Syntactic-Semantic Analysis of Modern Chinese with Left-Associative Grammar

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Preface

It is a long-term pursuit of people to interact with computers by natural languages. This is why natural language processing is significant in computer science and artificial intelligence. Before enabling a computer, or a robot, to give proper responses, we have to first make it understand what we say. Here comes the task of parsing.

For a long time, parsing refers only to syntactic analysis, which shows the grammatical relation of sentence elements. Some formal grammars, such as the Phrase Structure Grammar, the Categorial Grammar, the Dependency Grammar, etc. are applied for syntactic parsing.

However, syntax and semantics represent the duality of a language. Their relation resembles that of form and content. When these grammars are applied in Chinese parsing, the disadvantage of merely syntactic parsing becomes more outstanding.

Chinese is a parataxical language in which the semantic relation between sentence elements speaks loud. Additional semantic information of words is necessary for high-quality syntactic analysis. If the semantic relation between words is presented in the parsing result simultaneously with the syntactic relation, it will improve language production, which is important to machine translation, artificial intelligence, etc. In addition, if the whole analysis process models the mechanism of a human agent’s language understanding, it will be more theoretically solid and empirically valuable.

Under these circumstances, the Left-Associative Grammar (LAG) is proposed. LAG is supported by the language theory of Surface compositional Linear Internal Matching (SLIM). SLIM is agent-oriented, aiming to explain the understanding and purposeful production of signs in terms of completely explicit, mechanical (logically electronic) procedures. Its technical implementation is called Database Semantics (DBS). LAG and the data structure of a word bank are the two bases of DBS. As the particular algorithm of DBS, LAG follows the time-linear order of language input, allows parallel derivation and is therefore computationally efficient.

Guided by this procedural language theory of SLIM/DBS, LAG is applied to modern Chinese parsing in this research. The most basic and frequent patterns of phrases and sentences in Chinese are automatically analyzed on both the syntactic and the semantic levels. A detailed discussion is presented in the three parts of this dissertation, namely, NOUN, ADJECTIVE and VERB, which are the basic universal parts of speech in all languages. Analysis from the perspective of linguistics is also integrated in order to provide a solid foundation for the automatic parsing.

SLIM/DBS proves complete, consistent and instructive in Chinese parsing. LAG proves unique, efficient and competitive in the syntactic-semantic analysis of a natural language, i.e. Chinese.

The main content of this dissertation is as follows:

Part I is composed of five chapters. After an overview of Chinese nouns, the following chapters focus respectively on numerals, quantifiers, pronouns and some particular grammatical phenomena related to nouns.

Part II introduces various verbs in Chinese: common verbs, modal verbs, directional verbs,
causative verbs and three-valence verbs. The general application of these verbs are analyzed in LAG.

PART III presents the analysis of adjectives, adverbs, prepositions and conjunctives.

During the whole research, the difference between Chinese and English is slightly emphasized.

In PART IV comes the discussion and conclusion.

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Chapter 1

Introduction

Natural language processing (NLP) is concerned with the interactions between computers and natural languages. It is a part of computer science and artificial intelligence. NLP is generally composed of language understanding and language production. Language understanding is mainly represented by parsing. A key approach to the existing automatic syntactic parsing is rule-based.

1.1 Motivation

No matter how free the sentence structure is, the fundamental rules are relatively stable. The rule-based approach starts from the most fundamental features of sentences, such as morphology and syntax, and generalizes syntactic rules in a macro view. These formalized rules are defined in mathematics and adjusted for computer operations, therefore called “grammars for computational linguistics”.

These grammars include Transformational Grammar (TG), Government & Binding (GB), Minimalist Program (MP), Phrase Structure Grammar (PSG), Generalized Phrase Structure Grammar (GPSG), Head-driven Phrase Structure Grammar (HPSG), Functional Grammar (FUG), Lexical Functional Grammar (LFG), Tree Adjoining Grammar (TAG), Categorial Grammar (CG), Dependency Grammar (DG), Link Grammar (LG), and so on. All these grammars aim to explain how large language units are composed of small language units. They can be divided into two groups: one is phrase-based, e.g. TG, GB, MP, PSG, GPSG, HPSG, FUG, LFG and TAG; the other is word-based, e.g. CG, DG, LG, etc.

The traditional rule-based approach is also applied in Chinese syntactic parsing. A lot of research has been done in this field (Zhao et al. [1992]; Zhou et al. [1999]; Zhou [1999]; Yang [2000]; Yuan et al. [2001]; Wang et al. [2003]; Liu and Zhao [2009]; Hu et al. [2010]). Generally, the rule-based Chinese syntactic parsers share the following features:

- to rely on rules to define the collocation relations between sentence elements;
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- to generate a syntactic tree or other equivalent forms of the input string;
- to exclude incorrect structures through disambiguation mechanism;
- to be equipped with a rule base and an electronic dictionary.

1.1.1 Phrase Structure Grammar

Among all the grammars that have been introduced to Chinese parsing, the Phrase Structure Grammar (PSG) is the most classic. PSG (Chomsky [1957]; Chomsky [1965]) is further explained as regular, context-free, context-sensitive and recursively enumerable language with different level of restrictions. The context-free is widely applied in natural language processing (Wang et al. [2003]; Feng [2000]). Transformational rules are applied in PSG, which aims to define the basic grammatical relations in the deep structure of the sentence. The derivation order of PSG is schematized as follows:

The time-linear structure of language is emphasized by de Saussure (Saussure [1974]). The term “time-linear” means to be linear like time and in the direction of time (Hausser [1992]; Hausser [2001]). Obviously, the top-down expanding derivation of PSG is not based on time-linearity.

PSG has been introduced to and developed in the processing of Chinese. The existing PSG-based automatic methods for Chinese parsing mainly include the top-down parsing, the bottom-up parsing, the Tomita algorithm, the left-corner parsing and the CKY algorithm, etc.

The top-down parsing (predicative parsing) (Fang and Cheng [1994]) follows the derivation order of the classic PSG, while the bottom-up parsing (Yang et al. [2001]) is a shift-reduce algorithm. Fundamentally, the shift-reduce algorithm is a left-right algorithm (Aho et al. [1986]). It has a high efficiency in computation, but a low capability of ambiguity reduction. In order to reduce space and time complexity, the Tomita algorithm (Tomita [1985]) adopts the technology of graph-structure stack and packed-shared forest. It is known as a generated left-right algorithm. The left-corner algorithm (Feng [2005]) is a combination of the top-down and the bottom-up parsing. Because of the depth-first search, frequent backtracking is unavoidable and efficiency is not guaranteed.

Generally, backtracking is adopted in all the above four methods. If the input sentence is a well-formed expression of the language described by the grammar, the systematic backtracking guarantees the acceptation of the sentence. But, if the input sentence does not belong to the language, the backtracking will not stop until there is no more option. Systematic backtracking guarantees the accuracy of the algorithm, but it also causes redundant repetition and calculation (Feng [2000]).

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The CKY algorithm (Cocke and Schwartz [1970]; Kasami [1965]; Younger [1967]) is basically
a bottom-up parsing, adopting the strategy of breadth-first search and parallel algorithm. The
redundancy caused by backtracking is avoided. But, due to the combination with the breadth-first
search strategy, it is difficult to reduce ambiguity before the end of the analysis.

Generally, PSG grammar focuses only on the syntactic structure (Montague [1970a]). Its gener-
ation capacity is too high (Zhao et al., Gazdar) while the analysis capacity is relatively low (Liu
[1997]).

1.1.2 Categorial Grammar

The Categorial Grammar (CG)(Ajdukiewicz [1935]; Bar-Hillel [1964]; Lambek [1958]; Montague
[1970b]; Zou [1995]) is a typical representative of the word-based grammars (Feng [2001]). Its
derivation order is as follows:

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<td>% - % - % -</td>
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The basic idea of CG is to build up correspondence between language elements with certain kinds of
categories. The composition of language structure corresponds to the calculus between categories.
But it is often difficult to find the correspondence between words and categories. Some structure
information that is not carried by words is also difficult to be explained in the scheme of CG (Zhai
et al. [1991]). Hausser [2001] pointed out four disadvantages of CG, including too much dependence
on trial and error, high degree of lexical ambiguity, computationally inefficient and no time-linear
derivation. In addition, the focus of CG has been only on syntactic structure since its application
to natural language processing by Bar-Hillel [1960]. The particularity of Chinese language, such as
the inconsistency between word classes and syntactic roles and the emphasis of semantic relations
(Zhu [1982]), increases the complexity of syntactic analysis. Any simply category-based parsing,
like CG, will not have satisfactory result (Zhao and Bai [2005]). Then, Montague (1970) adds
semantics to CG. Montague declares that a syntactic theory is not interesting if it is independent
of semantics (Montague [1970a]). But, the Montague grammar has gone so far from syntactic
analysis that some linguists prefer to call it “Montague Semantics” (Dowty et al. [1981]).

1.1.3 Dependency Grammar

The Dependency Grammar (DG) (Tesnière [1959]; Gaifman [1965]; Lai and Huang [1994]) is
another important grammar in Chinese parsing. Liu [1997] takes it as one of the two prototypes of
all the existing grammar systems, the other one being the Transformational Generative Grammar.
In DG, a verb is the center of a sentence. It controls other elements, but is never controlled
by other elements. Noun phrases are called “actants” of the verb; Adverb phrases are called
“circonstants”. The number of “actants” is the “valence” of the verb. It describes the direct
relation between words as “control-subordinate”. The head-driven principle applies in DG though
it is not declared. This benefits profound analysis, but the resulting dependency tree does not
reflect the time-linear order of words and focuses mainly on syntactic function and relation Liu [1997].

Both Chomsky and Tesniere view syntax independent from semantics. DG is also originally a language theory of syntax. In fact, the syntactic level and the semantic level are parallel, which represents the duality of a language symbol. The relation between syntax and semantics is like form and content. The purpose of syntactic analysis is to better express and interpret the semantic meaning (Zhu [1982], Lv [1986]). The question is: Is there any grammar that is designed for simultaneous syntactic and semantic analysis? If yes, is it computationally efficient for Chinese analysis?

1.1.4 Left-Associative Grammar

In Hausser [2006], Left-Associative Grammar (LAG), is successfully applied to English parsing. The syntactic analysis and the semantic analysis of the example sentences are integrated systematically during the derivation.

LAG has also been applied to Chinese parsing: Oberhofer [1992] and Mei [2007]. Both are master theses. In Oberhofer [1992], LAG, in its early stage, is applied to the analysis of Chinese noun phrases, verb phrases, etc. In Mei [2007], both the functor-argument and the coordination structure in Chinese are introduced and some example sentences are analyzed with LAG. Though both analyses are limited to their scope, the adaptability of LAG to Chinese processing is proved positive to some degree.

LAG was invented by Roland Hausser (Hausser [1985]). It is motivated by the time-linear structure of natural language communication. LAG calculates input by combining a sentence start with a new word into a new sentence start. In case of syntactic or lexical ambiguity, the ambiguous derivation paths continue in parallel.

Hausser [2005] presented LAG as a basic alternative to PSG. He said that PSG is based on the principle of substitutions, while LAG is based on the principle of possible continuations.

Take “a, b, c ...” as word forms and “+” as the concatenation operator. The increasing structure adopted by LAG is as follows:

```
  a
  (a + b)
  ((a + b) + c)
  (((a + b) + c) + d)
  ...
```

The conceptual derivation order of LAG is bottom-up left-associative:
The LAG grammar for context-free $a^kb^k$ is as follows:

$$
LX = a = \{(a(a);[b(b)]\}
$$

$$
ST_s = \{(a([r_1,r_2])\}
$$

$$
r_1 : (X) \rightarrow (aX)(r_1, r_2)\}
$$

$$
r_2 : (aX) \rightarrow (X)(r_1)\}
$$

$$
ST_F = \{[;r_2]\}
$$

LAG is supported by a lexicon ($LX$), a set of start states ($ST_s$), a set of rules ($r_1, r_2$) and a set of finish states ($ST_F$). A LAG rule is composed of a ss (sentence start) pattern ($X$), a nw (next word) pattern ($a$), a set of operations and a rule package ($\{r_1, r_2\}$). The rule is activated when the defined patterns are matched. After the successful execution of the rule operations, the derivation result is copied into output, which becomes ss for next step. The rule(s) in the rule package indicates how the sentence may continue. When there is no more input or the patterns in the rules are not matched, the syntactic-semantic analysis stops.

According to Hausser [2001], LAG is one of the two bases of the language theory of Surface compositional Linear Internal Matching (SLIM), the other one being the data structure of a word bank. This theory of language is different from Structuralism, Behaviorism, Nativism, Model Theory, or Speech Act Theory. SLIM is agent-oriented, instead of sign-oriented. The aim of this language theory is to explain the understanding and purposeful production of signs in terms of completely explicit, mechanical (i.e. logically electronic) procedures. SLIM takes surface compositionality as its elementary methodological principle, time-linearity as its empirical principle and the internal matching of language and context information as its ontological and functional principle. Its technical implementation is called Database Semantics (DBS), which is the first and the only rule system to reconstruct natural language interpretation and production as turn-taking (Hausser [2005]).

Turn-taking means changing from the speaker mode to the hearer mode, or vise versa. In real communication, a human agent in the hearer mode (1) receives information from another agent or the context, (2) analyzes it in his cognition, (3) thinks about reaction, and then (4) gives a response by words or action. The input in DBS resembles (1). (It requires the computer/robot has an external interface.) The following LAG analysis, which is based on matching between the content of the context and the cognition, models (2). The LAG grammar on this stage is called LA-hear. A second variation of LAG that navigates inside the storage for proper content is called LA-think. It reflects the process of (3). LA-speak is the third variation of LAG. It carries the task of language production, similar to the human agent’s response in (4). Speaking of Chinese parsing, the first variation of LAG, i.e. LA-hear, mainly applies.
LAG can’t be separated from the network database of a word bank in SLIM or DBS. Hausser compares LAG with a locomotive and the word bank with the railroad that the locomotive navigates through. In a word bank are stored the flat feature structures of content, called “proplets”. “Proplet” is short for “proposition droplet”. A proplet is a set of non-recursive attribute-value pairs. Syntactic and semantic information of each word or sentence element is stored as values of certain attributes.

