                          (DEC 的)))
                                      (NP (NN 头骨)
                                          (CC 和)
                                          (NN 翅膀))))
                    (PU ， )
                    (VP (ADVP (AD 还))
                        (VP (CC 有)
                            (NP-OBJ (NP (NN 腰带)
                                        (CC 和)
                                        (NN 后肢))
                                    (CC 以及)
                                    (NP (QP (CD 多)
                                            (CLP (M 枚)))
                                        (NP (NN 羽毛)))))))
    (PU 。))  )
```

```
(VP (VCD (VV 开发) (VV 经营))
    (NP-OBJ (NP (NP (NN 国内))
                (QP (OD 第一)
                    (CLP (M 条)))
                (ADJP (JJ 合资))
                (NP (NN 公路))))
            (PRN (PU ——)
                 (NP-PN (NP-PN (NR 梅观))
                        (ADJP (JJ 高速))
                        (NP (NN 公路)))))
```

```
(IP (NP-SBJ (NP (NN 旅游))
            (ADJP (JJ 大))
            (NP (NN 轿车)))
    (VP (ADVP (AD 径))
        (PP-DIR (P 向)
                (NP (NP (NN 西南))
                    (PRN (PU ———)
                         (NP (NP-PN (NR 富士山))
                             (NP (NN 方向))))
```

```
        (VP (VV 疾驶))))
```

```
(IP (ADVP (AD 不一会))
          (PU ， )
          (PP-LOC (P 在)
                  (NP (QP (CD 一)
                          (CLP (ADJP (JJ 小))
                               (CLP (M 片))))
                      (NP (NN 开阔地))))
    (PU ， )
    (NP-SBJ (NP (NN 导游))
            (PRN (PU ———)
                 (NP (QP (CD 一)
                         (CLP (M 位)))
                     (CP (WHNP-1 (-NONE- *OP*))
                         (CP (IP (NP-SBJ (-NONE- *T*-1))
                                 (VP (VV 会)
                                     (VP (VV 操)
                                         (NP-OBJ (QP (CD ５)
                                                     (CLP (M 种)))
                                                 (NP-PN (NR 欧洲))
                                                 (NP (NN 语言))))))
                                 (DEC 的)))
                     (NP (NN 女郎)))
                 (PU ———)))
    (VP (VV 命令)
        (NP-OBJ (NN 车子))
        (IP (NP-SBJ (-NONE- *PRO*))
            (VP (VV 停下)))))
```

Section VI Null Elements

1 The building blocks

1.1 Inventory

The inventory of null elements is as follows:

Nominal phrasal null elements:

```
(XP (-NONE- *T*))      (trace of A′ -movement such as topicalization)
(NP (-NONE- *))        (trace of A-movement)
(NP (-NONE- *PRO*))    (empty category used in control structures)
(NP (-NONE- *pro*))    (empty category used to indicate a pro-drop)
(WHNP (-NONE- *OP*))      (null NP operator used in relative constructions)
(WHPP (-NONE- *OP*))      (null PP operator used in relative constructions)
```

Null elements used to represent pseudo-attach:

```
(XP (-NONE- *RNR*))  (null category used for right node raising)
```

Other null elements:

```
(XP (-NONE- *?*))  (placeholder for ellipses)
```

Null elements are also called empty categories (ECs) in the literature.

The dimensions along which the empty categories (-NONE- *), (-NONE- *pro*), (-NONE- *PRO*), and (-NONE- *T*) differ:

	position of the EC	can be replaced by overt NPs	antecedent has to be in the same sentence
T	adjunct/subj/obj	no	yes
*	object	no	yes
pro	subject/object	yes	no
PRO	subject	no	no*

no*: in subject-control or object-control case, the antecedent of the *PRO* has to be in the same sentence. But there is a third type of control called arbitrary control, and in this case, the antecedent of the *PRO* can be anything and it does not have to appear in the same sentence.

1.2 Co-indexing

Indexes are used only when they indicate a relationship that would otherwise not be retrievable from the bracketing alone. Indices are used to express relationships such as binding (as in the case of wh-movement). These relationships are shown only when some type of null element is involved, and only when the

relationship is intra-sentential. One null element may be associated with another, as in the case of the null wh-operator. Coreference relations between overt pronouns and their antecedents are not annotated.

(a) The identity index.

In principle, each bracket within the root CP/IP is understood to have a unique index (an ''identity index''), which in practice is used only when that constituent is coreferential with or otherwise closely associated with some null element in the sentence (or when it's acting in a gapping ''template''). The brackets surrounding null elements are also understood to be associated with a unique identity index. Identity indexes appear only on the bracket label, as in (NP-1 张三).

The actual numbering of the identity indexes is arbitrary; that is, the constituents are not necessarily numbered sequentially within the sentence, and a given sentence may contain brackets with the identity indexes -1, -2, -5, and -1978. In practice, we use one-digit numbers if possible.

(b) The reference index.

In most cases, a null element will be suffixed with an integer (the ''reference index'') that matches the identity index on the bracket label of some other constituent. Note that the reference index on the null element takes the form of a dash-number on the null element itself, and not on the bracket label, as in (NP (-NONE- *-1)). If the null element in turn refers to or is associated with a third element, it will bear its own identity index, along the lines of (NP-1 (-NONE- *T*-2)).

```
(IP (NP-PN-SBJ-1 (NR 张三))
    (VP (VV 好象)
        (IP (NP-SBJ-2 (-NONE- *-1))
            (VP (SB 被)
                (VP (VV 打)
                    (AS 了)
                    (NP (-NONE- *-2)))))))
```

Note also that null elements may bear additional function tags.

2 (-NONE- *T*): trace of A' movement

In Chinese, (-NONE- *T*) is most often used in two general constructions. One is topic construction, where a constituent is moved to the clause-initial position. The other use of (-NONE- *T*) is in the relative clause, another situation where A'-movement occurs. It is also used in constructions that an operator-variable analysis is considered appropriate.

(-NONE- *T*) can also be seen as marking the interpretation location of certain

constituents that are not in their usual (adjunct argument) position.

The trace (-NONE- *T*) always bears a referential index that corresponds to the identity index of some other constituent in the sentence (relative operator, topicalized NP, etc.).

2.1 Relative clauses

Relative clauses are adjoined to the head noun phrase. 的 is considered to be a complementizer and is put inside the CP. We also assume that there is an empty operator in the Spec of the CP and it is coindexed with the trace inside the clause. Notice that in Chinese the relative operator is always empty.

(-NONE- *T*) in object position:

```
 (NP (CP (WHNP-1 (-NONE- *OP*))
         (CP (IP (NP-PN-SBJ (NR 日本))
                 (VP (VV 发射)
                     (NP-OBJ (-NONE- *T*-1))))
             (DEC 的)))
     (ADJP (JJ 大型))
     (NP (NN 科学)
         (NN 试验)
         (NN 卫星)))
```

(-NONE- *T*) in subject position:

```
(NP (CP (WHNP-2 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-2))
                (VP (VV 漂浮)
                    (PP (P 于)
                        (NP (NN 宇宙)))))
            (DEC 的)))
   (NP (NN 废弃物)))
```

(-NONE- *T*) in topic position:

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-TPC (-NONE- *T*-1))
                (IP (IP (NP-SBJ (NN 投资额))
                        (VP (ADVP (AD 较))
                            (VP (VA 大))))
                    (PU 、)
                    (IP (NP-SBJ (NN 技术))
                        (VP (ADVP (AD 较))
```

```
                                (VP (VA 高))))))
              (DEC 的)))
    (NP (NN 台资)
        (NN 企业))))
```

(-NONE- *T*) in adjunct position:

```
(NP (CP (WHPP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (DP (PN 本))
                        (NP (NN 报)))
                (VP (PP-PRP (-NONE- *T*-1))
                    (VP (VV 开辟)
                        (NP-OBJ (DP (DT 这)
                                    (CLP (M 个)))
                                (NP (NN 专栏))))))
                   (DEC 的)))
    (NP (NN 目的)))
```

```
(NP (CP (WHPP-1 (-NONE- *OP*))
         (CP (IP (NP-SBJ (NP-PN (NR 中国))
                        (NP (NN 经济)))
                (VP (PP-LOC (-NONE- *T*-1))
                    (ADVP (AD 最为))
                    (VP (VA 活跃))))
             (DEC 的)))
    (NP (NN 地区)))
```

```
(NP (CP (WHPP-1 (-NONE- *OP*))
         (CP (IP (NP-SBJ (NN 卫星))
                (VP (PP-PRP (-NONE- *T*-1))
                    (VP (VPT (VV 进)
                            (AD 不)
                            (AS 了))
                        (NP-OBJ (ADJP (JJ 同步))
                                (NP (NN 轨道))))))
             (DEC 的)))
    (NP (NN 原因)))
```

```
(NP (CP (WHPP-1 (-NONE- *OP*))
         (IP (NP-SBJ (-NONE- *pro*))
            (VP (PP-TMP (-NONE- *T*-1))
                (VP (VV 利用)
                    (NP-OBJ (ADJP (JJ 大型))
                            (NP (NN 卫星)))))))
    (NP (NN 时代)))
```

Relative clauses without 的 are annotated in a similar fashion. Note that no empty counterpart of 的 is explicitly assumed:

```
 (NP (CP (WHNP-1 (-NONE- *OP*))
         (IP (NP-SBJ (NN 外商))
             (VP (VV 投资)
                 (NP (-NONE- *T*-1)))))
     (NP (NN 企业)))
```

It is possible to have multiple (-NONE- *T*)s for one operator:

```
     (NP (CP (WHNP-1 (-NONE- *OP*))
             (CP (IP (IP (NP-SBJ (-NONE- *T*-1))
                         (VP (NP-TMP (NT 过去))
                             (VP (VV 发生))))
                     (CC 和)
                     (IP (NP-SBJ (-NONE- *pro*))
                        (VP (VV 看到)
                             (NP-OBJ (-NONE- *T*-1)))))
                 (DEC 的)))
         (NP (NN 情况)))
```

Note that the (-NONE- *T*) occurs in different positions in the two conjuncts of the relative clause.