The parsing result from PSG, DG, etc. are usually represented by a tree construction. In Hausser’s new book, *Computational Linguistics and Talking Robots: Processing Content in Database Semantics*, DBS graphs are brought forward as one of the new developments of his language theory. This graphical representation makes the difference between LAG and other grammars more explicit. In Hausser [2011a], the example of “The little girl slept” is given for a comparison between PSG, DG and DBS:

One of the differences in the above constructions lies in that the definite article “the” is not shown in the DBS graph. It is because that DBS analyzes content while other grammars analyze language. Functions words are generally absorbed during the syntactic-semantic derivation in DBS, though they are again precipitated when required for language production. Another difference is that the modifier-modified relation is not specified in the PSG or the DG graph. But in DBS, “|” is designated for the modifier-modified relation. “/” represents the subject-verb relation, “\” the object-verb relation, and “——” the conjunct-conjunct relation (coordination).

The above DBS graph is called a semantic relations graph (SRG). If the nodes are replaced by letters, which represent the parts of speech of each word, then it becomes a part of speech signature, or signature for short. The signature of the above example is as follows:

The SRG and the signature can be automatically generated from the LAG derivation result. These two structures provide two simultaneous views (in the conceptual sense) on a given content.
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There are another two additional structures to complement the SRG and the signature, called the numbered arcs graph (NAG), and the surface realization. These two are mainly for natural language production from content. The NAG shows the time-linear activation order of the SRG, i.e. an NAG is more of less an SRG with numbered arcs. The surface realization shows the use of the traversal order for language production (Hausser, 2011:137).

The agent-oriented approach of DBS is the first, and so far the only, reconstruction of the cycle of natural language communication (Hausser, 2011:32). Its core algorithm LAG, LA-hear in particular, has many advantages that include, but are not limited to the following:

- integrated in a well-defined language theory
- supported by a data structure of a word bank
- time-linear
- low lexical ambiguity
- flat (non-recursive) structure
- syntactic analysis
- semantic analysis
- parallel algorithm

1.1.5 Proposal

LAG is promising to solve most of the problems that have been found with other grammars. This research in Chinese analysis follows the guidance of SLIM, aiming to find a more efficient way of automatic Chinese parsing by implementing LAG.

Because the statistics-based approach can provide useful data to improve systematic robustness and adaptability (Wang et al. [2003], Dai et al. [2011], Yu and Zhou [2010]), it can be integrated into this rule-based research.

For the benefit of later application and test in machine translation, it is better to have English counterparts as values of a certain attribute for the lexicon entries.

The complete LAG-Chinese research involves the following parts:

1. to build up an electronic LAG-Chinese lexicon, providing syntactic and semantic information of each independent entry, as well as English translations
2. to extract statistical data from a well-developed corpus and generalize sentence patterns accordingly
3. to compose LAG rules for syntactic-semantic analysis
4. to apply LAG rules to syntactic-semantic parsing
5. to evaluate and improve
1.2 Chinese Syntax

Before starting the implementation of LAG, it is necessary to have a general view of Chinese syntax.

Compared with European languages, Chinese is more parataxis than hypotaxis. The so-called hypotaxis refers to the realization of the connection of the words or phrases, with the help of language forms, including vocabulary and forms. Parataxis refers to the realization of the connection with the help of the logical meaning of the words or phrases, instead of the language form. Cohesion in form is more important in hypotaxis, while parataxis focuses on the significance of continuous coherence. Chinese lacks formal inflection and derivation. The combination of language units is more based on their semantic relations. In other words, language elements may have complex semantic relations without any formal structural marker. For example: all the following four sentences have the same structure of N+V+N.

1. 我 (wo, I) 去 (qu, go) 上海 (shanghai, Shanghai)。
2. 今天 (jintian, today) 去 (qu, go) 上海 (shanghai, Shanghai)。
3. 前面 (qianmian, front) 建 (jian, build) 房子 (fangzi, house)。
4. 李明 (liming, Ming Li) 建 (jian, build) 房子 (fangzi, house)。

Superficially, all of them have the same syntactic structure. But semantically, they differ from each other significantly. The translation of the above sentences is as follows:

1. I go to Shanghai.
2. ( ) go to Shanghai today. (logic subject missing)
3. A house is built in front. (passive)
4. Ming Li builds up a house.

Mr Li Wang, a well-known linguist in China said that, in respect with sentence structures, European languages are rule-based while Chinese is agent-based (Wang [1984]). Compared with other natural languages, Chinese syntax has two particularities:

- A word from the same category can play various syntactic roles without any morphological change.
- The composition of a Chinese sentence is consistent with that of a phrase.

In English, the correspondence between word classes and syntactic roles is relatively simple and stable. In Chinese, it is rather complex. For instance, a noun is mainly used as a subject, an object or an attributive in Chinese. But, under certain circumstances, it can also be a predicative. As for an adjective, its main role is to be an attributive. However, it is often observed that an adjective is used as a predicative, an adverbial or a complement. The key role of a verb is to be a predicative, but it is also seen as an attributive. It is also not rare to see a verb or an adjective as
A subject or an object. Therefore, it is not possible to designate a syntactic role for a word from a certain class. In fact, semantic constraints between words or phrases in a Chinese sentence are more important than grammatical constraints.

A phrase plays an important role in Chinese grammar. The particularity of a Chinese phrase lies in that its morphological form does not change with the syntactic role it plays. A phrase is composed of words. It may be presented in various patterns. Sentence patterns in Chinese have the same options. In other words, a Chinese phrase, provided with a proper punctuation mark, can become a sentence. In an English sentence, a finite verb is required and there is only one finite verb in a sentence. A Chinese phrase may equal an English phrase, and a simple sentence/clause as well.

1.3 Chinese Morphology

LAG is well-developed for morphological analysis of many languages. To ensure a better performance of Chinese parsing, morphological work seems also necessary. But one of the most outstanding features of modern Chinese is that Chinese words don’t have morphological changes. Nouns have no change in respect with case, gender or number. Verbs also have no change regarding person or tense.

This difference from European languages has resulted in a long-lasting argument that Chinese has no grammar or parts of speech. Historian Will Durant is a representative supporter of this opinion, as shown in “Our Oriental Heritage”, the first volume of The Story of Civilization. Some native linguists also argue that the term “morpheme” does not apply to Chinese. Chen [1992] takes it as an imported theory with no real power of explanation in Chinese linguistics: it is imagined, subjective and contradictory. However, Yang [2003] defines a Chinese morpheme as a minimum meaningful unit. Fan and Zhang [2000] state that a single Chinese character is a morpheme if it has a definite meaning. Zhang [1997] declares that Chinese is a unique word system. The uniqueness first lies in that each Chinese character represents a meaningful syllable with a tone, i.e. each character has three aspects: graphical form, syllable and meaning. A meaningful syllable with a tone is a morpheme. Ma [1999] makes it even clearer: a morpheme is a minimum meaningful sign, which is also called a character. According to Zhu [1980], the term “morpheme” has two interpretations: one is the meaningful component within a word, such as a word root, a prefix or a suffix; the other is the minimum meaningful linguistic unit. A systematic grammar may have five units, namely sentences, clauses, phrases, words and morphemes.

In Chinese, a morpheme may be a word root or a suffix based on its meaning and function. A morpheme that can be used as a word independently is called a free morpheme, such as “美 (mei, pretty), 听 (ting, listen), 走 (zou, walk), 他 (ta, he), 光 (guang, light)”. A morpheme that cannot be used as a word independently is called a bound morpheme. Generally, a bound morpheme has a fixed position when it combines with another morpheme to form a word. For example: “第 (di, Number)” in “第一 (digi, first)”, and “家 (jia, expert)” in “科学家 (kexuejia, scientist).”
Chinese affixes are different from English bound morphemes. First, the number of affixes in Chinese is limited. According to Lv [1986], there are only 5 prefixes and 7 suffixes in Chinese. Slightly different from Lv, Guo [1983] has a list of 4 prefixes and 11 suffixes. Though Ren [1981] enlarges the list to 14 prefixes and 43 suffixes, the number is still far smaller than that of English affixes. Zheng [1981] has collected 138 English prefixes and 210 suffixes. Secondly, not all Chinese affixes are used for derivational or inflectional changes. Some are only used to give monosyllable nouns another syllable, making them sound more balanced.

Under these circumstances, only two prefixes, “第 (di, Number)” and 初 (chu, DayNumber), and seven suffixes, “性 (xing, property)”, “学 (xue, discipline)”, “观 (guan, view)”, “率 (lv, rate)”, “家 (jia, expert)”, “长 (zhang, chief)” and “们 (men, MEN)” are listed in our LAG-Chinese lexicon. One reason is that they are the most frequently used. The other reason is that they bring inflectional or derivational changes to the root words. It is necessary to point out that all these affixes are stored as function words in the lexicon, i.e. they will be analyzed on the syntactic level.

All in all, due to the limitation of morphological variations, the part of Chinese morphological work is completely integrated with the syntactical analysis.

1.4 LAG-Chinese Lexicon

1.4.1 Word Selection

The selection of words to be added to the lexicon depends on its objective. The LAG-Chinese lexicon is designed for SLIM application to automatic modern mandarin Chinese analysis. It is used for computers instead of human users. Accordingly the design depends on the processing model and algorithms applied during the analysis. The principles for word selection are therefore different from those for any other kind of lexicon.

- First, every word in the lexicon has to be a standard modern Chinese word. According to Modern Chinese Word Segmentation Specification for Information Processing, a word is the minimum linguistic unit which can be used independently. A phrase refers to a group of two or more words which function as a single unit in the syntax of a sentence. A word segmentation unit for Chinese information processing may be a word or a phrase as above defined with definite semantic and syntactic meaning.

- Secondly, a word in the lexicon has to be usable. The lexicon mainly collects modern Chinese words, such as “巨大 (juda, huge), 渴望 (kewang, desire), 年纪 (nianji, age), 生活 (shenghuo, life)” etc. Historical terms or ancient Chinese words, such as “宰夫 (zaifu, cook), 帝 (yun, imperial robe), 庭实 (tingshi, court), 於 (yu, in-at-on), 且夫 (qiefu, moreover)”, are not included. Various dialect words which do not belong to Mandarin Chinese, i.e. Putunghua, such as “火匣儿 (huoxiaer, matchbox), 啥子 (shazi, what)”, are also excluded. Moreover, the lexicon is used mainly for written texts analysis, so those words that frequently appear in spoken Chinese but seldom in written form will not be found in the LAG-Chinese lexicon.
• Thirdly, any word in the lexicon should be frequently used, stable in its form and meaning.

• Fourthly, punctuation marks are included and described in the lexicon.

We take nouns as an example to explain our principles for word collection. Nouns in the lexicon include simple nouns and compound nouns. A simple noun may have one or more syllables.

Monosyllable nouns include 书 (shu, book), 手 (shou, hand), 车 (che, car), etc. Two-syllable nouns include 玻璃 (boli, glass), 葡萄 (putao, grapes), 沙发 (shafa, sofa), 逻辑 (luoji, logic), etc.

Compound nouns are further divided into compound nouns with and without affixes. Those with affixes are derived in the syntactic-semantic analysis, such as “厂长 (changzhang, factory chief)”, “科学家 (kexuejia, scientist)”, etc. Compound nouns composed of two bound morphemes, e.g. “状况 (zhuangkuang, situation)” and “措施 (cuoshi, measure)”, or two free morphemes, e.g. “大小 (daxiao, size)” and “火车 (huoche, train)”, are collected as individual entries in the lexicon.

Proper nouns are generally compound words in their complete form. For instance, a country name, city name, or a personal name. Temporal nouns include the twelve months in a year, the seven days in a week, names of dynasties, festivals, seasons, or a certain period of time. These nouns are mostly compound nouns, e.g. “白天 (baitian, day)” and “星期天 (xingqitian, Sunday)”. These compound words are also collected as individual entries.

Pronouns, numerals and quantifiers are classified as sub-groups of the NOUN category. The number of pronouns is limited, but that of numerals and quantifiers is not strictly restricted. But the lexicon only lists the most frequently used and those usable for the LAG-Chinese analysis.

In Chinese, there are quite a few patterns of repetition, including “AA (e.g. 听听)”, “AABB (e.g. 听听看看)”, “A yi A (e.g. 听一听)”, “A le A (e.g. 听了听)”, etc. It is impossible to present them all in the lexicon. It is not necessary, either. For instance, “AA”, “A yi A” and “A le A” don’t create new words. They have the same part of speech with their basic forms. Therefore, depending on their frequency, stability, syntactic or semantic difference from the basic forms, some of these patterns are collected as individual lexicon items, but others have only their basic forms listed, leaving the rest to syntactic analysis.

1.4.2 Proplet

Every language distinguishes noun, verb and adjective, which corresponds to object, relation and property in philosophy, and argument, functor and modifier in logics. This is viewed as another universal of natural languages (Hausser [2001]). Accordingly, in Hausser’s application of SLIM (Hausser [2006]), noun, verb and adjective are the only three parts of speech.

The parts of speech in a traditional Chinese dictionary include numeral, quantifier, pronoun, noun, adjective, adverb, preposition, conjunctive, verb and so on. In the LAG-Chinese lexicon, the number of core attributes is only three, consisting of “adj (short for adjective)”, “noun” and “verb”.