2.2 Topicalization

Not all topics are derived from movement and bind a trace. When they do, the trace (-NONE- *T*) is coindexed with the topic:

```
(IP (NP-TPC-3 (CP (WHNP-1 (-NONE- *OP*))
                  (CP (IP (NP-SBJ (-NONE- *T*-1))
                          (VP (VA 类似)))
                      (DEC 的)))
              (NP (NP (ADJP (JJ 假))
                      (NP (NN 新闻)))
                  (CC 和)
                  (NP (CP (WHNP-2 (-NONE- *OP*))
                          (CP (IP (NP-SBJ (-NONE- *T*-2))
                                  (VP (VA 半真半假)))
                              (DEC 的)))
                      (NP (NN 新闻)))))
     (PU ， )
```

```
    (ADVP (AD 并非))
    (LCP-SBJ (NP-TTL (PU 《)
                     (NR 湖北)
                     (NN 日报)
                     (PU 》))
             (LC 上))
    (VP (VE 有)
        (NP-OBJ (-NONE- *T*-3))))
```

Quotations that precede a verb of saying are treated as fronted arguments: they leave a trace (-NONE- *T*) and receive the -TPC tag.

```
 (IP (PU ``)
    (IP-TPC-1 (NP-SBJ (PN 我们))
              (IP (VP (VV 会)
                      (VP (VV 赢)))
                  (SP 的)))
    (PU ,)
    (PU ``)
    (NP-PN-SBJ (NR 张三))
    (VP (VV 说)
        (IP-OBJ (-NONE- *T*-1)))
    (PU .))
```

When a base-generated item is identified as the topic, the XP that is identified as the topic will be assigned the functional tag -TPC. In this case, there is no trace and hence no (-NONE- *T*) is identified and no coindexation is necessary.

```
 (IP (NP-PN-TPC (NR 富士山))
    (PU ， )
    (NP-SBJ (NN 海拔))
    (VP (VP (QP-PRD (CD ３７７６)
                    (CLP (M 米))))
        (PU ， )
        (VP (ADVP (AD 不))
            (VP (VV 及)
            (QP-EXT (DNP (NP-PN (NR 珠穆朗玛))
                         (DEG 的))
                    (QP (CD 一半)))))))
```

If the fronted argument is an instance of left-dislocation (i.e., associated with a resumptive pronoun), there is no coindexation between the fronted

argument and the pronoun, but the fronted NP is still assigned the functional tag -TPC:

```
(IP (NP-PN-TPC (NR 张三))
    (PU ,)
    (NP-PN-SBJ (NR 李四))
    (VP (VV 给)
        (NP-IO (PN 他))
        (NP-OBJ (QP (CD 一)
                    (CLP (M 间)))
                (NP (NN 住房)))))
```

2.3 Bei-construction

There is a lot of evidence to support the analysis that in long 被-construction, A′-movement is involved. One of them is that this movement can be long-distance. So we consider the gap inside the 被-construction to be a (NP (-NONE- *T*)):

```
(IP (NP-PN-SBJ (NR 张三))
    (VP  (LB 被)
         (CP (WHNP-1 (-NONE- *OP*))
             (IP (NP-PN-SBJ (NR 李四))
                 (VP (VV 派)
                     (NP-PN-OBJ-2 (NR 王五))
                     (IP (NP-SBJ (-NONE- *PRO*-2))
                         (VP  (VV 打)
                              (AS 了)
                              (NP-OBJ (-NONE- *T*-1)))))))))

(IP (NP-TMP (NT 今年))
    (PU ， )
    (NP-TMP (PN 他))
    (VP (VP (VV 参加)
            (NP-OBJ (NN 高考)))
        (PU ， )
        (CC 并)
        (VP (LB 被)
            (CP (WHNP-2 (-NONE- *OP*))
                (IP (NP-PN-SBJ (NR 杭州)
                               (NN 大学))
                    (VP (VV 录取)
                        (NP-OBJ (-NONE- *T*-2)))))))
    (PU 。))
```

Note however not all long-bei constructions involve movement. In the following example, there is no obvious place for the gap, so we do not use (-NONE- *T*) in this

case.

```
(IP (NP-SBJ (NP-PN (PU “)
                   (NP (NN 菊花))
                   (QP (CD ６)
                       (CLP (M 号)))
                   (PU ”))
            (NP (NN 卫星)))
    (VP (PP-TMP (P 在)
                (NP (NT ８月)
                    (NT ２８日)
                    (NT 下午)))
        (VP (LB 被)
            (IP-OBJ (NP-SBJ (QP (PU “) (CD Ｈ２－２) (PU ”)
                                (CLP (M 号)))
                            (NP (NN 火箭)))
                    (VP (VV 送上)
                        (NP-OBJ (NN 椭圆形)
                                (NN 轨道))))))))
```

2.4 Default positions for (-NONE- *T*)

When a verb has adjuncts as well as arguments, determining the position of (-NONE- *T*) can be difficult. To ensure consistency, we stipulate the default positions for the traces in the following positions:

(a) As subject

The default position for the subject is the position preceding all other adjuncts except the topic and some discourse-level adjuncts such as 但是. All other adjuncts are 'pushed' into the VP:

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ-2 (-NONE- *T*-1))
                (VP (PP-TMP (P 在)
                            (NP (CP (IP (NP-PN-SBJ (NR 中华)
                                                   (NN 民族))
                                        (VP (VV 处于)
                                            (NP-OBJ (NN 生死)
                                                    (NN 存亡))))
                                    (DEC 的))
                                (NP (NN 危难)
                                    (NN 关头))))
                    (PU ，)
                    (PP-LGS (P 由)
                            (NP (NR 国民党)
                                (NN 顽固派)))
                    (ADVP (AD 蓄谋))
                    (VP (VV 制造)
```

```
                    (NP-OBJ (-NONE- *-2)))))
            (DEC 的)))
     (NP (NN 惨案)))
```

(b) As topic

The default position for the topic is the first adjunct of the IP, except for some discourse-level adjuncts such as 但是:

```
(NP (CP (WHNP-3 (-NONE- *OP*))
        (CP (IP (NP-TPC (-NONE- *T*-3))
                (NP-TPC (NP-PN (NR 独联体)
                               (NN 国家))
                        (NP (NN 货包机)))
                 (PP-LOC (P 在)
                         (NP (NP-PN (NR 中国))
                             (NP (NN 境内))))
                 (IP (IP (NP-SBJ (NN 起降)
                                 (NN 架次))
                         (VP (ADVP (AD 最))
                             (VP (VA 多)))
                     (PU 、)
                     (IP (NP-SBJ (CP (WHNP-4 (-NONE- *OP*))
                                     (IP (NP-SBJ (-NONE- *pro*))
                                         (VP (VCD (VV 运载)
                                                  (VV 输出))
                                             (NP-OBJ (-NONE- *T*-4)))))
                                 (NP-PN (NR 中国))
                                 (NP (NN 商品量)))
                         (VP (ADVP (AD 最))
                             (VP (VA 大))))))
            (DEC 的)))
   (NP (NN 空港))))
```

(c) As adjunct

The default position for the adjunct trace is the first adjunct of the VP:

```
(NP (CP (WHPP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (ADJP (JJ 当代))
                        (NP-PN (NR 藏族))
                        (NP (NN 牧民)))
                 (VP (PP-LOC (-NONE- *T*-1))
                    (DVP (VP (VA 幸福))
                         (DEV 地))
                     (VP (VV 过上)
                         (NP-OBJ (NP (NN 社会主义))
                                 (ADJP (JJ 新))
```

```
                                    (NP (NN 生活))))))
            (DEC 的)))
    (NP (PU “)
        (NN 乐园)
        (PU ” ))))))
```

(d) As object

The default position for the object trace is the first complement of the verb unless there is dative (indirect) object:

```
(NP (CP (WHNP-2 (-NONE- *OP*))
         (CP (IP (NP-SBJ (NN 国家)
                         (NN 计委))
                 (VP (VV 制定)
                     (NP-OBJ (-NONE- *T*-2))))
            (DEC 的)))
    (NP (ADJP (JJ 固定))
        (NP (NN 资产)))
    (NP (NN 投资)
        (NN 计划))))


 (NP (CP (WHNP-1 (-NONE- *OP*))
          (CP (IP (NP-SBJ (PN 它))
                  (VP (VV 留给)
                      (NP-IO (NN 后人))
                      (NP-OBJ (-NONE- *T*-1))))
             (DEC 的)))
     (NP (NN 血泪)
         (NN 教训)
          (CC 与)
         (NN 痛苦)
         (NN 经验)))
```

3 (-NONE- *): trace of A movement

In Chinese the evidence for a passive construction is not conclusive. The closest counterpart for passives in English is the bei-construction. However, we treat 被 as a verb and therefore no A-movement is necessary for long bei-construction. We do need it for short bei-construction and raising predicates. The following verbs are identified as raising verbs and (-NONE- *) is often used when they occur: 好象.

3.1 Indexing

(NP (-NONE- *)) bears a reference index whenever it is fairly clear what nominal it is controlled by, corresponding roughly to a trace in raising constructions.

(a) ba-construction:

```
(VP (BA 将)
    (IP-OBJ (NP-SBJ-1 (QP (CD 三)
                          (CLP (M 名)))
                      (ADJP (JJ 涉嫌))
                      (NP (NN 犯罪)
                          (NN 分子)))
            (VP (VV 逮捕)
                (NP-OBJ (-NONE- *-1)))))
```

(b) short-bei construction:

```
(IP (NP-PN-SBJ-1 (NR 费孝通))
    (VP (SB 被)
        (VP (VV 授予)
            (NP-IO (-NONE- *-1))
            (NP-PN-OBJ (NR 麦格赛赛奖)))))


(IP (NP-SBJ-1 (NN 金融)
              (NN 部门))
    (VP (ADVP (AD 已))
        (VP (SB 被)
            (VP (VV 要求)
                (NP-OBJ-2 (-NONE- *-1))
                (IP (NP-SBJ (-NONE- *PRO*-2))
                    (VP (VV 开展)
                        (NP-OBJ (NN 职工)
                                (NN 个人)
                                (NN 住房)
                                (NN 抵押)
                                (NN 贷款)
                                (NN 业务)))))))
```

However, not all short-bei constructions can be plausibly analyzed as involving movement:

```
(IP (NP-SBJ (NN 住房))
    (VP (ADVP (AD 却))
        (VP (SB 被)
            (VP (VV 当作)
                (NP-OBJ (NN 职工)
                        (NN 福利))))))
```

In cases of strings of coindexed null elements, the null is coindexed to the subject of the innermost higher clause, as shown in the following example:

```
(IP (NP-PN-SBJ-1 (NR 张三))
      (VP (VV 好象)
          (IP (NP-SBJ-2 (-NONE- *-1))
              (VP (SB 被)
                  (VP (VV 打)
                      (AS 了)
                      (NP-OBJ (-NONE- *-2)))))))
```

When several NPs are conjoined, the indexing should be from the highest NP:

```
(IP (NP-SBJ-PN-1 (NR 张三)
                 (CC 和)
                 (NR 李四))
   (VP (VV 好象)
       (IP-OBJ (NP-SBJ (-NONE- *-1))
               (VP (VV 喜欢)
                   (NP-PN-OBJ (NR 王五))))))
```

4 (-NONE- *PRO*): the null element in control constructions

(-NONE- *PRO*) has the following definitive properties: (1) it is in complementary distribution with lexical NPs and therefore not substitutable for lexical NPs. (2) it cannot occur as a complement to a verb or a preposition. By definition it cannot occur at an adjunct position either. The only position available is then the subject position. However, (-NONE- *PRO*) is not the only null category that can occur in subject positions. The procedure to identify *PRO*s is described below.

(-NONE- *PRO*) comes in two flavors in terms of reference: generic or definite.

4.1 (-NONE- *PRO*) that gets an arbitrary (variable) reading.

A generic (-NONE- *PRO*) does not have to have an antecedent in the same sentence. It is not even coindexed with another element in the discourse. A generic (-NONE- *PRO*) typically occurs in the subject position of a clause that is the sentential subject of the whole sentence. When the sentential subjects can be demonstrated to be non-finite, then the generic (-NONE- *PRO*) can be used. If the sentential subject is non-finite, then aspect-markers like 着 (progressive aspect marker), 了 (perfective aspect marker), 过(experiential aspect marker) can not occur in it. Nor can adverbials that has aspectual meanings: 将,正在.