A word in the LAG-Chinese lexicon is stored in the form of a proplet. Most of the words in the lexicon have their English counterparts as values of their core attributes. This is originally out
of the hope for future generation of English translations. In the meantime, it helps non-Chinese
readers to follow the derivation process. In case it is impossible to find a proper English word as
the translated core value, the capitalized pinyin is adopted as the place holder. The graphic form
of Chinese words are stored as values of the “sur” attribute. The pronunciation, i.e. pinyin, is
presented as the value of the “pyn” attribute. When designated in explanation, both “pyn” value
and the core value will be given in the bracket after the Chinese word surface. In this case, the
“pyn” value is shown in italic, e.g. “美 (mei, pretty)”

One of the grammatical attributes, “cat (short for category)”, has various values (see appendix),
depending on the specific syntactic function of the words. Other attributes include “sem”, “fnc”,
“arg”, “mdr”, “mdd”, “nc”, “pc”, “wrn” and “prn”. “sem” stores the semantic information. “fnc”
is short for “functor”, “arg” for argument, “mdr” for “modifier”, “mdd” for “modified”, “nc” for
“next conjunct” and “pe” for “previous conjunct”. “wrn” and “prn” are bookkeeping attributes,
which show the number of the word and the proposition respectively. (In order to save space,
“wrn” and “prn” are not presented in any proplet in this LAG-Chinese analysis.)

Not every word has all the above attributes. For example: a noun in the lexicon has the attribute
of “fnc”, but not “arg”. Not all the attributes have values in the lexicon, either. “sur”, “pyn” and
the core attributes of “adj”, “noun” and “verb” have innate values for every word in the lexicon
and most words have their “sem” values as well. But all the other attributes only get their values
during derivation. Actually, the attributes “nc” and “pc” are also generated during the derivation
of sentences with coordination relations. The proplets with new values or any change in the innate
features are stored in the database, called a word bank, as word tokens (in comparison to word
types in the lexicon).

A proplet in this research is different from the feature structures used in the existing electronic
Chinese lexicons. Currently, the well-designed electronic Chinese dictionaries include the Chinese
Concept Dictionary (Yu and Yu [2002]), Hownet (http://www.keenage.com), the Synonyms Dic-
tionary (http://www.ir-lab.org), the Grammatical Knowledge-base of Contemporary Chinese (Yu
et al. [2001]) and the Semantic Knowledge-base of Modern Chinese (Wang et al. [2006]), etc. The
last two are co-products of Peking University and Chinese Academy of Sciences. Take the Seman-
tic Knowledge-base of Modern Chinese for example. The Chinese word “找 (zhao, look-for)” is
stored as follows:

<table>
<thead>
<tr>
<th>词语</th>
<th>词类</th>
<th>同形</th>
<th>释义</th>
<th>语义类</th>
<th>主体</th>
<th>客体</th>
<th>与事</th>
<th>WORD</th>
<th>备注</th>
</tr>
</thead>
<tbody>
<tr>
<td>找 v</td>
<td>A</td>
<td>找找</td>
<td>对待</td>
<td>具体事物</td>
<td>look for</td>
<td>~ 材料</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>找 v</td>
<td>B</td>
<td>返还</td>
<td>对待</td>
<td>“钱”</td>
<td>人</td>
<td>give change</td>
<td>~ 钱</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If translated into English, it is:

<table>
<thead>
<tr>
<th>word</th>
<th>pos</th>
<th>variation</th>
<th>explanation</th>
<th>semantic class</th>
<th>agent</th>
<th>patient</th>
<th>benefited</th>
<th>WORD</th>
<th>note</th>
</tr>
</thead>
<tbody>
<tr>
<td>找 v</td>
<td>A</td>
<td>look for</td>
<td>treatment</td>
<td>human</td>
<td>specific object</td>
<td>look for</td>
<td>~ material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>找 v</td>
<td>B</td>
<td>return</td>
<td>treatment</td>
<td>human</td>
<td>money</td>
<td>human</td>
<td>give change</td>
<td>~ money</td>
<td></td>
</tr>
</tbody>
</table>

But in the LAG-Chinese lexicon, the two readings are stored as two different proplets:
In the first proplet, the “cat” value, i.e. “s’ p’ tv”, means that it is a two-valence verb. The “cat” value in the second proplet means that it is a three-valence verb. The English translations are stored as the core values. The information of semantic combination is defined in the “sem” attribute. Such a flat feature structure is designed particularly for computation efficiency. According to Hausser [2011b], the format of non-recursive proplets satisfies the requirements for easy computation of the semantic relations between word forms. It also supports the computational straightforward matching procedure needed for rule application and interaction between the language and the context level. After the syntactic-semantic analysis with LAG, the derivation result is also stored in the form of proplets. The proplets coding the semantic relations are stored in an order-free manner, so that it can be easily stored in or retrieved from the database when needed.

1.5 Corpus and Technology

This LAG-Chinese research is mainly dependent on the self-made corpus of 10,000 sentences. However, the inspiration of data collection, word segmentation, POS (part of speech) and semantic tagging benefits a lot from the Chinese-English Parallel Corpus of CCL, Peking University; the Chinese-English Bilingual Corpus, HIT; the Penn Chinese Treebank and the Lancaster Corpus of Mandarin Chinese, etc. To ensure completeness of analysis and to avoid unnecessary interruption, any sentence in the LAG-Chinese corpus meets the following requirements:

- composed of only modern Chinese words;
- complete in structure;
- has a clear semantic meaning;
- has a representative pattern.

The parser for this research is written in Perl. It integrates a lex (lexicon) file, a rul (rule) file, an att (attribute) file and a var (variable) file. The basic principles of these files are similar to those for the Java implementation of SLIM theory (Weber et al. [2010], Handl [2010], Handl et al. [2009]). But, the function of some rule operations are expanded. Immediate test of any change in any file becomes possible. Applicable output of the derivation result is also available. In addition, adaption is particularly made for this Chinese analysis, such as row height, Chinese font recognition, etc.
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Part I

NOUN Application and Analysis
NOUN, as one of the three parts of speech in SLIM, covers the traditional noun, pronoun, numeral and quantifier. To distinguish it from the noun in the sub-class, the upper case is adopted for the name of this SLIM part of speech, and the lower case for the traditional noun.

This part consists of five chapters. Chapter 2 provides a general view of Chinese nouns. The inflectional and derivational changes are explained with examples.

Chapter 3 is about numerals and quantifiers. Numerals are divided into cardinals and ordinals. Ordinals are derived from the cardinals and analyzed on the syntactic level. The combination of a numeral with a quantifier plays various roles in a sentence. The repetition of quantifiers, as a particular case in Chinese, is also introduced in this chapter.

In chapter 4, Chinese personal pronouns are compared with English counterparts on the morphological level. Then a detailed explanation is provided with respect to the application of personal pronouns in Chinese. There are no “articles”, i.e. “a”, “an” and “the”, in Chinese. But some demonstrative pronouns are used as determiners. They are enlisted in the lexicon in both readings. The different application of demonstrative pronouns and determiners is exemplified in 4.2 and 4.3.

Chapter 5 introduces a special grammatical phenomenon, i.e. adverbial adjectives modifying nouns. From the perspectives of grammar and semantics, this pattern has shown its solidity in practical Chinese.

Since semantic relation is much more emphasized in Chinese, similar structures may have different interpretations. For instance, nouns may not be the logic subjects though they are in the subject position. Moreover, the nominal construction in the object position may also not be the logic object. This is discussed in Chapter 6.
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Chapter 2

Analysis of Nouns

A noun refers to a person, an animal, a place, a thing or an abstract idea. It is an open lexical category. Nouns can be classified into proper nouns and common nouns. Proper nouns are further divided into personal names (marked with “nm” as its “cat” value in the lexicon), e.g. “李明 (liming, Ming Li)”, and other names (marked with “nd”), e.g. “中国 (zhongguo, China)”. Common nouns can be divided into temporal nouns (“nt”), e.g. “今天 (jintian, today)”; nouns for location and direction (“nl”), e.g. “东 (dong, east)”; nouns referring to animals (“na”), e.g. “青蛙 (qingwa, frog)”; nouns referring to a certain kind of people (“nr”), e.g. “学生 (xuesheng, student)”; and other common nouns (“cn”), e.g. “茶 (cha, tea)”. Words in the group of “cn” are marked as “object” in the “sem” slot if they refer to objects and “abstract” if they refer to abstract ideas.

2.1 Inflectional Change

Compared with English or any other European language, Chinese lacks inflectional changes. The nouns in Chinese have the same form no matter whether they are used with their singular or plural meaning. In other words, the singular form of Chinese nouns is the same with their plural form. For example: “人 (ren, person)” in “一人” and “二人” has the same graphic form, but their meanings are “one person” and “two persons” respectively.

However, a bound morpheme “们 (men, MEN)”, which appears only immediately after nouns, sometimes helps to designate the plural meaning. For example:

1. 学生们全走了。(The students have all left.)

<table>
<thead>
<tr>
<th>surface</th>
<th>学生 们 全 走 了</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>xuesheng men quan zou le</td>
</tr>
<tr>
<td>English</td>
<td>student - all go -</td>
</tr>
</tbody>
</table>

2. 学生全走了。(The students have all left.)
1 and 2 are both grammatical sentences with the same semantic meaning. The corresponding word to “学生 (xuesheng)” in English is “student”. With the plural marker “们 (men, MEN)”, it is clear that the subject in 1 should be “students” if we translate the sentence into English. In 2, the plural marker “们 (men, MEN)” is missing, making it uncertain whether the subject is a single person or a group of persons. But, we still translate the subject “学生 (xuesheng)” into “students”. That is because of the following word is “全 (quan)”. “全 (quan)” means “all” and requires the plural meaning of the subject. But this kind of information is not always available.

When there is no such informative words in the sentence, ambiguity is unavoidable. For example:

3. 青蛙们唱歌。(Frogs sing.)

4. 青蛙唱歌。(Frogs sing./A frog sings.)

In 3, the plural meaning is rather clear because of the plural marker “们 (men, MEN)”. But in 4, “青蛙 (qingwa, frog)” is the subject. The morpheme “们 (men, MEN)” is not there. The noun is followed by the verb “唱歌 (changge, sing)”, which is actually the predicate of the sentence. Without further information from the context, it is impossible to figure out the number of the subject in this sentence. There might be only one frog, but it is not less possible that there are two or more frogs. So, “frogs” and “a frog” are equally acceptable as the translation of “青蛙 (qingwa, frog)” in 4.

“们 (men, MEN)” is treated as a function word in our analysis and named “the plural marker”. Thus, the inflection in Chinese is seen on the phrasal level, instead of the word level, no matter in its graphic form or semantic analysis.

All function words, including the plural marker, are classified into the large group of ADJECTIVE. Therefore the core attribute of “们 (men, MEN)” is “adj”. Since the counterpart in English is unavailable, the value of “adj” is “MEN”, the capitalized pinyin. The grammatical attribute “cat” has the value of “pmr”. The value “pl” of the “sem” attribute is short for “plural”.

“们 (men, MEN)” never appears independently as a sentence element. It has to be pointed out that most of the Chinese nouns modified by “们 (men, MEN)” are related to living creatures.
CHAPTER 2. NOUNS 2.1. INFLECTIONAL CHANGE

The combination of a noun with “们 (men, MEN)” follows the rule of W+MR. The precondition is that the sentence start (ss) proplet and the next word (nw) proplet match the patterns defined in the rule of W+MR.

Rule: W+MR {} clause 1

\[
\begin{align*}
ss-pattern: & \quad [\text{noun:}, \text{cat:(N)}, \text{fnc:}, \text{sem:}] \\
nw-pattern: & \quad [\text{adj:}, \text{cat:(pmr)}, \text{sem:(pl)}] \\
operation: & \quad \text{ecopy(nw.sem ss.sem)}
\end{align*}
\]

According to the above rule, the syntactic-semantic analysis of “学生们” is as follows:

Both the ss proplet and the nw proplet match the patterns defined in the above rule. The operation is executed and the “sem” value from the nw proplet is copied into the corresponding slot of the ss proplet. At the same time, the original “sem” value in the ss proplet is removed, if there is any.

The derivation result of “学生们”:

The combination of “青蛙们” is similar. The derivation result of “青蛙们” is:

The new proplet in the output has the same “sur”, “pyn” and “cat” values as the type proplet “青蛙 (qingwa, frog)” from the lexicon, but the “sem” value, here is “pl”, indicates the plural meaning. The new proplet resulting from the analysis is then stored in the word bank in a free order as a proplet token.
2.2 Derivational Change

Chinese words have no derivational changes, but there are some morphemes in Chinese with the effect of derivation. These morphemes change the meaning of the root words and sometimes also their grammatical categories. Similar to inflection, the derivation in Chinese is also seen on the phrasal level.

These derivational morphemes do not belong to a large family. Based on statistics, only six such morphemes are collected and marked, namely, “观 (guan), “学 (xue), “率 (le), “性 (xing), “家 (jia),” and “长 (zhang).” Depending on the semantic meaning of the new created words, “观 (guan), “学 (xue), “率 (le),” and “性 (xing)” are classified as markers for abstract nouns, while “家 (jia)” and “长 (zhang)” are markers for titles. These derivational morphemes are treated as function words, like the plural marker. They are absorbed by the root proplets, instead of being copied into output.

Generally speaking, no matter what part of speech the root word has, the new word with the noun marker “观 (guan), “学 (xue), “率 (le),” or “性 (xing)” is an abstract common noun. A new word with the marker “家 (jia)” or “长 (zhang)” is a noun referring to a title of a person. In the following part, all of them are discussed one after another. The basic meaning of these six noun markers is roughly generated as the value of their “adj” attribute. Some of them can follow words from all the three main parts of speech, i.e., noun, adjective and verb, but others may not be so productive. The rule of W+MR applies in any case.

2.2.1 观 (guan, view)

The abstract noun marker “观 (guan, view)” is stored in the lexicon in the form of the following proplet:

| sur : 观 | pyn: guan |
| adj : view | cat : nmr | sem: abstract |

As a noun marker (indicated with “nmr” in the “cat” slot), “观 (guan, view)” has the “sem” value of “abstract”, meaning the new noun will be an abstract noun.

- Noun + 观

“观 (guan, view)” may follow a noun root to form a new word. When the ss pattern and the nw pattern are both matched, a clause of the rule of W+MR applies. Take “世界观” as an example. “世界 (shijie)” means “world” and “世界观” means “world view”.

28
The syntactic-semantic analysis of “世界 (shijie, world)” + “观 (guan, view)” is as follows:

<table>
<thead>
<tr>
<th>sur : 世界</th>
<th>sur : 观</th>
</tr>
</thead>
<tbody>
<tr>
<td>pym : shijie</td>
<td>pym : guan</td>
</tr>
<tr>
<td>noun: world</td>
<td>adj : view</td>
</tr>
<tr>
<td>cat : cn</td>
<td>cat : nmr</td>
</tr>
<tr>
<td>sem :</td>
<td>sem: abstract</td>
</tr>
<tr>
<td>fnc :</td>
<td>mdr :</td>
</tr>
</tbody>
</table>

During the derivation, the two “sur” values are combined as the new value in the ss proplet. It is the same with the “pyn” values. The “adj” value of the noun marker proplet, i.e. “view” is copied to the “noun” slot in the ss proplet. The “sem” value of the nw proplet, i.e. “abstract”, is also copied to the corresponding slot in the ss proplet. Till now all the operations are successfully executed and the output is produced as a proplet of an abstract noun with the core value of “world|view”.

- Verb + 观

It is also seen that “观 (guan, view)” follows a verb to form a new noun. Take “发展” as an example. “发展 (fazhan)” means “to develop” while “发展观” means “view of development”.

The combination of “发展 (fazhan, develop)” with “观 (guan, view)”:
The derivation result is as follows:

```
sur: 发展观
pyn: fazhanguan
noun: develop|view
cat: cn
sem: abstract
fnc: 
mdr: 
```

The derivation of a verb plus a noun marker is more complicated. During the derivation, the nw proplet is absorbed into the ss proplet. Besides the combination of the “sur”, “pyn” and “sem” values, the core attribute in the ss proplet, here the proplet of “发展 (fazhan, develop)”, is changed from “verb” to “noun”. The value is changed accordingly. The “cat” value of “发展 (fazhan, develop)” is “s’ iv” before the combination, meaning it is an intransitive verb that needs a subject. After the combination, it is replaced by “cn”, meaning a common noun. The “arg” attribute in the ss proplet is canceled and a “fnc” attribute is created. Then all the operations are successfully executed, resulting in the new proplet of “发展观”.

2.2.2 学 (xue, discipline)

The noun marker “学 (xue, discipline)” is stored in the lexicon as the following proplet:

```
sur: 学
pyn: xue
adj: discipline
cat: nmr
sem: abstract
```

It also has “nmr” as its “cat” value and “abstract” as its “sem” value.

- Noun + 学

“学 (xue, discipline)” is usually preceded by a noun to form a name of a discipline. For example: “政治学 (politics)”, “心理学 (psychology)”, “生理学 (biology)”, etc. Therefore, its core value is set as “discipline”. Take “经济学” as an example. “经济 (jingji)” means “economy” and “经济学” means “economics”.

The syntactic-semantic analysis of “经济 (jingji, economy)” + “学 (xue, discipline)” is as follows:

```
sur: 经济
pyn: jingji
noun: economy
cat: cn
sem: abstract
fnc: 
mdr: 
```

```
sur: 学
pyn: xue
adj: discipline
cat: nmr
sem: abstract
```

```
concat(nw.sur, ss.sur)
concat(nw.pyn, ss.pyn)
sappend(ss.noun, ss.sur)
ecopy(nw.sem, ss.sem)
```
The derivation result is:

\[
\begin{array}{l}
sur: \text{经济学} \\
pyn: \text{jingjixue} \\
noun: \text{economy/discipline} \\
cat: \text{cn} \\
sem: \text{abstract} \\
mdr: \\
\end{array}
\]

The derivation process is similar to that of a noun plus “观 (guan, view)”. The “sur” and “pyn” values are combined. The “adj” value in the nw proplet is copied and appended to the “noun” value in the ss proplet. The “sem” value of the noun marker is copied to the “sem” slot in the ss proplet. Then after all the rule operations are successfully executed, a new proplet of “经济学” is achieved.

2.2.3 率 (lv, rate)

The abstract noun marker “率 (lv, rate)” is stored in the lexicon as the following proplet:

\[
\begin{array}{l}
sur: \text{率} \\
pyn: \text{lv} \\
adj: \text{rate} \\
cat: \text{nmr} \\
sem: \text{abstract} \\
\end{array}
\]

“率 (lv, rate)” is often seen after a verb or an adjective.

- Verb + 率

Take “生产率” as an example. “生产 (shengchan)” means “to produce” and “生产率” means “productivity”.

The combination of “生产 (shengchan, produce)” with “率 (lv, rate)”:  

\[
\begin{array}{l}
sur: \text{生产} \\
pyn: \text{shengchan} \\
verb: \text{produce} \\
cat: \text{tv} \\
sem: \text{produced} \\
arg: \text{0} \\
mdr: \\
\end{array}
\]

\[
\begin{array}{l}
sur: \text{率} \\
pyn: \text{lv} \\
adj: \text{rate} \\
cat: \text{nmr} \\
sem: \text{abstract} \\
\end{array}
\]

\[
\begin{array}{l}
\text{concat(nw.sur SS.sur)} \\
\text{concat(nw.pyn SS.pyn)} \\
\text{nattr(noun SS)} \\
\text{appendSS.verb “|” nw.adj SS.noun} \\
\text{cancel(SS.verb)} \\
\text{copy(cn SS.cat)} \\
\text{copy(nw.sem SS.sem)} \\
\text{nattr(nm SS)} \\
\text{cancel(SS.arg)} \\
\text{concat(nw.sur SS.sur)} \\
\end{array}
\]
The derivation result is:

```
<table>
<thead>
<tr>
<th>sur</th>
<th>生产率</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>shengchanlv</td>
</tr>
<tr>
<td>noun</td>
<td>produce</td>
</tr>
<tr>
<td>cat</td>
<td>cn</td>
</tr>
<tr>
<td>sem</td>
<td>abstract</td>
</tr>
<tr>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>
```

“生产 (shengchan, produce)” is a transitive verb. During the derivation, the “sur” and “pyn” values are combined as the new values in the ss proplet. The “verb” attribute in the ss proplet is canceled and a new attribute of “noun” is created. The value of the new “noun” attribute is the combination of the original “verb” value in the ss proplet and the “adj” value of the nw proplet. The “cat” and “sem” value in the ss proplet is replaced by the “cat” and “sem” value from the nw proplet. The “arg” attribute in the ss proplet is canceled and a new “fnc” attribute is created. Then after the successful execution of all the operations, the new proplet of “生产率” is achieved.

- Adjective + 率

When the noun marker “率 (lv, rate)” combines with an adjective, the derivation process is also complicated, similar to combining with a verb. Take “准确率” as an example. “准确 (zunque)” means “accurate” and “准确率” means accuracy.

The syntactic-semantic analysis of “准确 (zunque, accurate)” + “率 (lv, rate)” is as follows:

```
<table>
<thead>
<tr>
<th>sur</th>
<th>准确率</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>zunque lv</td>
</tr>
<tr>
<td>adj</td>
<td>accurate</td>
</tr>
<tr>
<td>cat</td>
<td>adj</td>
</tr>
<tr>
<td>sem</td>
<td>sem: abstract</td>
</tr>
<tr>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>
```

The derivation result is:

```
<table>
<thead>
<tr>
<th>sur</th>
<th>准确率</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>zunque lv</td>
</tr>
<tr>
<td>noun</td>
<td>accurate</td>
</tr>
<tr>
<td>cat</td>
<td>cn</td>
</tr>
<tr>
<td>sem</td>
<td>abstract</td>
</tr>
<tr>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>
```

The core attribute “adj” in the ss proplet is canceled and a new attribute, “noun”, is created. The value of this new attribute is the combination of the original two “adj” values. The values of “sur” and “pyn” are also combined together as the new values in the ss proplet. The new “cat” value is
CHAPTER 2. NOUNS 2.2. DERIVATIONAL CHANGE

designated as “cn”. The attribute “sem” gets the value of “abstract” from the nw proplet. Then, the successful application of the rule results in the proplet of “准确率”.

2.2.4 性 (xing, property)

The abstract noun marker “性 (xing, property)” is stored in the lexicon as the following proplet:

```
sur : 性
pyn: xing
adj : property
cat : nmr
sem: abstract
```

This noun marker is more productive. It is able to combine with words from all the three main parts of speech, i.e. noun, adjective and verb. The resulting abstract noun refers to the property the root has or describes.

• Noun + 性

A noun, usually an abstract noun, followed by “性 (xing, property)”, becomes another noun with the meaning of “the property of ...”. For example, “逻辑 (luoji)” means “logic”, and “逻辑性” means the property of logic.

The combination of “逻辑 (luoji, logic)” with “性 (xing, property)” goes as follows:

```
sur : 逻辑
pyn: luoji
noun: logic
adj : property
cat : cn
sem: abstract
fnc :
mdr :
```

Here is the derivation result:

```
sur : 逻辑性
pyn: luojixing
noun: logic|property
cat : cn
sem: abstract
fnc :
mdr :
```

Compared with the combination of a verb or an adjective with a noun marker, a noun plus a noun marker is much simpler. The “sur”, “pyn”, “noun”, “cat” and “sem” values of the ss proplet are changed, but no attribute is canceled or created. The successful application of the rule results in the new proplet of “逻辑性”.

• Adjective + 性
2.2 DERIVATIONAL CHANGE

An adjective is used to describe the property of something. When an adjective is followed by “性 (xing, property)”, an abstract noun is formed to refer to the property. For example, “稳定 (wending)” means stable, and “稳定性” means “stability”.

Here is the derivation process:

The derivation result is as follows:

Again, the core attribute is canceled and the new attribute of “noun” is created. The result of the rule application is the new proplet of “稳定性”.

• Verb + 性

A verb combined with “性 (xing, property)” forms an abstract noun referring to the property that the verb describes. We have “倾向性” as an example. “倾向 (qingxiang)” means “to tend” and “倾向性” means “tendentiousness”.

The syntactic-semantic analysis of “倾向 (qingxiang, tend)” + “性 (xing, property)” is as follows:
The analysis results in one proplet:

```
| sur  : 倾向性 |
| pyn  : qingxiangxing |
| noun : tend|property |
| cat  : cn |
| sem  : abstract |
| mdr  : |
```

The derivation process is similar to that of “生产率”. The attribute “verb” is removed from the ss proplet and the new attribute of “noun” is added. The value of this new attribute is the combination of the original “verb” value and “adj” value. The nw proplet is absorbed. The result is the new proplet of “倾向性”.

### 2.2.5 家 (jia, expert)

The noun marker “家 (jia, expert)” is stored in the lexicon as the following proplet:

```
| sur  : 家 |
| pyn  : jia |
| adj  : expert |
| cat  : nmr |
| sem  : individual |
```

“家 (jia, expert)” is seen in combination with a noun or a verb. The new word refers to a certain kind of person, and therefore gets the new “cat” value of “nr”.

- Noun + 家

For example, “政治 (zhengzhi)” means “politics” and “政治家” means “politician”.

The combination of “政治 (zhengzhi, politics)” with “家 (jia, expert)” goes as follows:

```
| sur  : 政治家 |
| pyn  : zhengzhijia |
| noun : politics|expert |
| cat  : cn |
| sem  : individual |
| mdr  : |
```

The analysis results in one proplet:
The derivation process is similar to the combination of a noun and any one of the above noun markers, but in the current case, the new word gets the “cat” value of “nr” instead of “cn”. The “sem” value in the “家 (jia, expert)” proplet is copied into the “sem” slot in the ss proplet. The result of the successful rule application is the proplet of “政治家”.

- Verb + 家

We take “演说家” as an example. “演说 (yanshuo)” means “to speak” and “演说家” means “the person who is good at delivering speech”. The analysis process is as follows:

The result is a single proplet:

As a noun marker (indicated with “nmr” in the “cat” slot), “长 (zhang, chief)” has the “sem” value of “abstract”, meaning the new noun will be an abstract noun.

Generally speaking, the noun marker “长 (zhang, chief)” combines with a noun, which refers to a unit, such as “厂 (chang, factory)”, “局 (ju, bureau)”, “组 (zu, group)”, etc. The new word with the marker “长 (zhang, chief)” refers to the chief or leader of the unit, and thus gets also the new “cat” value of “nr”.

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Here is an example: “厂 (chang)” means “factory” and “厂长 (changzhang)” means “factory chief”.

The rule operations are as follows:

After the rule application, a new proplet is derived:

During the derivation, the “sur”, “pyn” and “noun” value in the ss proplet is replaced by the combination of the related values from the two proplets. The “cat” value is replaced by “nr”. The derivation result is a noun proplet, i.e. “厂长”.
This page intentionally contains only this sentence.
Chapter 3

Analysis of Numerals and Quantifiers

Numerals are further divided into cardinals and ordinals. A cardinal tells “how many.” It is also known as a “counting number”, because it shows quantity. An ordinal tells the order of things in a set, such as first, second, third, etc. An ordinal does not show quantity. It only shows rank or position. This is true in Chinese, but the formal relation between cardinals and ordinals is different from that in English. Chinese cardinals are stored in the lexicon as individual entries. But ordinals are derived from cardinals by combining with certain morphemes. Therefore, ordinals are derived during the syntactic-semantic analysis instead of stored in the lexicon.