```
(IP (IP-SBJ (NP-SBJ (-NONE- *PRO*))
            (VP (VV 发展)
                (NP-OBJ (NN 国民)
                        (NN 经济))))
    (VP (VC 是)
```

```
        (NP-PRD (ADJP (JJ 头等))
                (ADJP (JJ 大))
                (NP (NN 事)))))
```

4.2 (-NONE- *PRO*) with definite references.

*PRO*s with definite references generally occur in the subject position of the complement clause of a "control" verb. In order to identify *PRO*s with definite reference, one has to first determine whether the verb that takes the complement clause is a control verb. Control verbs generally take an infinitive clause as their complement and the subject of the infinitival clause has to be a null element *PRO* and can not be substituted by a lexical NP. While it is fairly convenient in English to diagnose an infinitival clause by using 'to', in Chinese something comparable to 'to' does not exist. Still, there are a number of tests that can be used to distinguish finite and non-finite clauses. Diagnoses of control verbs are described in Section IV.

4.2.1 Subject control

The following are considered to be subject-control verbs: 要, 设法, etc. In a subject-control construction the subject is coreferential with the subject of the clause one-level higher.

```
  (IP (NP-PN-SBJ (NR 中国))
      (VP (VV 设法)
          (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                  (VP (VV 发展)
                      (NP-OBJ (NN 科技))))))
```

```
  (IP (NP-PN-SBJ (NN 政府))
      (VP (VV 答应)
          (NP-OBJ (NN 公众))
          (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                  (VP (VV 发展)
                      (NP-OBJ (NN 科技))))))
```

4.2.2 Object control

The following are considered to be object-control verbs: 请, 劝, 叫, 让, etc. The object of these verbs binds the PRO in the subject position of the embedded clause.

```
(IP (NP-PN-SBJ (NR 张三))
    (VP (VV 劝)
```

```
(NP-PN-OBJ (NR 李四))
(IP-OBJ (NP-SBJ  (-NONE- *PRO*))
        (VP (VV 参加)
            (NP-OBJ (NN 会见))))))
```

5 (-NONE- *pro*): used in pro-drop situations

pro can occur in subject or object positions in Chinese. Unlike *PRO*s, *pro*s are optional in the sense that they can be replaced by overt constituents.

5.1 Imperative subjects

```
(IP (NP-SBJ (-NONE- *pro*))
    (VP (VV 关上)
        (NP-OBJ (NN 门)))
    (PU !))
```

5.2 Understood subject/object in the discourse

```
(IP (NP-SBJ (-NONE- *pro*))
    (VP (NP-TMP (NT 一九五五年))
        (VP (VP (VV 赴)
                (NP-PN-OBJ (NR 苏联)
                           (NR 莫斯科)
                           (NR 斯大林)
                           (NN 汽车厂)))
            (VP (VV 实习))))
    (PU 。))
```

5.3 Subject in existential sentences

```
(IP (NP-SBJ (-NONE- *pro*))
    (VP (VE 有)
        (IP-OBJ (NP-SBJ (QP (CD 二十三)
                            (CLP (M 项)))
                        (NP (ADJP (JJ 高))
                            (ADJP (JJ 新))
                            (NP (NN 技术)))
                        (NP (NN 项目)))
                (VP (VP (VV 进)
                        (NP-OBJ (NN 区)))
                    (VP (VV 开发))))))
```

6 (-NONE- *RNR*): used in right node raising

(-NONE- *RNR*) occurs when two coordinated verb shares a complement. The complement is grouped with the last verb and all other verbs take an (-NONE- *RNR*) that is coindexed with it. Note that the way (-NONE- *RNR*) is used here is different from that of the Penn English Treebank.

```
(VP (VP (ADVP (AD 积极))
        (VP (VV 引进)
           (NP-OBJ (-NONE- *RNR*-1))))
        (PU ， )
    (VP (ADVP (AD 精心))
        (V (VV 种养)
           (NP-OBJ-1 (ADJP (JJ 优稀))
                     (ADJP (JJ 名贵))
                     (NP (NN 品种))))))
```

Section VII Coordination

1 General guidelines for the bracketing of coordination structures

1.1 Coordination in all cases is done at the lowest possible level; that is, when there is a choice between word-level coordination and phrase-level coordination, word-level coordination is always preferred.

1.2 Labeling at the level of coordination

A conjunction joins two or more elements. Phrases with identical bracket labels or part-of-speech tags are of course coordinated under the appropriate bracket label (e.g., the level of coordination for NPs and for single-word nouns is labeled NP, etc.). As has been shown in previous sections, sometimes the conjuncts have different labels. In this case the coordination structure as a whole is labeled UCP.

1.3 Function tags at the level of coordination

Function tags appear only on the bracket label at the highest level of

coordination in conjuncts of the same phrase type and the same function.

```
(NP-SBJ (NR 中国)
        (CC 和)
        (NR 美国))
```

Note that the functional tag goes to the whole coordination structure only when all the conjuncts share the same functional tag, in which case each individual conjunct no longer receives that same function tag. The individual conjuncts can be viewed as inheriting the functional tag of the whole coordinating structure. If all conjuncts do not share the same function, the function tags appear on individual conjuncts.

```
(NP (NP-PN (NR 亚洲))
    (CC 和)
    (NP (NN 世界)))
```

2 Levels of Coordination

Coordination occurs at different levels. They are described below:

2.1 Word-level

Single-word elements (including compounds) of the same syntactic category are coordinated at word-level and are annotated with a flat structure. One rule of thumb is that only word categories that are INCAPABLE of taking complements can be coordinated at the word level. In Chinese these categories include all nouns (NT, NN, NR), pronouns, adjectives and intransitive verbs.

(a) Nouns

```
 (NP (NN 热战)
     (PU 、)
     (NN 冷战)
     (PU 、)
     (NN 动荡)
     (PU 、)
     (NN 冲突)
     (CC 和)
     (NN 剧变))

 (NP (NN 血泪)
     (NN 教训)
     (CC 与)
     (NN 痛苦)
     (NN 经验))

 (NP (NN 和平)
```

```
    (CC 与)
    (NN 安全)))
```

Dates are coordinated at the word level:

```
(NP (NT 一九八六)
    (CC 至)
    (NT 一九九0年))
```

Proper nouns can be coordinated at the word level under the condition that all the conjuncts are proper nouns. The whole coordinated NP receives the functional tag -PN:

```
(NP-PN (NR 俄罗斯)
       (CC 和)
       (NR 德国))

(NP-PN (NR 张三)
       (CC 和)
       (NR 李四))
```

Nouns can be coordinated at the word level because they do not take complements. An NP formed by nouns coordinated at the word level can take modifiers:

```
(NP (DNP (NP (NN 仲裁)
             (NN 协议))
         (DEG 的))
    (NP (NN 制定)
        (CC 与)
        (NN 执行)))

(NP (NP (NN 社会主义))
    (NP (NN 物质)
        (NN 文明)
         (CC 和)
         (NN 精神)
        (NN 文明))))))

(NP (DNP (NP (PN 自身))
         (DEG 的))
   (NP  (NN 政治)
        (NN 素质)
        (CC 和)
        (NN 业务)
        (NN 素质)
         (CC 以及)
         (NN 职业)
        (NN 道德)
        (NN 水平)))
```

NPs formed by word-level coordination can also be modifiers:

```
(NP (NP (NN 国际主义)
        (CC 和)
        (NN 人道主义))
    (NP (NN 援助)))
```

(b) Intransitive verbs

```
(VP (VA 聪明)
    (CC 又)
    (VA 漂亮))

(VP (VA 广泛)
    (CC 而)
    (VA 良好))

(VP (CC 既)
    (VA 高兴)
    (CC 又)
    (VA 紧张))

(VP (VA 公正)
    (PU 、)
    (VA 及时))
```

VPs formed by word-level coordinations can share modifiers:

```
(VP (ADVP (AD 都))
    (PP (P 与)
        (NP (NP-PN (NR 德国))
             (NP (NN 始祖鸟))))
    (VP (VA 相近)
        (CC 和)
        (VA 相似)))
```

(c) JJs

```
  (NP (ADJP (JJ 大型)
            (CC 和)
            (JJ 小型))
      (NP (NN 项目)))
```

(d) PNs

```
 (NP (PN 我)
     (CC 和)
     (PN 他))
```

(e) adverbs

```
(VP (ADVP (AD 快速)
          (PU 、)
          (AD 健康))
    (VP (VV 增长))))
```

2.2 Phrase-level

When one or more of the coordinated elements are multi-word (not compounds and of the same syntactic category), each element is bracketed with the appropriate label, as is the immediate dominating node. All coordinating conjunctions are children of the top phrase node (''conjunction level'' or ''coordination level'').

(a) noun phrases

When the noun conjuncts take on different functional tags, they are phrase-level coordination because each conjunct has to have a label to anchor the functional tag and the functional tags cannot be assigned to the whole conjunction. In the example below, the NP within the DNP is a coordination at the phrase level because (NP-PN (NR 亚洲)) and (NP (NN 世界)) bear different functional tags.

```
(NP (DNP (NP (NP-PN (NR 亚洲))
             (CC 和)
             (NP (NN 世界)))
         (DEG 的))
    (NP (NN 和平)
        (CC 与)
        (NN 安全)))
```

When the NPs takes on modifiers they are conjoined at the phrase level:

```
(NP (NP (ADJP (JJ 大型))
        (NP (NN 工程)))
    (CC 和)
    (NP (ADJP (JJ 小型))
        (NP  (NN 项目))))
```

(b) Coordination of verb phrases

If the conjuncts have different modifiers or at least one of the conjuncts has a complement, the coordination is at the phrase level:

-- at least one of the conjuncts takes one or more complements:

```
 (VP (VP (VCD (VV 改革)
              (VV 开放) ))
     (CC 和)
     (VP (VV 发展)
         (NP-OBJ (NN 经济))))
```

-- the conjuncts have different modifiers even if none of them take complements:

```
(VP (VP (ADVP (AD 大胆))
        (VP (VV 改革)))
    (CC 并)
    (VP (ADVP (AD 锐意))
        (VV (VV 进取))))
```

-- the conjuncts have different modifiers and complements:

```
   (VP (VP (VV 提高)
           (NP-OBJ (DNP (NP (PN 自身))
                        (DEG 的))
                   (NP (NN 政治)
                       (NN 素质))))
        (PU ， )
        (CC 并且)
        (VP (ADVP (AD 尽快))
            (ADVP (AD 普遍))
            (VP (VV 采用)
                (NP-OBJ (CP (WHNP-2 (-NONE- *OP*))
                            (CP (IP  (NP-SBJ (-NONE- *T*-2))
                                     (VP (ADVP (AD 更加))
                                         (VP (VA 先进))))
                                (DEC 的)))
                        (ADJP (JJ 现代))
                        (NP (NN 监管)
                            (NN 手段))))))
```

-- When the conjuncts share a complement, the whole structure is still considered to be coordinated at the phrase level and the verb that is not adjacent to the complement takes an (-NONE- *RNR*) complement:

```
(VP (VP (ADVP (AD 积极))
        (VP (VV 引进)
            (NP-OBJ (-NONE- *RNR*-1))))
    (PU ， )
    (VP (ADVP (AD 精心))
        (VP (VV 种养)
            (NP-OBJ-1 (ADJP (JJ 优稀))
                      (ADJP (JJ 名贵))
                      (NP (NN 品种))))))
```

(c) QPs

Word-level of QP coordination (of numerals that do not take measure words as complements) are rarely observed. When the conjuncts are numerals that take measure words as complements they are conjoined at the phrase level.