In English, numerals usually modify nouns directly. But in Chinese, they are frequently followed by quantifiers to form numeral-quantifier phrases first. These numeral-quantifier phrases are then used as subjects, objects or modifiers, such as attributives, complements or adverbials.

3.1 Combination of N-Q

3.1.1 Combination of Cardinal-Quantifier

The combination of a cardinal with a quantifier follows the rule of NUM+QUAN. For example, “一 (yi, one)” + “名 (ming, MING)” . They are stored in the lexicon as follows:
The analysis goes as follows:

<table>
<thead>
<tr>
<th>sur</th>
<th>sur : 名</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>pyn : ming</td>
</tr>
<tr>
<td>noun</td>
<td>noun: MING</td>
</tr>
<tr>
<td>cat</td>
<td>cat : nquan</td>
</tr>
<tr>
<td>sem</td>
<td>sem : +man</td>
</tr>
<tr>
<td>fnc</td>
<td>fnc :</td>
</tr>
<tr>
<td>mdr</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd</td>
<td>mdd :</td>
</tr>
</tbody>
</table>

The derivation result is:

<table>
<thead>
<tr>
<th>sur</th>
<th>名</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>yi ming</td>
</tr>
<tr>
<td>noun</td>
<td>one</td>
</tr>
<tr>
<td>cat</td>
<td>cdn-q</td>
</tr>
<tr>
<td>sem</td>
<td>+man</td>
</tr>
<tr>
<td>fnc</td>
<td>fnc :</td>
</tr>
<tr>
<td>mdr</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd</td>
<td>mdd :</td>
</tr>
</tbody>
</table>

Most Chinese quantifiers have no counterparts in English. Therefore, the value of the core attribute “noun” for most quantifiers is the capitalized pinyin. The “sem” value indicates the combination capability of the quantifier. “+man” means the quantifier is usually used as a unit of people.

When a numeral is combined with a quantifier, the rule of NUM+QUAN is activated. During the derivation, the “sur” and “pyn” values are combined as the new value in the ss proplet. The “noun” value in the ss proplet stays intact. The “cat” value is changed from “cdn” to “cdn-q”, meaning it is a cardinal-quantifier phrase. The “sem” value from the nw proplet is copied into the ss proplet. After all the operations, the nw proplet is absorbed into the ss proplet. The result is a “cdn-q” proplet, i.e. “一名”.

(1) Cdn-q as Attributive

One of the most basic application of a cardinal-quantifier phrase is attributive. For example: “一名战士 (one soldier).”

They are stored in the lexicon as follows:

<table>
<thead>
<tr>
<th>sur</th>
<th>战士</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>ming</td>
</tr>
<tr>
<td>noun</td>
<td>soldier</td>
</tr>
<tr>
<td>cat</td>
<td>nquan</td>
</tr>
<tr>
<td>sem</td>
<td>+man</td>
</tr>
<tr>
<td>fnc</td>
<td>fnc :</td>
</tr>
<tr>
<td>mdr</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd</td>
<td>mdd :</td>
</tr>
</tbody>
</table>

The syntactic-semantic analysis of the phrase is concerned with 2 steps. In step 1, the combination of “一名 (yi, one)” and “战士 (ming, MING)” follows the rule of NUM+QUAN. The derivation process
is as discussed above. The resulting proplet of “一名 (yiming, one)” becomes the ss proplet for next step. The combination of “一名 (yiming, one)” and “战士 (zhanshi, soldier)” activates the rule of NQ+NOUN, as in the following step 2:

2. sur : 一名 sur : 战士
pyn : yiming pyn : zhanshi
noun: one noun: soldier
cat : 战士 q cat : 战士
sem : 人 sem :
nc : 人 nc :
mdr : one mdr :
mdd:

The main idea of the rule of NQ+NOUN is the absorption of the ss proplet. During the derivation, the value of the core attribute “noun” in the ss proplet is replaced by the “noun” value from the nw proplet. The original “noun” value in the ss proplet is copied as the “mdr” value. Both the “cat” value and the “sem” value are replaced by those from the nw proplet. The successful rule application results in a single proplet, i.e. “战士 (zhanshi, soldier)”.

The derivation result is:

(2) Cdn-q as Complement

The combination of a cardinal with an adnominal quantifier can be used in a complement construction. But, it does not appear independently. An additional noun is often required in the construction. Take the following sentence as an example.

Example 1. 他们来了三个月。（They have been here for three months.）

The syntactic-semantic analysis is composed of 7 times of combination. Step 0 always refers to the input of the first word of a sentence. Since no combination happens in this step, it is given the number “0”. (To save space, this step is omitted throughout this dissertation.)

The derivation in step 1-3 are discussed in the part of “Inflection of Nouns” and “Verb as Predicator” respectively. To save space, they are skipped here. The resulting two proplets are copied
3.1. COMBINATION OF N-Q

CHAPTER 3. NUMERALS AND QUANTIFIERS

into output as the sentence start for next step.

4. \[
\begin{array}{|c|c|c|}
\hline
\text{sur} & \text{pyn} & \text{noun} \\
\text{他} & \text{ta} & \text{he} \\
\text{来} & \text{lai} & \text{verb: come} \\
\text{三} & \text{san} & \text{noun: three} \\
\hline
\end{array}
\]

In the current step, the cardinal “三 (san, three)” is read in and simply copied into output according to the rule of V+COMP.

5. \[
\begin{array}{|c|c|c|}
\hline
\text{sur} & \text{pyn} & \text{noun} \\
\text{他} & \text{ta} & \text{he} \\
\text{来} & \text{lai} & \text{verb: come} \\
\text{个} & \text{ge} & \text{noun: GE} \\
\hline
\end{array}
\]

The rule of NUM+QUAN is applied and the quantifier proplet is absorbed into the cardinal proplet.

6. \[
\begin{array}{|c|c|c|}
\hline
\text{sur} & \text{pyn} & \text{noun} \\
\text{他} & \text{ta} & \text{he} \\
\text{来} & \text{lai} & \text{verb: come} \\
\text{月} & \text{yue} & \text{noun: month} \\
\hline
\end{array}
\]

In step 6, “月 (yue, month)” is read in, activating a variation of the rule of NQ+NOUN. In this sentence, “三个” modifies “月 (yue, month)”, and the noun phrase “三个月” modifies the predicate verb “来 (lai, come)”. In this step, the “noun” value in the cardinal proplet is copied to the “mdr” slot and then the “sur”, “pyn”, “noun”, “cat” and “sem” values are all replaced by those from the nw proplet of “月 (yue, month)”. This method of conditional absorption guarantees content representation and maintenance of key values for later data retrieval. The “noun” value of “月 (yue, month)” is copied to the “mdr” slot in the verb proplet. Accordingly, the “verb” value in the verb proplet is copied to the “mdd” slot in the noun proplet, thus establishing the modifying and modified relation. The additional value “complement” is at the end copied to the “sem” slot in the noun proplet. The derivation result of the whole sentence is composed of three proplets, namely “他 (ta, he)”, “来 (lai, come)”, and “月 (yue, month)”. 42
The derivation result is as follows:

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 来</th>
<th>sur : 月</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : lai</td>
<td>pyn : yue</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: come</td>
<td>noun: month</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : vq mark</td>
<td>cat : nt</td>
</tr>
<tr>
<td>sem : pl agent</td>
<td>sem : spt perf</td>
<td>sem : complement</td>
</tr>
<tr>
<td>fnc : come</td>
<td>arg : he</td>
<td>fnc :</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr: month</td>
<td>mdr : three</td>
</tr>
<tr>
<td>nmr :</td>
<td>nmr: come</td>
<td></td>
</tr>
</tbody>
</table>

The semantic relation graph (SRG) and the part of speech signature (signature) of this example sentence are as follows (in the corresponding order of a and b):

a) come he month
   /
  / |
b) V
   he N N

In a), the root node “come” is the core value of the verb predicator proplet. The two nodes “he” and “month” on a lower level are core values from the two noun proplets in the derivation result. The functor-argument relation is indicated by “/”. The modifier-modified relation is indicated by “|”. In b), the core values are replaced by letters that represent the parts of speech of each proplet.

Quantifiers like “个 (ge, GE)” are marked as “nquan” in their “cat” attribute. This is because they are used as adnominal modifiers. There is a second group of quantifiers in the lexicon, e.g. “次 (ci)”, “回 (hui)”, “趟 (tang)”,”遭 (zao)” and “场 (chang)”, etc., which are marked as “vquan”. Usually, this second group of quantifiers combine with numerals to modify verbs, indicating times or momentum. A modifier formed by such a combination usually appears after the modified verb as a complement. Take the following sentence as an example.

Example 2. 他来了两次。(He has come twice.)

| surface: 他 来 了 两 次 |
| pinyin: ta lai le liang chi |
| English: he come - two - |

Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : lai</td>
<td>pyn : le</td>
<td>pyn : liang</td>
<td>pyn : ci</td>
<td>pyn :</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: come</td>
<td>adj : LE</td>
<td>noun: two</td>
<td>noun: time</td>
<td>sem: v’ decl</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem : spt</td>
<td>sem : perf</td>
<td>sem :</td>
<td>sem : +V</td>
<td></td>
</tr>
<tr>
<td>fnc :</td>
<td>arg :</td>
<td>fnc :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nmr :</td>
<td>nmr :</td>
<td>nmr :</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:
Step 0-2 are skipped. The resulting two proplets are copied into output as the sentence start for next step.

3. sur : 他
   pyrn : ta
   noun : he
   cat : pro
   sem : s3 agent
   fnc : come
   mdr :

   sur : 来
   pyrn : lai
   noun : verb
   cat : vq
   sem : spt perf
   fnc : arg : he
   mdr :

   sur : 两
   pyrn : liang
   noun : two
   cat : cdn
   sem :
   fnc :
   mdr :

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 来</th>
<th>sur : 两</th>
</tr>
</thead>
<tbody>
<tr>
<td>sur : 他</td>
<td>sur : 来</td>
<td>sur : 两</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
</tbody>
</table>

In this step, the input of the cardinal “两 (liang, two)” starts the rule of V+COMP. The nw proplet is copied into output.

4. sur : 他
   pyrn : ta
   noun : he
   cat : pro
   sem : s3 agent
   fnc : come
   mdr :

   sur : 来
   pyrn : lai
   noun : verb
   cat : vq
   sem : spt perf
   fnc : arg : he
   mdr :

   sur : 两
   pyrn : liang
ci
   noun : two
   cat : cdn-q
   sem :
   fnc :
   mdr :

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 来</th>
<th>sur : 两</th>
</tr>
</thead>
<tbody>
<tr>
<td>sur : 他</td>
<td>sur : 来</td>
<td>sur : 两</td>
</tr>
<tr>
<td>--------</td>
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<td>--------</td>
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<tr>
<td>--------</td>
<td>--------</td>
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</tr>
</tbody>
</table>

In this step, the rule of NUM+QUAN is activated. The cardinal proplet is combined together with the nw proplet “次 (ci, time)” through the sappend operations. All the “sur”, “pyrn”, “noun”, “cat” and “sem” values in the cardinal proplet are renewed. The “noun” value from the nw proplet is copied to the “mdr” slot in the verb proplet. The “verb” value from the verb proplet is copied to the “mdd” slot of the renewed cardinal proplet. Thus is represented the modifying and modified relation between the verb and the quantifier. Since the phrase “两次” modifies the verb as a complement, an additional value “complement” is copied to the “sem” slot.

5. sur : 他
   pyrn : ta
   noun : he
   cat : pro
   sem : s3 agent
   fnc : come
   mdr :

   sur : 来
   pyrn : lai
   noun : verb
   cat : vq
   sem : spt perf
   fnc : arg : he
   mdr :

   sur : 两次
   pyrn : liang|ci
cat : mark
   noun : two|time
   cat : cdn-q
   sem : +V complement
   fnc :
   mdr :

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 来</th>
<th>sur : 两次</th>
</tr>
</thead>
<tbody>
<tr>
<td>sur : 他</td>
<td>sur : 来</td>
<td>sur : 两次</td>
</tr>
<tr>
<td>--------</td>
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<td>--------</td>
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<td>----------</td>
</tr>
</tbody>
</table>

When the full stop is read in, the syntactic-semantic analysis comes to the end. The derivation result is composed of three proplets, namely “他 (ta, he)”, “来 (lai, come)” and “两次 (liangci, two|time)”.

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CHAPTER 3. NUMERALS AND QUANTIFIERS  

3.1. COMBINATION OF N-Q

Derivation result:

\[
\begin{array}{c|c|c}
\text{sur} : & \text{他} & \text{两次} \\
\text{pyn} : & \text{ta} & \text{liang\text{ci}} \\
noun : & \text{he} & \text{noun: two(time)} \\
cat : & \text{pro} & \text{cat : cdn-q} \\
sem : & \text{s\text{\text{3}} agent} & \text{sem : +V complement} \\
\text{fnc} : & \text{come} & \text{fnc :} \\
\text{mdr} : & \text{mdr: two(time)} & \text{mdr :} \\
\end{array}
\]

The SRG and the signature presentation:

\[
\begin{array}{c|c|c}
\text{a)} & \text{come} & \text{b)} \\
he & \text{two\text{time}} & \text{V} \\
\end{array}
\]

\(1\) Cdn-q as Adverbial

An adverbial in Chinese usually precedes the modified verb. An adverbial formed by a cardinalquantifier combination in Chinese is another construction that is never seen in English. Take the following sentence as an example.

Example 3. 他一口吞了巧克力。(He swallowed the chocolate at once.)