```
(QP (QP (CD 一百八十一万)
        (CLP  (M 吨)))
    (CC 和)
    (QP (CD 七点三亿)
        (CLP (M 立方米))))
```

When two numerals share a complement, the numerals that are not adjacent to the complement takes a null (CLP (-NONE- *RNR*)), which is coindexed with the shared measure word complement:

```
  (QP (QP (CD 4 )
          (CLP (-NONE- *RNR*-1)))
      (CC 至)
      (QP (CD 7 )
          (CLP-1 (M 个))))
```

(d) LCPs

```
(LCP (LCP (NP (NN 桌子))
          (LC 上))
     (CC 和)
     (LCP (NP (NN 椅子))
          (LC 上)))
```

(e) UCPs

Coordination of phrases of different categories are always at the phrase level:

```
(PP (P 随着)
    (UCP (IP (NP-SBJ (NP-PN (NR 俄罗斯))
                     (NP (NN 国内))
                     (PP (P 对)
                         (NP (NN 工业品)))
                     (NP (NN 需求)))
             (VP (PP-DIR (P 向)
                         (NP (NN 中高档)
                             (NN 方向)))
                 (VP (VV 发展))))
         (CC 和)
         (NP (DNP (NP (NN 国内)
                      (NN 经济)
                      (NN 形势))
                  (DEG 的))
             (ADJP (JJ 逐步))
```

```
            (NP (NN 稳定))))
```

2.3 Clause-level coordination

When there are multiple clauses inside a sentence and they are not in a superordinate-subordinate relationship, they are coordinated at the sentence-level. For example,

```
(IP (CC 不但)
    (IP (NP-PN-SBJ (NR 张三))
        (VP (VV 来)
            (AS 了)))
    (CC 而且)
    (IP (NP-PN-SBJ (NR 李四))
        (VP (ADVP (AD 也))
            (VP (VV 来)
                (AS 了)))))
```

Some clause-level coordinations do not have explicit coordinating conjunctions. The clauses are often separated by punctuations. In this case, the punctuations and the clauses are attached at the same level.

```
 (IP (PP (P 据)
         (NP (CP (WHNP-1 (-NONE- *OP*))
                 (CP (IP (NP-SBJ (-NONE- *T*-1))
                         (VP (VV 来自)
                             (NP-OBJ (NN 省)
                                     (NN 外经贸委))))
                         (DEC 的)))
             (NP (NN 消息))))
     (PU ， )
     (NP-TMP (NT 一九九六年))
     (PU ， )
     (IP (IP (NP-SBJ (NP-PN (NR 山东))
                     (NP (NN 外资)
                         (NN 企业)))
             (VP (VCD (VV 出口) (VV 创汇))
                 (QP-EXT (CD 五十四点九亿)
                         (CLP (M 美元)))))
         (PU ， )
         (IP (NP-SBJ (-NONE- *pro*))
             (VP (VV 占)
                 (QP-OBJ (DNP (NP (NP (DP (DT 全))
                                      (NP (NN 省)))
                                  (NP (NN 出口)
                                      (NN 总额)))
```

```
                        (DEG 的))
                    (QP (CD 百分之五十一)))))
    (PU ; )
    (IP (NP-SBJ (CP (WHNP-2 (-NONE- *OP*))
                     (IP (NP-SBJ (DP (DT 全))
                                 (NP (NN 省)))
                         (VP (ADVP (AD 实际))
                             (VP (VV 利用)
                                 (NP-OBJ (-NONE- *T*-2)))))
                 (NP (NN 外资))))
        (VP (VV 占)
            (QP-OBJ (DNP (NP (NP (DP (DT 全))
                                 (NP (NN 社会)))
                             (NP (ADJP (JJ 固定))
                                 (NP (NN 资产)))
                             (NP (NN 投资)))
                         (DEG 的))
                     (QP (CD 百分之十四点七)))))
    (PU ; )
    (IP (NP-SBJ (NP (NN 外商)
                    (NN 投资)
                    (NN 企业))
                (ADJP (JJ 从业))
               (NP (NN 人员)))
        (VP (ADVP (AD 已))
            (VP (VV 达)
                (NP-OBJ (QP (CD 一百一十五万))
                        (NP (NN 人))))))
    (PU , )
    (IP (NP-SBJ (-NONE- *pro*))
        (VP (VV 占)
            (QP-OBJ (DNP (NP (NP (NP (DP (DT 全))
                                     (NP (NN 省)))
                                 (NP (NN 工业))
                                 (ADJP (JJ 从业))
                                 (NP (NN 人员)))
                             (NP (NN 总数)))
                         (DEG 的))
                    (QP (CD 百分之十点九))))))
    (PU 。))
```

3 Bracketing of coordinating conjunctions

3.1 Single-word conjunctions.

Single-word conjunctions are attached as sisters of the conjuncts.

Examples:

和, 与, 或, 或者, 还是, 至, 到, 及, 并, 而, 并且, 兼, 跟, 同, 以及.

```
(NP (NP (PN 其))
    (NP (NN 时代)
        (CC 和)
        (NN 形态)
        (NN 构造)))

(NP (NP (NN 卫生部))
    (CC 和)
    (NP (ADJP (JJ 有关))
        (NP (NN 部门))))

(NP (NP-APP (NN 主席)
            (CC 兼)
            (NN 行政)
            (NN 总裁))
    (NP-PN  (NR 罗约翰)
            (NN 先生)))

(NP (NP (NN 科技))
    (CC 及)
    (NP (DP (DT 其他))
        (NP (NN 领域))))

(NP (NN 彗星)
    (CC 与)
    (NN 木星))
```

3.2 Paired conjunctions.

Paired conjunctions are attached as sisters to the conjuncts:

Examples:

```
       不但   而且
       不仅   而且
       又   又

(VP (CC 不仅)
    (VP (PP-BNF (P 为)
                (NP (ADJP (JJ 原始))
                    (NP (NN 鸟类))))
        (VP (VV 增加)
            (AS 了)
            (NP-OBJ (ADJP (JJ 新))
                    (NP (NN 成员)))))
    (CC 而且)
    (VP (VV 扩大)
        (AS 了)
        (NP-OBJ (DNP (NP (ADJP (JJ 最早期))
```

```
                    (NP (NN 鸟类)))
                (DEG 的))
            (NP (NN 地理)
                (NN 分布)))))

(VP (CC 既)
    (VP (VV 包括)
        (NP-OBJ (DNP (PP (P 对)
                         (NP (NN 卫生)
                             (NN 技术)
                             (NN 人员)))
                     (DEG 的))
                (NP (NN 提高)
                    (NN 教育))))
    (PU ， )
    (CC 也)
    (VP (VV 包括)
        (NP-OBJ (PP (P 对)
                    (NP (NN 门诊)
                        (NN 性病)
                        (NN 病人)))
                (DEG 的))
        (ADJP (JJ 针对))
        (NP (NN 教育))))
```

3.3 punctuations as conjunctions

In Chinese, it is often the case that coordinated structures do not have an overt coordinating conjunction. Instead, a punctuation is used to separate the different conjuncts. In this case, the punctuation and conjuncts are attached at the same level.

At the word level:

```
(NP (NP-APP (NN 水)
            (PU 、)
            (NN 电)
            (PU 、)
            (NN 气)
            (PU 、)
            (NN 热)
            (PU 、)
            (NN 通讯)
            (ETC 等))
    (NP (NN 设施)))
```

At the phrase level:

```
    (VP (VP (VV 规划)
            (NP-OBJ (NN 面积))
```

```
            (QP-EXT (CD 七)
                    (CLP (M 平方公里))))
         (PU ， )
         (VP (ADVP (AD 已))
             (VP (VV 开发)
                 (NP-OBJ (NN 土地))
                 (QP-EXT (CD 三点八)
                         (CLP (M 平方公里)))))
        (PU ， )
         (VP (VV 累计)
             (NP-OBJ (NN 基础)
                     (NN 设施)
                     (NN 投入))
             (NP-EXT (QP (CD 十二亿多)
                         (CLP (M 元)))
                     (NP (NN 人民币))))
         (PU ， )
         (VP (ADVP (AD 已))
             (VP (VV 形成)
                (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                            (CP (IP (NP-SBJ (-NONE- *T*-1))
                                    (VP (VA 完备)))
                                (DEC 的)))
                        (NP (NP-APP (NN 水)
                                    (PU 、)
                                    (NN 电)
                                    (PU 、)
                                    (NN 气)
                                    (PU 、)
                                    (NN 热)
                                    (PU 、)
                                    (NN 通讯)
                                    (ETC 等))
                           (NP (NN 基础)
                               (NN 设施)))))))
```

At the clause level:

```
 (IP (IP (NP-SBJ (PU “)
                 (NP (NP-PN (NN 世界)
                            (NN 贸易)
                            (NN 组织))
                     (CC 与)
                     (NP (NP-PN (NR 中国))
                         (NP (NN 服务)
                             (NN 贸易))))
                 (NP (NN 研讨会))
                 (PU ”))
         (VP (ADVP (AD 将))
             (PP-TMP (P 于)
                     (NP (NT 四月)
```

```
                    (NT 十九日)))
            (PP-LOC (P 在)
                    (NP-PN (NR 上海)))
            (VP (VV 召开))))
    (PU ， )
    (IP (NP-SBJ (NP-APP (NP-PN (NN 世界)
                               (NN 贸易)
                               (NN 组织))
                    (NP (NN 总干事)))
                (NP-PN (NR 鲁杰罗)))
        (VP (ADVP (AD 将))
            (VP (VP (VV 出席))
                (CC 并)
                (VP (VV 作)
                   (NP-OBJ (NN 专题)
                           (NN 演讲))))))
    (PU 。))
```

3.4 Zero conjunction

In the so-called serial verb constructions not even a punctuation is used. In this case, the phrases in the construction are assumed to be conjoined:

```
 (IP  (NP-PN-SBJ  (NR 张三))
      (VP  (VP (VV 起床))
           (VP (VV 洗)
               (NP-OBJ (NN 脸)))
           (VP (VV 刷)
               (NP-OBJ (NN 牙)))
           (VP (MSP 去)
               (VP (VV 上班)))))
```

Section VIII Subordinating Clauses

1 Scope of this section

This section covers various clauses that function as complements or adjuncts of various phrasal and clausal categories. It covers all occurrences of clauses except those in coordinating structures.

2 Distribution of subordinating clauses

Clauses (IP or CP) occur at the following levels:

2.1 CP

Complementizers take IPs as their complements. Besides 的/DEC, sentence-final particles except 了/SP are considered to be complementizers. Note that words that are tagged CS are not treated as complementizers.