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{surface} & \text{他} & \text{一} & \text{口} & \text{吞} & \text{了} & \text{巧克力} \\
pinyin & \text{ta yi kou tun le qiaokeli} & \text{English} & \text{he one - swallow - chocolate} \\
\end{array}
\]

Lexical lookup:

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{sur} : & \text{他} & \text{一} & \text{口} & \text{吞} & \text{了} & \text{巧克力} & \text{。} \\
pyn : & \text{ta yi kou tun le qiaokeli} & \text{cat : mark} & \text{noun: chocolate} & \text{adj : LE} & \text{noun: chocolate} & \text{verb: swallow} & \text{adj : LE} \\
noun : & \text{he yi} & \text{noun: time} & \text{noun: time} & \text{noun: two(time)} & \text{noun: two(time)} & \text{verb: swallow} & \text{adj : LE} \\
cat : & \text{pro} & \text{cat : cdna} & \text{cat : vquan} & \text{cat : s' p' tv} & \text{cat : s' p' tv} & \text{cat : s' p' tv} & \text{cat : s' p' tv} \\
sem : & \text{s\text{\text{3}} agent} & \text{sem : +V} & \text{sem : perf} & \text{sem : object} & \text{sem : object} & \text{sem : object} & \text{sem : object} \\
\text{fnc} : & \text{fnc :} & \text{arg :} & \text{arg :} & \text{arg :} & \text{arg :} & \text{arg :} & \text{arg :} \\
\text{mdr} : & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} \\
\end{array}
\]

Syntactic-semantic analysis:

1.  \[
\begin{array}{c|c|c|c|c|c|c|c}
\text{sur} : & \text{他} & \text{一} & \text{口} & \text{吞} & \text{了} & \text{巧克力} & \text{。} \\
pyn : & \text{ta yi kou tun le qiaokeli} & \text{cat : mark} & \text{noun: chocolate} & \text{adj : LE} & \text{noun: chocolate} & \text{verb: swallow} & \text{adj : LE} \\
noun : & \text{he yi} & \text{noun: time} & \text{noun: time} & \text{noun: two(time)} & \text{noun: two(time)} & \text{verb: swallow} & \text{adj : LE} \\
cat : & \text{pro} & \text{cat : cdna} & \text{cat : vquan} & \text{cat : s' p' tv} & \text{cat : s' p' tv} & \text{cat : s' p' tv} & \text{cat : s' p' tv} \\
sem : & \text{s\text{\text{3}} agent} & \text{sem : +V} & \text{sem : perf} & \text{sem : object} & \text{sem : object} & \text{sem : object} & \text{sem : object} \\
\text{fnc} : & \text{fnc :} & \text{arg :} & \text{arg :} & \text{arg :} & \text{arg :} & \text{arg :} & \text{arg :} \\
\text{mdr} : & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} & \text{mdr :} \\
\end{array}
\]
3.1. COMBINATION OF N-Q  CHAPTER 3. NUMERALS AND QUANTIFIERS

In step 1, the ss proplet is "他 (ta, he)", and the nw proplet is "一 (yi, one)". The nw proplet is simply copied into output.

In step 2, the input of the quantifier "口 (kou, time)" activates the rule of NUM+QUAN. Because it is impossible to find an exact counterpart for each quantifier, most of the v-quantifiers in the lexicon have the universal value of "time". After all the rule operations, the quantifier proplet is absorbed into the cardinal proplet.

In step 3, the verb "吞 (tun, swallow)" is read in and a variation of the rule of S+V is applied. Besides representing the functor-argument relation between the subject pronoun and the verb, the rule operations also fulfill the task of adverbial absorption. The "noun" value of the "cdn-q" proplet is coped as the "mdr" value. Then all the "sur", "pyn", "cat" and "sem" values are replaced by those from the verb proplet. The core attribute of "noun" is canceled. Then the new core attribute of "verb" is created and provided with the value from the nw proplet. The "verb" value in the nw proplet is copied to the "fnc" slot of the noun proplet "他 (ta, he)". The "fnc" attribute in the original "cdn-q" proplet is canceled and an "arg" attribute is created. The "noun" value from the proplet "他 (ta, he)" is then copied to the new "arg" slot. When all the operations are completed, the derivation goes to next step.

With the input of the full stop, the analysis comes to the end. The derivation result is composed of three proplets, namely "他 (ta, he)", "吞 (tun, swallow)" and "巧克力 (qiaokeli, chocolate)".
3.1.2 Derivation of Ordinals

Combined with certain morphemes, cardinals in Chinese are changed into ordinals. This is similar to English in that Chinese ordinals are also derived from cardinals. But the difference is that Chinese ordinals are compound words instead of simple words. For example: the English word “first” is “第一 (diyi)” in Chinese, and “second” is “第二 (dier)”. Chinese ordinals are composed of at least two characters, the first being a marker and the second a cardinal. There are only two alternations for the preceding morpheme: “第 (di, Number)” and “初 (chu, DayNumber)”. “第 (di, Number)” and “初 (chu, DayNumber)” are stored in the lexicon as follows:

They share the same “sem” value, i.e. “odn (ordinal)”, but their “cat” values are different. “omr” means “ordinal marker”, while “tmr” means “temporal noun marker”. The morpheme “初 (chu, DayNumber)” is only used for counting the first ten days of a Chinese lunar month. In other words, there are only ten ordinals starting with this morpheme, each one referring to a specific day. These ordinals with “初 (chu, DayNumber)” are never followed by quantifiers. In fact, they function as temporal nouns. Therefore, “初 (chu, DayNumber)” is called a temporal noun marker and its combination with a cardinal creates a temporal noun with the “cat” value of “nt”.

(1) 第 + Cardinal

First, let’s have a look at the combination of “第 (di, Number)” with a cardinal. Take “第三” as
3.1. COMBINATION OF N-Q  
CHAPTER 3. NUMERALS AND QUANTIFIERS

an example. The combination is analyzed as follows:

The success of rule operations result in a new proplet:

As an ordinal marker, “第 (di, Number)” is stored with the core attribute of “adj”. The new proplet resulting from the derivation keeps the core attribute of “adj”, since it is more often used as a modifier. The combination of an ordinal marker with a cardinal follows the rule of MR+ROOT. The operations are as written in the square and indicated by the arrows. The “sur”, and “pyn” values from the nw proplet are appended to those in the ss proplet. The “noun” value from the nw proplet is copied to the “adj” slot in the “omr” proplet. The “cat” value is changed from “omr” to “odn”, which means “ordinal”. The derivation result is an ordinal proplet, i.e. “第三”.

- Ordinal + noun

Ordinals starting with “第 (di, Number)” have some features of adjectives. They modify nouns directly. For example: “第三课 (Lesson three)”. 

Lexical lookup:

Syntactic-semantic analysis:

In step 1, the combination of “第 (di, Number)” and “三 (san, three)” follows the rule of MR+ROOT.
The result is copied into output as the ss proplet for step 2.

In step 2, the rule of ADJ+N is activated by the input of “课 (ke, lesson)”. The “adj” value in the ss proplet is copied as the “mdr” value. Both the “sur” value and the “pyn” value are replaced by those from the nw proplet. The core attribute “adj” is canceled. The attribute of “noun” is created and provided with the value from the nw proplet. The “cat” and “sem” values are also replaced by those of the nw proplet. The successful application of the rule results in a noun single proplet:

- Ordinal + quantifier + noun

The combination of “第 (di, Number)” with a cardinal may also be followed by a quantifier, and then the new combination functions as an adnominal modifier. For example: “第三个星期天 (the third Sunday)”. 

Lexical lookup:

Syntactic-semantic analysis:

Step 1 is skipped here. The derivation result is copied into output as a single proplet of “第三”.

"Ordinal + quantifier + noun"
In step 2, the combination of the ordinal proplet with the quantifier “个 (ge, GE)” follows the rule of NUM + QUAN. The nw proplet is absorbed into the ss proplet. The “cat” value is changed from “odn” to “odn-q”.

When the noun proplet “星期天 (xingqitian, Sunday)” is read in, the rule of “NQ + NOUN” is activated. The “adj” value in the ss proplet is copied to the “mdr” slot. Then the core attribute “adj” is canceled. A new attribute, “noun”, is created and provided with the “noun” value from the nw proplet. The result is a single noun proplet, namely “星期天 (xingqitian, Sunday)”. Derivation result:

This new proplet differs from the one in the lexicon in the “mdr” value.

(2) 初 + Cardinal

As an ordinal marker, “初 (chu, DayNumber)” is also stored in the lexicon with the core attribute of “adj”. The combination of “初 (chu, DayNumber)” with a cardinal creates a noun proplet. Take “初三” as an example. When the rule concerned is activated, the operations are as follows:

```
sur: 星期天
pyn: xingqitian
noun: Sunday
adj: Number|three
cat: nt
sem: 
fnc: 
mdr: Number|three
```
CHAPTER 3. NUMERALS AND QUANTIFIERS

3.1. COMBINATION OF N-Q

The derivation result is:

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: chu</td>
<td>pyn: san</td>
<td>pyn: de</td>
<td>pyn: yewan</td>
</tr>
<tr>
<td>noun: DayNumber</td>
<td>three</td>
<td>adj : DE</td>
<td>noun: night</td>
</tr>
<tr>
<td>cat : tmr</td>
<td>cat : cdm</td>
<td>cat : nt</td>
<td></td>
</tr>
<tr>
<td>sem: odn</td>
<td>sem:</td>
<td>sem:</td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
</tr>
</tbody>
</table>
```

The rule of MR+ROOT applies. The core attribute of the new proplet is “noun” instead of “adj”. The new “cat” value, i.e. “nt”, is also different from those in the ss proplet and the nw proplet. Actually the resulting proplet is a temporal noun proplet.

3.1.3 Ordinal as Attributive

The temporal noun composed of the marker “初 (chu, DayNumber)” and a cardinal is used as subject, object, attributive, adverbial, etc. When used as an attributive, it is never followed by a quantifier. It either modifies a noun immediately or is first followed by the structure auxiliary “的 (de, DE)”. For example: “初三的夜晚 (the night of the third day)”. 

Lexical lookup:

```
   pyn: chu | pyn: san | pyn: de | pyn: yewan |
   noun: DayNumber| three | adj : DE | noun: night |
   cat : tmr | cat : cdm | cat : nt | |
   sem: odn | sem: | sem: | |
   mdr: | mdr: | mdr: | |
   mdd: | mdd: | mdd: | |
```

Syntactic-semantic analysis:

```
   pyn: chu | pyn: san | pyn: de | pyn: yewan |
   noun: DayNumber| three | adj : DE | noun: night |
   cat : tmr | cat : cdm | cat : nt | |
   sem: odn | sem: | sem: | |
   mdr: | mdr: | mdr: | |
   mdd: | mdd: | mdd: | |
```

2. sur : 初三 | sur : 的 |
   pyn: chu|san | pyn: de |
   noun: DayNumber|three | adj : DE |
   cat : nt | cat : sur |
   sem: odn | sem: |
   mdr: | mdr: |
   mdd: |
3.1. COMBINATION OF N-Q

CHAPTER 3. NUMERALS AND QUANTIFIERS

3.1.4 Ordinal as Adverbial

When used as an adverbial, the ordinal composed of “初 (chu, DayNumber)” and a cardinal starts a sentence or appears between the subject and the main verb. Take the following sentence as an example.

Example 4. 我初三来。(I will come on the third day.)

<table>
<thead>
<tr>
<th>surface</th>
<th>pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>我初</td>
<td>wo chu san</td>
<td>Ithree</td>
</tr>
<tr>
<td>三来</td>
<td>lai</td>
<td>come</td>
</tr>
</tbody>
</table>

In this sentence, the temporal noun comes after the subject but before the predicate verb.
The syntactic-semantic analysis is composed of 4 times of combination:

1. 
   sur: 初
   pyn: wo
   noun: I
   cat: pro
   sem: s1
   fnc: 
   mdr: 

2. 
   sur: 初
   pyn: wo
   noun: I
   cat: pro
   sem: s1
   fnc: 
   mdr: 

3. 
   sur: 初
   pyn: wo
   noun: I
   cat: pro
   sem: s1
   fnc: 
   mdr: 

4. 
   sur: 初
   pyn: wo
   noun: I
   cat: pro
   sem: s1
   fnc: 
   mdr: 

Derivation result:

At the very beginning, the first word of the sentence, i.e. a pronoun, is read in.
In step 1, the temporal noun marker is read in and copied into output, because the syntactic-semantic relation is not clear yet.

In step 2, the rule of MR+ROOT is applied when the cardinal “三 (san, three)” is read in.

In step 3, the input of the verb activates a variation of the rule of S+V. The “noun” value in the second ss proplet is copied to the “mdr” slot in the nw proplet. Then the “verb” value from the nw proplet is copied as the “mdr” value in the second ss proplet. An additional value “adverbial” is copied into the “sem” slot in the second ss proplet. The “verb” value from the nw proplet is also copied into the “fnc” slot in the first ss proplet and the “noun” value from the first ss proplet is copied to the “arg” slot in the nw proplet. Thus, both the functor-argument relation and the modifier-modified relation are represented. When the full stop is read in, the rule of S+IP is activated and the analysis comes to the end. The derivation result is composed of three proplets.

The SRG and the signature presentation:

\[
\begin{array}{c}
\mathrm{a)} \quad \text{come} \\
/ \quad | \\
I \quad \text{DayNumber|three} \\
\end{array}
\quad \begin{array}{c}
\mathrm{b)} \quad V \\
/ \quad | \\
N \quad N \\
\end{array}
\]

If the temporal noun comes before the subject, the semantic meaning of the sentence does not change at all. Though the derivation process has to be changed accordingly, the result are the same three proplets.

**Example 5.** 初三我来。(I will come on the third day.)

| surface: 初三我来 | pinyin: chu san wo lai | English: - three I come |

Derivation result:

\[
\begin{array}{c}
sur : 初三 \\
pyn : chu|san \\
noun: DayNumber|three \\
cat : nt \\
sem : adverbial \\
fnc : \\
mdr : \\
mdd : come \\
\end{array}
\quad \begin{array}{c}
sur : 我 \\
pyn : wo \\
noun: I \\
cat : pro \\
sem : agent \\
fnc : come \\
mdr : \\
mdd : come \\
\end{array}
\quad \begin{array}{c}
sur : 来 \\
pyn : lai \\
noun: verb: come \\
cat : eq mark \\
sem : spt \\
fnc : come \\
mdr : DayNumber|three \\
mdd : come \\
\end{array}
\]

The SRG and the signature presentation also resembles that of the above example:

\[
\begin{array}{c}
\mathrm{a)} \quad \text{come} \\
/ \quad | \\
I \quad \text{DayNumber|three} \\
\end{array}
\quad \begin{array}{c}
\mathrm{b)} \quad V \\
/ \quad | \\
N \quad N \\
\end{array}
\]
3.2 Quantifiers in Repetition

Quantifiers are used as units of people, things or actions. They are roughly classified into two groups. One is used to describe the number of the modified nouns, and therefore called “adnominal quantifiers” (marked as “nquan” in the lexicon). The other is used to modify movement or action, and therefore called “adverbial quantifiers” (marked as “vquan” in the lexicon). Some linguists argue that there is a third group, which is called “time quantifiers”, including “小时 (xiaoshi, hour)”, “星期 (xingqi, week)”, “年 (nian, year)” and so on. But basically, these words refer to a certain period of time. At the same time, multi-category does not help reducing ambiguity. Therefore, these words are collected as temporal nouns only.

Quantifiers usually don’t appear independently as sentence elements. They are preceded by numerals and determiners. Then the combination as a whole functions as a sentence element. The combination of numerals and quantifiers is discussed in 2.1 and 2.2. The combination of numerals with determiners is discussed in 3.3. In this section, we focus on the repetition of quantifiers.

Almost all monosyllable quantifiers can be repeated immediately after its first appearance, but once only, forming the pattern of “QQ (quantifier-quantifier)”. If preceded by a cardinal, it means “one by one” or “numerous”, depending on the part of speech of the modified. It is necessary to point out that, in this case, the cardinal is always “一 (yi, one)”, forming the pattern of “一QQ”.

If there isn’t any cardinal in front, its meaning is equivalent to “every one” in English.

3.2.1 “QQ”

Take the quantifier “件 (jian, piece)” as an example. The repetition activates the rule of “X+X”. The operations are as follows:

When a quantifier is repeated, the rule of X+X is activated. Both the “sur” and “cat” values are combined. A new value “every|one” is provided for the “noun” slot. The “sem” value is canceled. The “cat” value is changed from “nquan” to “nquan-p”, which means “adnominal quantifier phrase”. If the quantifier has the “cat” value of “vquan”, then the new “cat” value is “vquan-p”.

In the corpus, the “QQ” pattern is only seen as a subject or an object.

55
• “QQ” as subject

Example 6. 件件漂亮。 (Every one is pretty.)

<table>
<thead>
<tr>
<th>surface</th>
<th>件件漂亮</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>jian jian piaoliang</td>
</tr>
<tr>
<td>English</td>
<td>piece piece pretty</td>
</tr>
</tbody>
</table>

Step 1 of the syntactic-semantic analysis results in the proplet “件件” (as discussed above). It is copied into output and becomes the sentence start for step 2.

In step 2, the rule of S+AV is activated by the input of “漂亮 (piaoliang, pretty)” . “件件” is the subject and also the argument of the adjective predicator. Therefore, an additional attribute “arg” is created in the adjective proplet and an “fnc” attribute is created in the ss proplet. The “adj” value from the nw proplet is copied into the new created “fnc” slot. Accordingly, the “noun” value from the ss proplet is copied into the new “arg” slot. Then the full stop is read in. With the application of the rule of S+IP, the analysis comes to the end. The derivation result is composed of two proplets.

Derivation result:

The SRG and the signature presentation:

a) pretty  b) A
   every|one        N

• “QQ” as object
Example 7. 他件件洗。 (He washes every one.)

| surface: | 他 件 件 洗 |
| pinyin: | ta jian jian xi |
| English: | he piece piece wash |

Since “件 (jian, piece)” is often used as a unit of clothes, it is not difficult to get the idea that “He is washing clothes”. And, there are several pieces of clothes, because the quantifier is repeated. Superficially, this logic object “件件 (jianjian)” between the subject and the main verb is in the position of an adverbial. But in deep structure, its function is more like a pronoun. In this case, it is taken as a special case of “object-fronting”. The derivation process is as follows:

1. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : mdr:

2. sur : 件
   pyn : jian
   noun: piece
   cat : nquan
   sem : +N
   fnc : mdr:

3. sur : 件件
   pyn : jianjian
   noun: every|one
   cat : nquan
   sem : +N
   fnc : mdr:

In step 3, the rule of S+V is activated. The “verb” value is copied to the “fnc” slot in the first ss proplet and the new created “fnc” slot in the second. Accordingly, the “noun” values in the two ss proplets are copied to the “arg” slot in the verb proplet. The first and second value of the “cat” attribute in the verb proplet is thereafter canceled. The “sem” values of “agent” and “patient” are respectively copied to the two ss proplets. Then the analysis comes to the end with the input of the full stop. The derivation result is composed of three proplets.
3.2. QUANTIFIERS IN REPETITION  
CHAPTER 3. NUMERALS AND QUANTIFIERS

Derivation result:

The SRG and the signature presentation:

3.2.2 “一件 QQ”

During the syntactic-semantic analysis of “一件件”, the rule of NUM+QUAN is applied for the combination of “一件 (yi, one)” and “件 (jian, piece)” in step 1. The result is the single proplet of “一件 (yijian, one)”.

In step 2, the rule of X+X is activated. The combination of “一件 (yijian, one)” and “件 (jian, piece)” differs from that of “件 (jian, piece)” and “件 (jian, piece)”. The “noun” slot is filled with the value “one-one” and the “cat” value is replaced by “cdn-qq”. After the operations of “X+X”,

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the derivation result is as follows:

```
sur : 一件件
pyn : yijianjian
noun : one-one
cat : cdn-qq
sem :
fnc :
mdr :
mdd:
```

“— QQ” has been seen as an attributive or an adverbial.

- “— QQ” as attributive

When used as an adnominal modifier, “— QQ” means “numerous”. For example: “一件件衣服 (numerous clothes)”.

Lexical lookup:

```
sur : 件
pyn : jian
noun : piece
cat : nquan
sem : +N
fnc :
mdr :
mdd:

sur : 衣服
pyn : yifu
noun : clothes
cat : cn
sem : object
fnc :
mdr :
mdd:
```

We skip Step 0-2 of the syntactic-semantic analysis. The result of the previous steps, i.e. the proplet “一件件” becomes the ss part in step 3.