```
(CP (ADVP (CS 如果))
    (CP (IP (NP-SBJ (DNP (LCP (NP (NN 传说))
                              (LC 中))
                         (DEG 的))
                     (NP (PU “)
                         (NN 西天)
                         (PU ” )))
            (VP (VC 是)
                (NP-PRD (CLP (M 个))
                        (NP (PU “)
                       (NN 极乐世界)
                       (PU ” )))))
         (SP 的话)))
```

```
(CP (IP (NP-PN-VOC (NR 老叶))
        (PU ， )
        (NP-SBJ (DP (DT 这))
               (NP (NN 车子)))
        (VP (ADVP (AD 怎么))
           (ADVP (AD 直))
           (ADVP (AD 往下))
            (VP (VV 走))))
    (SP 呢)
    (PU ？ ))
```

2.2 IP

Clauses attached at the IP level include clausal modifiers (either IP or CP), sentential subjects (IP), and topic clauses (IP).

(a) Modifiers

CP as modifiers

```
 (IP (CP-CND (ADVP (CS 如果))
```

```
            (IP (NP-TPC (DP (DT 这)
                            (CLP (M 颗)))
                        (NP (NN 卫星)))
                (NP-SBJ (NN 试验))
                (VP (VA 成功))))
    (PU ， )
    (NP-PN-SBJ (NR 日本))
    (VP (ADVP (AD 从此))
        (ADVP (AD 就))
         (VP (VV 能)
             (VP (VV 进入)
                 (NP-OBJ (CP (WHPP-1 (-NONE- *OP*))
                             (IP (NP-SBJ (-NONE- *pro*))
                                 (VP (PP-TMP (-NONE- *T*-1))
                                     (VP (VV 利用)
                                         (NP-OBJ (ADJP (JJ 大型))
                                                 (NP (NN 卫星)))))))
                         (NP (NN 时代)))))))
```

IP as modifiers

```
 (IP (IP-CND (NP-SBJ (CP-APP (IP (NP-SBJ (-NONE- *pro*))
                                 (VP (VV 设立)
                                     (NP-PN-OBJ (NR 重庆)
                                                (NN 直辖市))))
                             (DEC 的))
                     (NP (NN 议案)))
             (VP (ADVP (CS 若))
                 (VP (VV 获得)
                     (NP-OBJ (NN 通过)))))
    (PU ， )
    (NP-PN-SBJ (NR 重庆))
    (VP (ADVP (AD 将))
         (VP (VV 成为)
             (NP-OBJ (QP (OD 第四)
                         (CLP (M 个)))
                     (NP (NN 直辖市)))))
    (PU 。))
```

(b) sentential subject

```
(IP (IP-SBJ (NP-SBJ (NN 外商))
            (VP (VV 投资)
                (NP-PN-OBJ (NR 广西))))
   (VP (ADVP (AD 相当))
       (VP (VA 活跃))))
```

```
(IP (IP-SBJ (NP-SBJ (DNP (NP (NN 卫星))
                         (DEG 的))
                     (NP (NN 远地点)
                         (NN 发动机)))
            (VP (CP-PRP (ADVP (CS 因))
                        (IP (NP-SBJ (NN 燃料阀))
                            (VP (VV 发生)
                                (NP-OBJ (NN 故障)))))
                (ADVP (AD 不))
                (VP (VV 能)
                    (VP (ADVP (AD 正常))
                        (VP  (VV 运转))))))
    (VP (VC 是)
        (NP-PRD (CP (WHPP-1 (-NONE- *OP*))
                    (CP (IP (NP-SBJ (-NONE- *pro*))
                            (VP (PP-PRP (-NONE- *T*-1))
                                (VP (VV 造成)
                                    (NP-OBJ (NN 失败)))))
                        (DEC 的)))
                (NP (NN 原因))))
    (PU 。))
```

(c) sentential topic

```
(IP (IP-TPC (NP-PN-SBJ (NR 广西))
            (VP (PP (P 对)
                    (NP (NN 外)))
                (VP (VV 开放))))
     (NP-SBJ (NN 成绩))
     (VP (VV 斐然)))
```

2.3 VP

Clauses can occur at either complement or adjunct positions at the VP level. For a detailed description of the VP complements and adjuncts. See Section IV.

(a) Clausal complements

```
  (IP (NP-SBJ (NN 研讨会))
      (VP (ADVP (AD 还))
          (ADVP (AD 将))
          (VP (VV 探讨)
              (IP-OBJ (NP-PN-SBJ (NR 上海))
                      (VP (NP-TMP (NT 今后))
                          (PP-LOC (P 在)
                                  (NP (NN 外贸)
```

```
                                    (NN 经营)
                                    (NN 方面)))
                            (VP (VV 试办)
                                (NP-OBJ (QP (CD 一些))
                                        (ADJP (JJ 合资))
                                        (NP (NN 企业))))))))
     (PU 。))
```

(b) Clausal adjuncts

Where there is a clear predication between the subject and the verb phrase, the intervening clause is treated as a VP-level modifier:

```
    (IP (NP-SBJ (DNP (NP-PN (NR 欧洲))
                     (DEG 的))
                (NP (NN 安全)
                    (CC 和)
                    (NN 幸福)))
        (VP (CP-CND (ADVP (CS 只有))
                    (IP (NP-SBJ (-NONE- *pro*))
                        (VP (PP (P 同)
                                (NP-PN (NR 俄罗斯)))
                            (VP (VV 进行)
                                (NP-OBJ (ADJP (JJ 密切))
                                        (NP (NN 合作)))))))
            (ADVP (AD 才))
            (VP (VV 会)
                (VP (VE 有)
                    (NP-OBJ (NN 保障))))))
```

2.4 NP

There are two types of adjunct clauses at the NP level: relative and appositive clauses. Relative clauses are different from appositive clauses in that they have a missing argument or adjunct inside it.

(a) Relative clauses

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (-NONE- *T*-1))
                (VP (VV 联通)
                    (NP-OBJ (DP (DT 全))
                            (NP (NN 国)))))
            (DEC 的)))
    (NP (NN 铁路))
    (ADJP (JJ 专用))
    (NP (NN 通讯)
        (NN 网络)))
```

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-SBJ (ADJP (NN 当代))
                        (NP-PN (NR 藏族))
                        (NP (NN 牧民)))
                (VP (PP-LOC (-NONE- *T*-1))
                    (VP (VV 过上)
                        (NP-OBJ (NP (NN 社会主义))
                                (ADJP (JJ 新))
                                (NP (NN 生活))))))
         (DEC 的)))
    (NP (PU “)
        (NN 乐园)
        (PU ” )))
```

(b) Appositive clauses

```
 (NP (CP-APP (IP (LCP-SBJ (NP (NP-PN (NR 德国))
                              (NP (NN 领土)))
                          (LC 上))
                 (VP (VV 存在)
                     (NP-OBJ (NN 占领军))))
            (DEC 的))
     (NP (NN 状态)))
```

```
  (NP (CP-APP (IP (NP-SBJ (NP (NN 物质)
                              (NN 文明)
                              (CC 和)
                              (NN 精神)
                              (NN 文明))
                          (NP (NN 建设)))
                  (VP (NP-ADV (QP (CD 两))
                              (NP (NN 手)))
                      (VP (VV 抓))))
              (DEC 的))
      (NP (NN 方针)))
```

2.5 PP

Propositions take clausal complements but not clausal adjuncts.

```
  (PP (P 随着)
      (IP (NP-SBJ (NN 经营)
                  (NN 规模))
          (VP (ADVP (AD 不断))
              (VP (VV 扩大)))))
```

```
 (PP (P 据)
     (IP (NP-PN-SBJ (PU 《)
                    (NP-PN (NR 中国))
                    (NP (NN 证券报))
                    (PU 》 ))
         (VP (VV 报道))))
```

2.6 LCP

Localizers take clausal complements but not clausal adjuncts.

```
 (LCP (IP (NP-SBJ (-NONE- *pro*))
          (VP (VV 回顾)
              (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                          (CP (IP (NP-SBJ (NN 乡镇)
                                          (NN 企业)
                                          (NN 发展))
                                  (VP (VV 取得)
                                      (NP-OBJ (-NONE- *T*-1))))
                              (DEC 的)))
                      (ADJP (JJ 重大))
                      (NP (NN 成就)))))
     (LC 后))
```

3 Bracketing of subordinating conjunctions

This subsection describes how the class of words tagged as CS are bracketed. Words that are tagged as CS are treated as adverbs and they either take clause-initial positions or post-subject positions. They are treated as adverbs rather than complementizers because of their distributions. However, they have properties that differentiate them from other adverbs; that is, they mark a clause as subordinate. So when they (with their modifying adverbs) occur in the sentence-initial position, they are adjoined to CP. Otherwise, they are adjoined to IP/VP just like any other adverbs.

3.1 Sentence-initial CSs

Example:

```
 (IP (CP-CND (ADVP (CS 如果))
             (IP (NP-PN-SBJ (NR 张三))
                 (VP (VV 参加))))
     (PU ， )
     (NP-PN-SBJ (NR 李四))
     (VP (ADVP (AD 也))
         (VP (VV 参加))))
```

3.2 Preverbal, post-subject CS

```
(IP (NP-SBJ (CP-APP (IP (NP-SBJ (-NONE- *pro*))
                        (VP (VV 设立)
                            (NP-PN-OBJ (NR 重庆)
                                       (NN 直辖市))))
                    (DEC 的))
            (NP (NN 议案)))
    (VP (ADVP (CS 若))
        (VP (VV 获得)
            (NP-OBJ (NN 通过)))))
```

Section IX Punctuations

1 Mid-sentence punctuation

This includes parentheses, braces, commas, colons, dashes, quotation marks, semicolons, and punctuation marks for book titles (e.g., <<, >>).

1.1 Paired punctuation

Paired punctuation marks are siblings of the constituent they surround. Paired punctuation marks in Chinese include quotation marks and they usually mark the beginning and the end of a constituent.

1.1.1 Quotation marks

```
(IP (IP (NP-SBJ (PU “)
                (NP (NP-PN (NN 世界)
                           (NN 贸易)
                           (NN 组织))
                    (CC 与)
                    (NP (NP-PN (NR 中国))
                        (NP (NN 服务)
                            (NN 贸易))))
                (NP (NN 研讨会))
                (PU ”))
        (VP (ADVP (AD 将))
            (PP-TMP (P 于)
                    (NP (NT 四月)
                        (NT 十九日)))
            (PP-LOC (P 在)
                    (NP-PN (NR 上海)))
            (VP (VV 召开))))
    (PU ，)
```

```
(IP (NP-SBJ (NP-APP (NP-PN (NN 世界)
                           (NN 贸易)
                           (NN 组织))
                    (NP (NN 总干事)))
            (NP-PN (NR 鲁杰罗)))
    (VP (ADVP (AD 将))
        (VP (VP (VV 出席))
            (CC 并)
            (VP (VV 作)
               (NP-OBJ (NN 专题)
                      (NN 演讲))))))
(PU 。))
```

Note that the quotation marks are siblings of (NN 世界) (NN 贸易) (NN 组织) (NR 中国) (NN 服务) (NN 贸易) and (NN 研讨会), and they start and end the whole subject NP.

```
(IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                (CP (IP (NP-SBJ (CP (WHNP-2 (-NONE- *OP*))
                                    (CP (IP (NP-PN-SBJ (NR 日本)
                                                       (NN 经济)
                                                       (NN 企划厅)
                                                       (NN 经济)
                                                       (NN 研究所))
                                            (VP (VV 下属)
                                                (NP-OBJ (-NONE- *T*-2))))
                                        (DEC 的)))
                                (NP (NP (PU “)
                                        (NP (NP-PN (NR 中国))
                                            (NP (NT 将来)))
                                        (CC 与)
                                        (NP (NP-PN (NR 亚太))
                                            (NP (NN 经济)))
                                        (PU ”))
                                    (NP (NN 研究会))))
                            (VP (NP-TMP (NT 日前))
                                (VP (VV 发表)
                                    (NP-OBJ (-NONE- *T*-1)))))
                    (DEC 的))
                (QP (CD 一)
                    (CLP (M 份)))
                (NP (NN 报告))))
    (VP (VV 说)
        (PU ，)
        (IP-OBJ (NP-SBJ (DNP (NP (NP-PN (NR 中国))
                                 (NP (NN 经济)))
                             (DEG 的))
                        (ADJP (JJ 高速))
                        (NP (NN 增长)))
```

```
                    (VP (VV 有助于)
                       (NP-OBJ (DNP (NP (NP-PN (NR 亚太))
                                        (NP (NN 地区)))
                                    (DEG 的))
                                (NP (NN 发展))))))
       (PU 。))
```

Note that in this case the quoted NP is a coordination structure and the quotation marks are siblings of the top-level constituents of the NP.

Quotation marks should go outside whatever they surround whenever possible. When it is not possible they just get yanked around by whatever is inside them. They are at the very bottom of the pecking order.

In the following example the second of the pair of quotes gets yanked to IP level by the period:

```
(IP (NP-SBJ (NP (DNP (NP-PN (NR 中国)
                            (NN 社会)
                            (NN 科学院))
                        (DEG 的))
                    (NP (NN 经济)
                       (NN 学者)))
                (NP (NP-PN (NR 朱运法))
                    (PU 、)
                    (NP-PN (NR 张延群))))
     (VP (VV 说)
         (PU ：)
          (IP-OBJ (PU “)
                 (IP-SBJ (NP-SBJ (NN 住房)
                                 (NN 分配))
                         (VP (VV 货币化)))
                    (VP (ADVP (AD 已))
                        (VP (VC 是)
                            (NP-PRD (NN 大势所趋))))))
     (PU 。)
     (PU ” ))
```

1.1.2 Braces, parentheses, dashes.

Dashes may appear as standard double hyphens -- or as single hyphens -.

In order to distinguish annotation brackets from brackets that were part of the original text, original brackets are shown with codes:

(a) Parentheses (and) are indicated with -LRB- (for Left Round Bracket) and -RRB- (for Right Round Bracket), respectively.

(b) Braces { and } are indicated with -LCB- and -RCB-, respectively.

(c) Brackets [and] are indicated with -LSB- and -RSB-, respectively.

Most things that are set off by parentheses or dashes are labeled PRN.

```
(IP (NP-SBJ (NP (NT 昨天))
            (PRN (PU -LRB-)
                 (NP (NT 五月)
                     (NT 二十日))
                 (PU -RRB-)))
    (VP (VC 是)
        (NP-PRD (DNP (NP-PN (NR 张三))
                     (DEG 的))
                (NP (NN 生日))))
    (PU 。))
```

```
(IP (NP-SBJ (NP (NR 张三))
            (PRN (PU --)
                 (QP (CD 一)
                     (CLP (M 个)))
                 (NP (NP-PN (NR 中国))
                     (NP (NN 学生)))
                 (PU --)))
    (VP (VP (VV 到)
            (NP-PN-OBJ (NR 美国)))
        (VP (VV 学习)))
    (PU 。))
```

```
(IP (NP-SBJ (DP (DT 这)
                (CLP (M 个)))
            (NP (NN 开发区)))
    (VP (VV 位于)
        (NP-OBJ (NP (NP-PN (NR 中国))
                    (ADJP (JJ 著名))
                    (NP (NN 风景)
                        (NN 旅游城)))
                (PRN (PU ——)
                     (LCP (NP (NP-PN (NR 杭州))
                              (NP (NN 市区)))
                          (LC 内))))))
```

1.1.3 Punctuation for book and article titles

```
(NP (CP (WHNP-1 (-NONE- *OP*))
        (CP (IP (NP-TMP (NT 一九九五年)
                        (NT 九月))
                (NP-SBJ (NN 建设部)
                        (CC 和)
                        (NN 外经贸部))
                (VP (ADVP (AD 联合))
                    (VP (VV 发布)
                        (NP-OBJ (-NONE- *T*-1)))))
            (DEC 的)))
    (NP-TTL (PU <<)
            (DNP (PP (P 关于)
                     (IP (NP-SBJ (-NONE- *pro*))
                         (VP (VV 设立)
                             (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                                         (IP (NP-SBJ (NN 外商))
                                             (VP (VV 投资)
                                                 (NP-OBJ (-NONE- *T*-1)))))
                                     (NP (NN 建筑业)
                                         (NN 企业))))))
                 (DEG 的))
            (NP (NN 规定))
            (PU >>)))
```

1.2 Unpaired punctuation (commas, colons, and semicolons)

Unpaired punctuation intervenes between constituents at the highest possible dividing level:

```
(IP (ADVP (AD 据悉))
    (PU ， )
    (NP-SBJ (DNP (NP (NN 研讨会))
                 (DEG 的))
            (NP (NN 主题)))
    (VP (VC 是)
        (IP-PRD (IP (NP-SBJ (CP (WHNP-1 (-NONE- *OP*))
                                (CP (IP (NP-PN-SBJ-2 (NR 中国))
                                        (VP (PP-LOC (P 在)
                                                    (LCP (NP (NN 谈判))
                                                         (LC 中)))
                                            (PP-DIR (P 对)
                                                    (NP (NP-APP
                                                        (NN 金融)
                                                        (PU 、)
                                                        (NN 保险)
                                                        (PU 、)
```

```
                                                    (NN 海空运)
                                                  (PU 、)
                                                   (NN 咨询)
                                                  (PU 、)
                                                   (NN 零售业)
                                                  (PU 、)
                                                   (NN 广告)
                                                  (PU 、)
                                                   (NN 律师)
                                                  (PU 、)
                                                   (NN 会计师)
                                                   (ETC 等))
                                              (NP (NN 服务)
                                                  (NN 贸易)
                                                  (NN 行业))))
                                        (VP (MSP 所)
                                            (VP (VV 作)
                                                (NP-OBJ (-NONE- *T*-1)))))))
                                 (DEC 的)))
                        (IP-APP  (NP-SBJ (-NONE- *pro*))
                                 (VP (PP (P 对)
                                         (NP (NN 外)))
                                     (V (VV 开放))))
                        (NP (NN 承诺)))
            (PU ， )
            (VP (ADVP (AD 将))
                (VP (VV 会)
                    (VP (PP (P 对)
                            (NP (NN 国内)
                                (NN 同行)))
                        (VP (VV 产生)
                            (NP-OBJ (CP (WHNP-2 (-NONE- *OP*))
                                        (CP (IP (NP-SBJ (-NONE- *T*-2))
                                                (VP-WH (VV 怎样)))
                                            (DEC 的)))
                                    (NP (NN 影响))))))))
 (PU ， )
(IP (NP-SBJ (DNP (NP (DP (DT 各))
                     (NP (NN 行业)))
                 (DEG 的))
            (NP (NN 国际)
                (NN 竞争力)))
    (VP-WH (VV 如何)))
(PU ， )
(IP (NP-SBJ (NP-PN (NR 中国))
            (NP (NN 政府)))
    (VP (PP-LOC (P 在)
                (LCP (NP (NN 谈判))
                     (LC 中)))
        (ADVP-WH (AD 如何))
        (VP (VV 掌握)
            (NP-OBJ (DNP (PP (P 对)
```

```
                                        (NP (NN 服务)
                                            (NN 贸易)))
                                    (DEG 的))
                                (NP (NN 开放度))))))
            (ETC 等))
    (PU 。))
```

1.3 Apostrophe

Apostrophe is bracketed at the lowest level possible:

```
 (IP-HLN (NP-PN-SBJ (NP  (PU ’)
                         (NT 98))
                     (NP (NP-PN (NR 中国))
                         (NP (NN 东西部)))
                    (NP (NN 投资)
                         (CC 与)
                         (NN 贸易))
                    (NP (NN 洽谈会)))
            (VP (ADVP (AD 将))
                (PP-LOC (P 在)
                        (NP-PN (NR 西安)))
                (VP (VV 举行))))
```

2 Sentence-final punctuation

Final punctuation, as a rule, is a child of the highest level of structure, whether the structure be an IP, a CP or a coordination of IPs:

```
     (IP (NP-SBJ (NP (NP-PN (NN 世界)
                            (NN 贸易)
                            (NN 组织))
                     (CC 与)
                     (NP (NP-PN (NR 中国))
                         (NP (NN 服务)
                             (NN 贸易))))
                 (NP (NN 研讨会)))
         (VP (ADVP (AD 将))
             (PP-LOC (P 在)
                     (NP-PN (NR 上海)))
             (VP (VV 举行)))
        (PU 。))

 (CP-Q (IP (NP-SBJ (PN 这))
```

```
        (VP (VC 是)
            (NP-PN-PRD (NR 天津))))
    (SP 吗)
    (PU ?))


(IP (IP (NP-SBJ (PU “)
                (NP (NP-PN (NN 世界)
                           (NN 贸易)
                           (NN 组织))
                    (CC 与)
                    (NP (NP-PN (NR 中国))
                        (NP (NN 服务)
                            (NN 贸易))))
                (NP (NN 研讨会))
                (PU ”))
        (VP (ADVP (AD 将))
            (PP-TMP (P 于)
                    (NP (NT 四月)
                        (NT 十九日)))
            (PP-LOC (P 在)
                    (NP-PN (NR 上海)))
            (VP (VV 召开))))
    (PU ，)
    (IP (NP-SBJ (NP-APP (NP-PN (NN 世界)
                               (NN 贸易)
                               (NN 组织))
                        (NP (NN 总干事)))
                (NP-PN (NR 鲁杰罗)))
        (VP (ADVP (AD 将))
            (VP (VP (VV 出席))
                (CC 并)
                (VP (VV 作)
                    (NP-OBJ (NN 专题)
                            (NN 演讲))))))
    (PU 。))
```

Section X Ambiguity

Ambiguity is a very common phenomenon that occurs at various levels:

word segmentation, POS tagging, syntax, semantics, discourse, and so on.

1. Principles of handling ambiguities:

(1) In our corpus, we don't annotate the ambiguity at word segmentation and POS tagging level; that is, we keep exactly one segmented POS-tagged sequence per sentence. As a result, the syntactic ambiguity caused by POS ambiguity is "eliminated".

For example, the sequence "coverb + NP + VP" can either be:
the PP modifies VP, when the coverb is tagged as P, or
serial verb construction, when the coverb is tagged as VV.

The annotator will choose a unique POS tag for the coverb according to the context, thus leading to unique syntactic structure.

(2) Most of syntactical ambiguity can be resolved with the help of the context. In such cases, we annotate only the correct reading.

For example, in the sentence 鸡[chicken] 吃[eat] 了[AS],
鸡 is either the logic object of eating, and the agent of eating is absent,
or 鸡 is the agent of eating, and the logic object of eating is absent.
Nevertheless, from the context, it should be clear who ate what. We will annotate only the correct reading.

(3) If the ambiguity cannot be resolved with the context, currently, we choose only the most likely one.

We believe that the truly ambiguous sentences are rare, and even when there are more than one plausible reading, the annotators might recognize only one of these readings.

2. The types of syntactic ambiguities

We classify them according to the causes of the ambiguities (For the examples below, we will include the English gloss and the translation).

2.1. Ambiguities caused by POS ambiguities.

As mentioned before, we don't annotate this type of ambiguities. The meaning difference of various readings can be very subtle. Annotators choose the right POS tags according to the meaning.

2.1.1. Words with both verb and preposition tags

Ex. 他 在 屋里 做 饭
(He exist/at room-inside cook dinner)

Two readings:

(1) "He cooked dinner in the room."

```
(IP (NP-SBJ (PN 他))
    (VP (PP (P 在)
            (NP (NN 屋里)))
        (VP (VV 做)
            (NP-OBJ (NN 饭)))))
```

(2) "He was in the room and cooked dinner."

```
(IP (NP-SBJ (PN 他))
    (VP (VP (VV 在)
            (NP-OBJ (NN 屋里)))
        (VP (VV 做)
            (NP-OBJ (NN 饭)))))
```

2.1.2. Words with both verb and noun tags

```
企业      投入                一亿        元
(company  invest/investment 100-million yuan)
```

Two readings:

(1) "The company invests 100 million yuans."

```
(IP (NP-SBJ (NN 企业))
    (VP (VV 投入)
        (QP-OBJ (CD 一亿)
                (CLP (CL 元)))))
```

(2) "The investment from companies is 100 million yuans."

```
(IP (NP-SBJ (NN 企业)
            (NN 投入))
    (VP (QP-PRD (CD 一亿)
                (CLP (CL 元)))))
```

2.2. Ambiguities caused by attachment

The pattern is: X Y1 Y2 or Y2 Y1 X.
where X is either the sister of Y1 or the sister of the parent of Y1 and Y2. The relation between Y1 and Y2 can be modifier-modifiee, head-complement, conjuncted elements. Y1 and Y2 don't have to be of the same syntactic category.

Some examples of X Y1 Y2:

- relative clause + NP1 + de5 + NP2:
  Ex: 在 工厂 打工 的 学生 的 家长
  (at factory work DE student DE parent)

  a. (XY1)-Y2: the parents of the students who work in the factory.
  b. X-(Y1Y2): the students' parents who work in the factory.

- QP + NP1 + de5 + NP2:
  e.g. 三 个 商店 的 雇员
  (three CL store DE employee)

  a. (XY1)-Y2: the employees of three stores
  b. X-(Y1Y2): three store employees

Some examples of Y2 Y1 X:

- V + NP1 + de5 + NP2:
  Ex: {我 喜欢} 看 动物 的 小孩
  ({I like} watch animal DE child)

  a. Y2-(Y1X): I like to watch animals' children.
  b. (Y2Y1)-X: I like the children who watch animal.

- NP1 + CC + NP2 + de5 + NP3:
  Ex: 北京 和 天津 的 北部
  (Beijing and Tianjin DE northern-part)

  a. Y2-(Y1X): Beijing and the northern part of Tianjin.
  b. (Y2Y1)-X: the northern part of Beijing and Tianjin.

2.3. Ambiguities caused by transformations (e.g., topicalization and argument-drop)

2.3.1. object drop vs. (fronted object + subject drop)

Ex: 鸡 吃 了
(chicken eat AS)

object drop:

```
(IP (NP-SBJ (NN 鸡))
    (VP (VV 吃)
        (AS 了)
        (NP-OBJ (-NONE- *pro*))))
```

fronted object + subject drop:

```
(IP (NP-TPC-1 (NN 鸡))
```

```
        (NP-SBJ (-NONE- *pro*))
        (VP (VV 吃)
            (AS 了)
            (NP-OBJ (-NONE- *T*-1))))
```

2.3.2. object in topic position vs. object in focus position

e.g. 他 连 我 都 不 认识
(he/him even I/me all not know)

object in topic position: "Even I don't know him."

```
(IP (NP-TPC-1 (PN 他))
    (NP-SBJ (ADVP (AD 连))
            (NP (PN 我)))
    (VP (ADVP (AD 都))
        (ADVP (AD 不))
        (VP (VV 认识)
            (NP-OBJ (-NONE- *T*-1)))))
```

object in focus position: "He does not even know me."

```
(IP (NP-SBJ (PN 他))
    (VP (NP-FOC-1 (ADVP (AD 连))
                  (NP (PN 我)))
        (ADVP (AD 都))
        (ADVP (AD 不))
        (VP (VV 认识)
            (NP-OBJ (-NONE- *T*-1)))))
```

2.4. Others

The ambiguities might not be reflected in syntactic structures according to our current analyses.

2.4.1. V-R compound

Ex: 张三 追累 了 李四 (See Li Yafei's work)
(Zhangsan chase-tired AS Lisi)

```
(IP (NP-SBJ (PN 张三))
    (VP (VV 追累)
        (AS 了)
        (NP-OBJ 李四)))
```

a. Zhangsan chased Lisi, as a result, Lisi was tired.
b. Zhangsan chased Lisi, as a result, Zhangsan was tired.
c. Lisi chased Zhangsan, as a result, Lisi was tired.

2.4.2. V-de

Ex: 张三 追 得 李四 很 累
(Zhangsan chase DE Lisi very tired)

```
(IP (NP-SBJ (PN 张三))
    (VP (VV 追)
        (DER 得)
        (IP (NP-SBJ (PN 李四))
            (VP (ADVP (AD 很))
                (VP (VA 累))))))
```

a. Zhangsan chased Lisi, as a result, Lisi was tired.
b. Lisi chased Zhangsan, as a result, Lisi was tired.

In summary, we don't annotate the ambiguities in type 2.1 and 2.4. True ambiguities (i.e. the ones that cannot solved by the context) in type 2.2 and 2.3 should be rare, and we annotate only the most plausible reading.

XI Problematic cases

1 The bracketing of complicated sentences

Most of the sentences in our Treebank are complicated. To ensure consistency, annotators should be able to break up such sentences in a consistent manner. The following is a list of typical sentences that are likely to cause consistency problems and how they should be bracketed.

```
(IP (IP (NP-SBJ (NN 煤炭))
        (VP (PP-DIR (P 从)
                    (NP-PN (NR 徐州)))
            (VP (VV 运来))))
       (PU ，)
    (IP (IP-TPC (NP-SBJ (-NONE- *pro*))
                (VP (VV 走)
                    (NP-OBJ (NN 运河))))
        (PP (P 比)
            (IP (NP-SBJ (-NONE- *pro*))
                (VP (VV 走)
                    (NP-OBJ (NN 陆路)))))
         (NP-SBJ (NN 运费))
         (VP (DP-ADV (DT 每)
```

```
                        (CLP (M 吨)))
                 (VP (VA 便宜)
                    (QP-EXT (CD 十五)
                            (CLP (M 元)))))))


(IP (IP (NP-SBJ (NN 内地)
                (NN 经济))
        (VP (ADVP (AD 长期))
            (DVP (VP (VA 稳定))
                 (DEV 地))
            (VP (VV 增长))))
    (PU ， )
    (IP (NP-SBJ (NP-PN (NR 香港))
                (NP (NN 经济)))
        (VP (ADVP (AD 将))
            (PP  (P 从)
                (LCP (NP (CP (WHNP-1 (-NONE- *OP*))
                             (CP (IP (NP-SBJ (-NONE- *T*-1))
                                     (VP (VV 充满)
                                         (NP-OBJ (NN 活力))))
                                 (DEC 的)))
                         (NP (NN 内地)
                             (NN 经济)))
                     (LC 中)))
            (VP (VV 获益)))))
```

In the above two examples the annotator is likely to be tempted to bracket the first clause as a subordinating clause because semantically the first clause expresses cause or manner of the second IP. Because we are more concerned with syntactic analysis than anything else, an IP will not be bracketed as subordinating clause unless there is a subordinating conjunction in it.

```
(IP (IP (NP-AD (NN 此外))
        (PU ， )
        (NP-PN-SBJ (NR 中国))
        (VP (PP-LOC (P 在)
                    (NP (NP (NN 航天)
                            (NN 技术)
                            (CC 和)
                            (NN 激光)
                            (NN 技术))
                        (NP (NN 领域)))
            (VP (VV 安排)
                (AS 了)
                (NP-OBJ (DNP (NP (QP (CD 四百多)
                                     (CLP (M 个)))
                                 (NP (NN 课题)))
                             (DEG 的))
                        (NP (NN 研究))))))
    (PU ， )
```

```
(IP (NP-SBJ (-NONE- *pro*-1))
    (VP (VP (VV 涉及)
            (NP-OBJ (NP (NP (NN 空间)
                            (NN 科学))
                        (CC 及)
                        (NP (NN 应用)))
                    (PU 、)
                    (NP (ADJP (JJ 大型))
                        (NP (NN 运载)
                            (NN 火箭)))
                    (PU 、)
                    (NP (NN 空间站))
                    (PU 、)
                    (NP (NN 天地)
                        (NN 往返)
                        (NN 运输)
                        (NN 系统))))
        (PU ，)
        (VP (PP-LOC (P 在)
                    (NP (QP (CD 一些))
                        (NP (NN 关键)
                            (NN 技术)
                            (NN 领域))))
            (VP (VV 取得)
                (NP-OBJ (NN 阶段性)
                        (NN 成果))))))
 (PU 。))
```

Instead of bracketing the second clause as a relative clause of some kind, it is bracketed as a separate clause. Only pre-head relative clauses are allowed.

```
(IP (IP (NP-SBJ (NP-APP (NP-PN (NR 中国))
                        (ADJP (JJ 最高))
                        (NP (NN 立法)
                            (NN 机关)))
                (NP-PN (NP (DP (DT 全))
                           (NP (NN 国)))
                       (NP (NN 人大)
                           (NN 常委会))))
        (VP (NP-TMP (NT 今天))
            (VP (VV 通过)
                (NP-OBJ (NN 决定)))))
    (PU ，)
    (IP (NP-PN-SBJ (NR 中国))
        (VP (ADVP (AD 将))
            (PP-TMP (P 在)
                    (LCP (IP (NP-SBJ (-NONE- *pro*))
                             (VP (NP-TMP (NT 一九九七年))
                                 (VP (VV 恢复)
```

```
                                        (IP-OBJ (NP-SBJ (-NONE- *PRO*))
                                                (VP (PP (P 对)
                                                        (NP-PN (NR 香港)))
                                                    (VP (VV 行使)
                                                        (NP-OBJ (NN 主权))))))))
                        (LC 时)))
            (PU ， )
            (VP (VV 重组)
                (NP-OBJ (NP-PN (NR 香港))
                        (NP (NN 立法)
                            (NN 机关)
                            (CC 和)
                            (NN 区域)
                            (NN 组织)))))))
    (PU 。))
```

In the example above, the second IP is bracketed as a separate IP instead of an appositive clause to the object in the first IP. Only pre-head appositive clauses are allowed.

```
(IP (IP (NP-PN-SBJ (NR 水东)
                   (NN 开发区))
        (VP (VV 位于)
            (NP-OBJ (NP (DNP (NP (LCP (NP-PN (NR 粤))
                                      (LC 西))
                                 (NP (NN 地区)))
                             (DEG 的))
                        (NP (NR 茂名市)))
                    (NP (NN 境内)))))
    (PU ， )
    (IP (NP-SBJ (NN 面积))
        (VP (QP-PRD (CD 八十多)
                    (CLP (M 平方公里)))))
    (PU ， )
    (IP (NP-SBJ (-NONE- *pro*))
        (VP (VC 是)
            (NP-PRD (CP (WHNP-1 (-NONE- *OP*))
                        (CP (IP (NP-SBJ (-NONE- *pro*))
                                (VP (VP (VV 适应)
                                        (NP-OBJ (DNP (NP (NN 乙烯)
                                                         (NN 工程))
                                                     (DEG 的))
                                                (NP (NN 需要))))
                                    (VP (MSP 而)
                                        (VP (VV 建立)
                                            (NP-OBJ (-NONE- *T*-1))))))
                            (DEC 的)))))))
```

The above example can be conceivably bracketed with a more complicated

structure involving topic and empty subjects. Instead, it is broken down into three separate coordinated clauses.

2 的话

的话 is treated as a complementizer. It can either occur alone, or together with 如果. Either way it renders the clause of which it is a constituent a subordinating clause.

```
(CP (ADVP (CS 如果))
    (CP (IP (NP-SBJ (DNP (LCP (NP (NN 传说))
                              (LC 中))
                         (DEG 的))
                    (NP (PU “)
                        (NN 西天)
                        (PU ” )))
            (VP (VC 是)
                (NP-PRD (CLP (M 个))
                        (NP (PU “)
                            (NN 极乐世界)
                            (PU ” )))))
        (SP 的话)))
```

3 即

We treat 即 as a discourse-level adverb. Such adverbs always occur before the subject. Therefore, if the subject is an empty category, it comes after this type of adverb. The distribution of 即 is similar to that of 其中, 此外.

```
(IP (IP (NP-SBJ (NN 公司)
                (NN 兼并))
        (VP (VE 有)
            (AS 着)
            (NP-OBJ (CP (WHNP-1 (-NONE- *OP*))
                        (CP (IP (NP-SBJ (-NONE- *T*-1))
                                (VP (VA 积极)))
                            (DEC 的)))
                    (QP (CD 一))
                    (NP (NN 面)))))
   (PU ， )
   (IP (ADVP (AD 即))
       (NP-SBJ (-NONE- *pro*))
       (VP (VP (VV 降低)
               (NP-OBJ (NN 成本)))
           (PU 、 )
```

```
            (VP (VV 提高)
                (NP-OBJ (NN 效率)))
            (PU 、)
            (VP (VV 加强)
                (NP-OBJ (NN 竞争)
                        (NN 实力))))))
```

4 等

(ETC 等) is treated as one of the conjuncts in the coordination conjunction.

```
(NP (NP-APP (NN 现汇)
            (NN 贸易)
            (PU 、)
            (NN 经济)
            (NN 技术)
            (NN 合作)
            (CC 和)
            (NN 资金)
            (NN 技术)
            (NN 引进)
            (ETC 等))
    (NP (NN 项目)))
```

Appendix A: Summary of the phrasal categories

1. Head-final phrases, represented as S(pec) C(omplement) H(ead):

```
(CP Spec
    (CP IP
        C))
```

Spec can be CS, WHNP, and so on.
C can be DEC and SP.

```
(IP NP
    VP)

(LCP NP/IP/QP
     LC)

(DNP ADJP/QP/DP/NP/PP/LCP/CLP
     DEG)

(DVP VP/IP/NP
     DEC)
```

2. Head-initial phrases

```
(PP  P
     NP/IP)

(VP V
    NP/CP/QP/ADJP/DP/IP/DP)
```

3. Phrases without complement

(NP N)

(CLP M)

(ADJP JJ)

(ADVP AD)

4. Coordination:

(XP CC XP)

5. Garbage disposal:

FRAG

PRN

UCP

LST

Appendix B: Verb sequences that do not form verb compounds

There are several cases where the verb sequences are not treated as verb compounds. We classify them according to the structures they form.

1. V1 and V2 are treated as parts of two VPs. (serial verb construction)

1(a) NP0 + V1 + V2: VP-FOC + VP
V1 is an action verb, V2 is a stative verb.
NP0 is the theme of V1, and V2 is the result of V1.

It is similar to V-R in that V1 is an action, V2 describes the result of V1, the differences are:
in V-R: V-R can either be intransitive or transitive.
In the former, the theme is the subject, in the latter, the theme is the object. Also, no adverbs can occur between the V and the R.

In "NP0 V1 V2", there is no object after V2, and V2 can be modified by adverbs.

Treatment:
We treat V2 as the main verb, and V1 projects to VP and the VP is marked as -FOC.

Examples:

```
(NP (CP (WHNP-2 (-NONE- *OP*))
         (CP (IP (NP-SBJ (-NONE- *T*-2))
                 (VP (VP-FOC (VV 保存))
                     (VP (VA 完整)))
             (DEC 的)))
      (NP (NN 头骨)
          (CC 和)
          (NN 翅膀)))
```

More examples:

(VV 进展) (VA 顺利)
(VV 保存) (VA 完整)
(VV 申报) (AD 不) (VA 实)

1(b) NP0 + V1 + V2 + IP/CP: VP + VP

V2 is 曰 or 说, and the V1 is a "speaking" verb.

We project both V1 and V2 to VPs, and treat IP/CP as V2's complement.

For example:

```
(VP (VP (VV 强调))
    (VP (VV 说)
        (IP-OBJ ...)))

(VP (VP (VV 提醒)
        (NP-OBJ (-NONE- *pro*)))
    (VP (VV 说)
        (IP-OBJ ...)))
```

(VV 答) (VV 曰)
(VV 介绍) (VV 说)
(VV 提醒) (VV 说)
(VV 强调) (VV 说)

1(c) V1+V2: VP + VP

V1 and V2 are two actions.

Project both V1 and V2 to VPs.

(VV 减员) (VV 增效)

2. V2 projects to VP, which is a sister of V1. V1 is an aspectual or modal verb

2(a) V1+V2:

V1 is an aspectual verb, auxiliary verb (including modal verb), or "passivized" verbs such as 预计/(is estimated), 相信/(is believed).

The NP before V1 is the logic subject of V2, but not the logic subject of V1.

We project V2 to VP which is a sister of V1.

Examples:

```
(IP (NP-SBJ (NN 产值))
    (VP (VV 继续)
        (VP (VV 增长))))
```

More examples:

aspectual verbs:
(VV 继续) (VV 努力)
(VV 继续) (VV 增长)

"passivized" verbs:
(VV 预计) (VV 下降)

auxiliary verbs:
(VV 是否) (VE 有)
(VV 没有) (VV 屈服)
(VV 没有) (VV 发生)

2(b) V1+V2: V+VP

V1 is 来 or 去.

Project V2 to VP, which is a sister of V1.

(VV 去) (VV 踢球)

3. V1 + IP-OBJ: V2 projects to IP, which is a sister of V1.
V1 is a control verb.

3(a) V1+V2:

The NP before V1 is the logic subject of both V1 and V2.

We project V2 to IP, which is the sister of V1.

Examples:

```
(VP (VV 注重)
    (IP-OBJ
        (NP-SBJ (-NONE- *PRO*))
        (VP (VV 引进)
            (NP-OBJ (NP (NN 国外))
                    (ADJP (JJ 先进))
                    (NP (NN 技术)
                       (CC 与)
                       (NN 设备))))))

(VP (VE 有)
    (NP-OBJ (NN 权))
    (IP-OBJ (NP-SBJ (-NONE- *PRO*))
            (VP (VV 予以)
                (NP-OBJ (VV 退运)))))
```

More examples:
(VV 获准) (VV 经营)
(VV 着手) (VV 制订)

(VV 加快) (VV 发展)
(VV 加紧) (VV 派遣)
(VV 注重) (VV 引进)
(VV 足以) (VV 证明)

(VV 计划) (VV 达到)
(VV 协助) (VV 做好)

4. V1+NP: the head of the NP can also be a verb in other context.
If the noun is mis-tagged as a verb in this context, the pattern looks like V1 + "V2".

The logic object of "V2" cannot occur after "V2", but it can appear as the modifier of "V2" or the subject of V1 or the complement of a PP before V1.

Examples:

```
(IP (NP-SBJ 产量)
    (VP (VV 有所)
        (NP (NN 提高))))
```

(VV 予以) (NN 退运)
(VV 加以) (NN 推进)
(VV 有所) (NN 回落)
(VV 有所) (NN 提高)
(VV 不予) (NN 办理)
(VV 值得) (NN 忧虑)

Note: for 有所, if we treat it as two words, then the "V2" can be seen as a verb. Also, 值得 can also take an IP as a complement, in which case the "V2" is followed by an object.

Appendix C: The Treebank tagset

1. Part-of-speech tags: 33 tags

AD	adverbs
AS	aspect marker
BA	把 in ba-const
CC	coordinating conj
CD	cardinal numbers
CS	subordinating conj
DEC	的 for relative-clause etc.
DEG	associative 的
DER	得 in V-de const. and V-de-R
DEV	地 as the head of DVP
DT	determiner
ETC	tags for 等 and 等等 in coordination phrases
FW	foreign words
IJ	interjection
JJ	noun-modifier other than nouns
LB	被 in long bei-construction
LC	localizer
M	measure word (including classifiers)
MSP	some particles
NN	common nouns
NR	proper nouns
NT	temporal nouns
OD	ordinal numbers
ON	onomatopoeia
P	prepositions (excluding 把 and 被)
PN	pronouns
PU	punctuation
SB	被 in short bei-construction
SP	sentence-final particle
VA	predicative adjective
VC	copula 是
VE	有 as the main verb
VV	other verbs

2. Syntactic tags: 23 tags

2.1. Tags for phrases: 17 tags

ADJP	adjective phrase
ADVP	adverbial phrase headed by AD (adverb)
CLP	classifier phrase
CP	clause headed by C (complementizer)
DNP	phrase formed by ''XP + DEG''
DP	determiner phrase
DVP	phrase formed by ''XP + DEV''
FRAG	fragment
IP	simple clause headed by I (INFL)
LCP	phrase formed by ''XP + LC''
LST	list marker
NP	noun phrase
PP	preposition phrase
PRN	parenthetical
QP	quantifier phrase
UCP	unidentical coordination phrase
VP	verb phrase

2.2. Tags for verb compounds: 6 tags

VCD	coordinated verb compound
VCP	verb compounds formed by VV + VC
VNV	verb compounds formed by A-not-A or A-one-A
VPT	potential form V-de-R or V-bu-R
VRD	verb resultative compound
VSB	verb compounds formed by a modifier + a head

3. Functional tags: 26 tags

ADV	adverbial
APP	appositive
BNF	beneficiary
CND	condition
DIR	direction
EXT	extent
FOC	focus
HLN	headline
IJ	interjective
IMP	imperative
IO	indirect object
LGS	logic subject
LOC	locative
MNR	manner
OBJ	direct object
PN	proper names
PRD	predicate
PRP	purpose or reason
Q	question
SBJ	subject
SHORT	short form
TMP	temporal
TPC	topic
TTL	title
WH	wh-phrase
VOC	vocative

4. Empty categories (null elements): 7 tags

OP	operator
pro	dropped argument
PRO	used in control structures
RNR	right node raising
T	trace of A′-movement
*	trace of A-movement
?	other unknown empty categories