```
sur : 一件件
pyn : yijianjian
noun : one-one
cat : cdn-qq
sem :
fnc :
mdr :
mdd:
```

The rule of NQ+NOUN is activated by the input of “衣服 (yifu, clothes)” in step 3. The “cdn-qq” proplet is absorbed after the rule operations. The “noun” value of the “cdn-qq” is copied as the
3.2 QUANTIFIERS IN REPEATITION

"mdr" value. The derivation result is a single noun proplet:

- "一 QQ" as adverbial

When "一 QQ" is used as an adverbial, its semantic meaning resembles "one after another". It shows the manner of the action.

Example 8. 他一件件数。(He count one by one.)

<table>
<thead>
<tr>
<th>surface: 他</th>
<th>一</th>
<th>件</th>
<th>件</th>
<th>数</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin: ta</td>
<td>yi</td>
<td>jian</td>
<td>jian</td>
<td>shu</td>
</tr>
<tr>
<td>English: he</td>
<td>one</td>
<td>piece</td>
<td>piece</td>
<td>count</td>
</tr>
</tbody>
</table>

The syntactic-semantic analysis is as follows:

1. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : 
   mdr : one-one
   mdd: 

2. sur : 他
   pyn : yi
   noun: one
   cat : cdn
   sem : s3
   fnc : 
   mdr : 
   mdd: 

3. sur : 件
   pyn : jian
   noun: piece
   cat : nquan
   sem : +N
   fnc : 
   mdr : 
   mdd: 

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A variation of the rule of “S+V” is activated in step 4. The “verb” value from the nw proplet is copied as the “fnc” value in the first ss proplet, and the “noun” value of the first ss proplet is accordingly copied to the “arg” slot in the nw proplet. The value of “agent” is copied to the “sem” slot in the first ss proplet. The “verb” value from the nw proplet is copied into the “mdd” slot in the cdn-qq proplet, and, in return, the “noun” value from the cdn-qq proplet is copied as the “mdr” value in the nw proplet. After the input of the full stop, the analysis comes to the end.

The derivation result is composed of three proplets.

The SRG and the signature presentation:

\[
\begin{align*}
\text{a)} & \quad \text{count} \\
\text{b)} & \quad V \\
& \quad \text{he} \quad \text{one-one} \\
& \quad N \quad N
\end{align*}
\]
This page intentionally contains only this sentence.
Chapter 4

Analysis of Pronouns

Traditionally, pronouns in Chinese are further divided into personal pronouns, demonstrative pronouns and interrogative pronouns. Demonstrative pronouns are often followed by quantifiers. In this case, we name them determiners for separation from the common application of pronouns.

4.1 Personal Pronouns

As in English, Chinese personal pronouns distinguish first person, second person and third person. But the inflection and derivation of Chinese personal pronouns are much simpler.

Table 4.1: English Personal Pronouns

<table>
<thead>
<tr>
<th></th>
<th>1st per.</th>
<th>1st per.</th>
<th>2nd per.</th>
<th>2nd per.</th>
<th>3rd per.</th>
<th>3rd per.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>singular</td>
<td>plural</td>
<td>singular</td>
<td>plural</td>
<td>singular</td>
<td>plural</td>
</tr>
<tr>
<td>Nominative:</td>
<td>I</td>
<td>we</td>
<td>you</td>
<td>you</td>
<td>he/she/it</td>
<td>they</td>
</tr>
<tr>
<td>Accusative:</td>
<td>me</td>
<td>us</td>
<td>you</td>
<td>you</td>
<td>him/her/it</td>
<td>them</td>
</tr>
<tr>
<td>Noun-possessive:</td>
<td>mine</td>
<td>ours</td>
<td>yours</td>
<td>yours</td>
<td>his/hers/its</td>
<td>theirs</td>
</tr>
<tr>
<td>Adjective-possessive:</td>
<td>my</td>
<td>our</td>
<td>your</td>
<td>your</td>
<td>his/her/its</td>
<td>their</td>
</tr>
</tbody>
</table>

Table 4.2: Chinese Personal Pronouns

<table>
<thead>
<tr>
<th></th>
<th>1st per.</th>
<th>1st per.</th>
<th>2nd per.</th>
<th>2nd per.</th>
<th>3rd per.</th>
<th>3rd per.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>singular</td>
<td>plural</td>
<td>singular</td>
<td>plural</td>
<td>singular</td>
<td>plural</td>
</tr>
<tr>
<td>Nominative:</td>
<td>我</td>
<td>我们</td>
<td>你</td>
<td>你们</td>
<td>他/她/它</td>
<td>他们/她们/它们</td>
</tr>
<tr>
<td>Accusative:</td>
<td>我</td>
<td>我们</td>
<td>你</td>
<td>你们</td>
<td>他/她/它</td>
<td>他们/她们/它们</td>
</tr>
<tr>
<td>Noun-possessive:</td>
<td>我的</td>
<td>我们的</td>
<td>你的</td>
<td>你们的</td>
<td>他/她/它的</td>
<td>他们/她们/它们的</td>
</tr>
<tr>
<td>Adjective-possessive:</td>
<td>我 (的)</td>
<td>我们 (的)</td>
<td>你 (的)</td>
<td>你们 (的)</td>
<td>他/她/它 (的)</td>
<td>他们/她们/它们 (的)</td>
</tr>
</tbody>
</table>

Obviously, the English personal pronouns change their forms according to person, number and case. But in Chinese, they change according to person, number, but not case. Moreover, the change
based on person and number is much simpler. The plural form of Chinese personal pronouns is composed of its singular form and the plural marker “们 (men, MEN)”. The nominative forms do not differ from the accusative forms. The singular noun possessive pronouns consist of the singular pronouns and the particle “的 (de, DE)”. The plural noun possessive pronouns are composed of the plural pronouns and the particle “的 (de, DE)”. The singular and plural adjective possessive pronouns resemble the noun possessive pronouns, but the particle “的 (de, DE)” is often omitted.

Since “们 (men, MEN)” and “的 (de, DE)” are separable and they are also used in many other places without any change in their function, we prefer to separate them from the single pronouns. Therefore, in the LAG-Chinese lexicon, the personal pronouns only include “我 (wo, I)”, “你 (ni, you)”, “他 (ta, he)”, “她 (ta, she)” and “它 (ta, it)”. The plural and possessive changes are left to the syntactical and semantic analysis.

Personal pronouns are used as subjects, objects and attributives. Here are some examples.

4.1.1 Personal Pronoun as Subject

Example 9. 我笑。 (I laugh.)

| surface: | 我笑 |
| pinyin: | wo xiao |
| English: | I laugh |

The first combination starts the rule of “S+V”:

1. sur : 我  sur : 笑
   pyn : wo  pyn : xiao
   noun: I  verb: laugh
   cat : pro  cat : s’ iv
   sem : sl  arg :
   fnc :  agent SS.sem
   mdr :  

Derivation result:

With only one word as the subject and one word as the predicate, the analysis process is very simple. During the application of the rule of S+V, the “noun” value is copied to the “arg” slot in the nw proplet and the “verb” value is copied to the “fnc” slot in the ss proplet. The value “agent” is copied to the “sem” slot of the subject proplet. The nw proplet is copied into output.
The SRG and the signature presentation:

\[
\text{a) laugh} \quad \text{b) V} \\
\text{I} \quad \text{N}
\]

4.1.2 Personal Pronoun as Object

Example 10. 母亲爱我。 (Mother loves me.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>母亲</th>
<th>爱</th>
<th>我</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>muqin</td>
<td>ai</td>
<td>wo</td>
</tr>
<tr>
<td>English:</td>
<td>mother</td>
<td>love</td>
<td>I</td>
</tr>
</tbody>
</table>

Lexical lookup:

<table>
<thead>
<tr>
<th>sur: 母亲</th>
<th>sur: 爱</th>
<th>sur: 我</th>
<th>sur: 。</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: muqin</td>
<td>pyn: ai</td>
<td>pyn: wo</td>
<td>cat: mark</td>
</tr>
<tr>
<td>noun: mother</td>
<td>verb: love</td>
<td>noun: I</td>
<td>sem: v' decl</td>
</tr>
<tr>
<td>cat: nr</td>
<td>cat: s' tv</td>
<td>cat: pro</td>
<td></td>
</tr>
<tr>
<td>sem:</td>
<td>sem:</td>
<td>sem: s1</td>
<td></td>
</tr>
<tr>
<td>fnc:</td>
<td>arg:</td>
<td>fnc:</td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

1. sur: 母亲 \quad sur: 爱 \quad sur: 我 \quad sur: 。
   pyn: muqin \quad pyn: ai \quad pyn: wo \quad cat: mark
   noun: mother \quad verb: love \quad noun: I \quad sem: v’ decl
   cat: nr \quad cat: s’ tv \quad cat: pro
   sem: \quad sem: \quad sem: s1
   fnc: \quad arg: \quad fnc: \\
   mdr: \quad mdr: \quad mdr:

2. sur: 母亲 \quad sur: 爱 \quad sur: 我
   pyn: muqin \quad pyn: ai \quad pyn: wo
   noun: mother \quad verb: love \quad noun: I
   cat: nr \quad cat: p’ tv \quad cat: pro
   sem: agent \quad sem: \quad sem: s1
   fnc: love \quad arg: mother \quad fnc: \\
   mdr: mdr: mdr:

The rule of V+N is activated in step 2. The “noun” value of the pronoun proplet is copied to the “arg” slot in the verb proplet, and accordingly the “verb” value is copied to the “fnc” slot in the pronoun proplet.
4.1. PERSONAL PRONOUNS

Derivation result:

\[
\begin{array}{c|c|c}
\text{sur: 母亲} & \text{sur: 爱} & \text{sur: 我} \\
pyn: muqin & pyn: ai & pyn: wo \\
noun: mother & verb: love & noun: I \\
cat: nr & cat: tv mark & cat: pro \\
sem: agent & sem: & sem: s1 patient \\
fnc: love & arg: mother I & fnc: love \\
mdr: & mdr: & mdr: \\
\end{array}
\]

The SRG and the signature presentation:

\[
\begin{array}{c}
\text{a)} & \text{b)} \\
& \text{love} & \text{N} & \text{N} \\
\text{mother} & \text{I} & \text{N} & \text{N} \\
\end{array}
\]

4.1.3 Personal Pronoun as Attributive

When used as attributives, personal pronouns are either followed by the particle “的 (de, DE)” or not. In other words, the particle “的 (de, DE)” in the adjective possessive pronouns are often omitted.

- pro+ 的 +N: 我的朋友 (my friend)

Lexical lookup:

\[
\begin{array}{c|c|c}
\text{sur: 我} & \text{sur: 的} & \text{sur: 朋友} \\
pyn: wo & pyn: de & pyn: pengyou \\
noun: I & adj: DE & noun: friend \\
cat: pro & cat: smr & cat: nr \\
sem: s1 & sem: & sem: \\
fnc: & fnc: & fnc: \\
mdr: & mdr: & mdr: \\
\end{array}
\]

Syntactic-semantic analysis:

\[
\begin{array}{c|c|c|c|c}
\text{sur: 我} & \text{sur: 的} & \text{sur: 朋友} \\
pyn: wo & pyn: de & pyn: pengyou \\
noun: I & adj: DE & noun: friend \\
cat: pro & cat: smr & cat: nr \\
sem: s1 & sem: & sem: \\
fnc: & fnc: & fnc: \\
mdr: & mdr: & mdr: \\
\end{array}
\]
### 4.1. PERSONAL PRONOUNS

The combination of “我 (wo, I)” with the particle “的 (de, DE)” follows a variation of the rule of W+MR. An “mdd” attribute is created in the pronoun proplet and a temporary value of “#” is copied as its value, indicating the modified is expected.

The output after this rule application becomes the sentence start for next step. When “朋友 (pengyou, friend)” is read in, the rule of AN+N is activated. After all the rule operations, the modifier-modified relation is represented. The derivation result is composed of two proplets.

Derivation result:

<table>
<thead>
<tr>
<th>sur: 我</th>
<th>sur: 朋友</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: wo</td>
<td>pyn: pengyou</td>
</tr>
<tr>
<td>noun: I</td>
<td>noun: friend</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: nr</td>
</tr>
<tr>
<td>sem: s1</td>
<td>sem:</td>
</tr>
<tr>
<td>fnc:</td>
<td>fnc:</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
</tr>
<tr>
<td>mdd: friend</td>
<td></td>
</tr>
</tbody>
</table>

- pro+N: 我朋友 (my friend)

The particle “的 (de, DE)” between a personal pronoun and a noun is often omitted, without any change to the semantic relation. The syntactic-semantic analysis process is one step less than that of “我的朋友 (my friend)”, but the final result is the same.

### 4.1.4 Noun Possessive Pronoun

The Chinese noun possessive pronoun is composed of the basic pronoun and the particle “的 (de, DE)”, which is the same as the adjective possessive pronoun. When such a noun possessive construction appears, a gap is left in the derivation result.

**Example 11.** 书是我的。（The book is mine.）

<table>
<thead>
<tr>
<th>surface:</th>
<th>书 是 我 的</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>shu shi wo de</td>
</tr>
<tr>
<td>English:</td>
<td>book be I -</td>
</tr>
</tbody>
</table>

In this example, the construction “我的” equals to “mine” in English.
The syntactic-semantic analysis of the sentences is composed of 4 times of combination:

1. sur : 书  
   pyn : shu  
   noun: book  
   verb: be  
   cat : cn  
   sem : object  
   fnc : arg :  
   mdr :  

   sur : 是  
   pyn : shi  
   noun: book  
   verb: be  
   cat : c   
   sem : object  
   fnc : arg :  
   mdr :  

   sur : 我  
   pyn : wo  
   noun: I  
   verb: be  
   cat : p'  
   sem : theme  
   fnc : arg :  
   mdr :  

   sur : 的  
   pyn : de  
   noun: I  
   verb: be  
   cat : p'  
   sem : theme  
   fnc : arg :  
   mdr : 

   ① acopy(SS.noun nw.arg)  
   ② cancel(unw noun cat 1)  
   ③ acopy(awn verb SS.fnc)  
   ④ acopy(theme SS.sem)

In this step, the pronoun “我 (wo, I)” is read in. Because the subject is a common noun, it is not possible for the two nouns to have any clear relation so far. A temporary value of “#” is copied to the “arg” slot in the verb proplet and the second “cat” value is accordingly canceled. The nw proplet is copied into output.

2. sur : 书  
   pyn : shu  
   noun: book  
   verb: be  
   cat : cn  
   sem : object theme  
   fnc : be  
   mdr :  

   sur : 是  
   pyn : shi  
   noun: book  
   verb: be  
   cat : p'  
   sem : theme  
   fnc : be  
   mdr : 

   sur : 我  
   pyn : wo  
   noun: I  
   verb: be  
   cat : pro  
   sem : theme  
   fnc : be  
   mdr : 

   sur : 的  
   pyn : de  
   noun: I  
   verb: be  
   cat : smr  
   sem : theme  
   fnc : be  
   mdr : 

   ① acopy(# SS.2 arg)  
   ② cancel[SS.2 cat 1]

When the particle “的 (de, DE)” is read in, an additional “mdd” attribute is created in the pronoun proplet and a temporary value of “#” is provided. Since next input is a full stop, the temporary value has no chance to be replaced.

Derivation result:

3. sur : 书  
   pyn : shu  
   noun: book  
   verb: be  
   cat : cn  
   sem : object theme  
   fnc : be  
   mdr :  

   sur : 是  
   pyn : shi  
   noun: book  
   verb: be  
   cat : p'  
   sem : theme  
   fnc : be  
   mdr : 

   sur : 我  
   pyn : wo  
   noun: I  
   verb: be  
   cat : pro  
   sem : theme  
   fnc : be  
   mdr : 

   sur : 的  
   pyn : de  
   noun: I  
   verb: be  
   cat : smr  
   sem : theme  
   fnc : be  
   mdr : 

   ① acopy(# SS.mdd)

Semantically, the subject is also the modified. The two “#” in the verb proplet and the pronoun proplet can both be replaced by the core value from the subject proplet. To avoid repetition and confusion, the “#” is maintained in the DBS graphs.
CHAPTER 4. PRONOUNS 4.2. DEMONSTRATIVE PRONOUNS

The basic demonstrative pronouns in Chinese include “这 (zhe, this)”, “那 (na, that)”, “这些 (zhexie, these)”, “那些 (naxie, those)”, “这样 (zheyang, so)”, “那样 (nayang, so)”, “这么 (zheme, so)”, “那么 (name, so)”, “这里 (zheli, here)” and “那里 (nali, there)”. Like other pronouns, demonstrative pronouns function as subjects, objects, predicates, attributives or adverbials.

4.2.1 这 (zhe, this)

“这 (zhe, this)” occurs 840 times in the corpus, referring to a person, an object, a place or an event.

- “这 (zhe, this)” refers to an object

Example 12. 这是车。(This is a car.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这 是 车</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zhe shi che</td>
</tr>
<tr>
<td>English</td>
<td>this be car</td>
</tr>
</tbody>
</table>

- “这 (zhe, this)” refers to an event

Example 13. 这使我难过。(This makes me sad.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这 使 我 难过</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zhe shi wo nanguo</td>
</tr>
<tr>
<td>English</td>
<td>this make I sad</td>
</tr>
</tbody>
</table>

It is surprising to see “这 (zhe, this)”, 99% of the 840 times, is used as the short form of “这里 (zheli, here)”. That is to say, “这 (zhe, this)” refers most frequently to a place. In this case, it functions mainly as an adverbial or an object of the preposition “在 (zai, in-at-on)”.

Example 14. 我来这。(I come here)
In this example, “来 (lai, come)” is a directional verb, for which only a subject is required. “这 (zhe, this)” indicates the direction and functions as an adverbial.

The second combination in the sentence is as follows:

In this step, the rule of “V+COMP” is applied. An additional “mdd” attribute is created in the pronoun proplet. The “verb” value is then copied to the new “mdd” slot and the noun value in the pronoun proplet is copied to be the “mdr” value in the verb proplet. The nw proplet is copied into output.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

The similarity between “这 (zhe, this)” and “这里 (zheli, here)” is clearer in the following example.

Example 15. 我在这工作。(I work here.)
In this example, the pronoun “这 (zhe, this)” is the object of the preposition “在 (zai, in-at-on)”. There is no doubt that “这 (zhe, this)” refers to a place and the preposition phrase “在这” modifies the verb “工作 (gongzuo, work)” by providing information of location. It may also be written as “我在这里工作。” (I work here.)” From both the syntactic and the semantic view, there is no difference between the two sentences.

The derivation result of “我在这里工作。”

\[
\begin{align*}
&\text{sur : 我} & \text{sur : 在} & \text{sur : 工作} \\
pyn : wo & \text{pyn : zai} & \text{pyn : gongzuo} \\
noun: I & \text{adj : in-at-on} & \text{verb: work} \\
cat : pro & \text{cat : prep} & \text{cat : iv mark} \\
sem : sl agent & \text{sem : } & \text{sem : } \\
fnc : work & \text{arg : this-here} & \text{arg : I} \\
mdr : mdr: work mdr: in-at-on \\
\end{align*}
\]

The SRG and the signature presentation:

a) work b) V

/ I \ /
I in-at-on N A

4.2.2 这里 (zheli, here)

“这里 (zheli, here)” has occurred 102 times in the corpus, used as subjects, objects, attributives or adverbials.

• “这里 (zheli, here)” as subject

Example 16. 这里是办公室。(Here is the office.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这里是办公室</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>zheli shi bangongshi</td>
</tr>
<tr>
<td>English:</td>
<td>here be office</td>
</tr>
</tbody>
</table>

In the above example, “这里 (zheli, here)” is the subject followed by a link verb “是 (shi, be)”.

The derivation result of “这里是办公室。”

\[
\begin{align*}
&\text{sur : 这里} & \text{sur : 是} & \text{sur : 办公室} \\
pyn : zheli & \text{pyn : shi} & \text{pyn : bangongshi} \\
noun: here & \text{verb: be} & \text{noun: office} \\
cat : dqro & \text{cat : vx mark} & \text{cat : cn} \\
sem : theme & \text{sem : } & \text{sem : despriptive} \\
fnc : be & \text{arg : here office} & \text{fnc : be} \\
mdr : mdr: office mdr : \\
\end{align*}
\]

The SRG and the signature presentation:
4.2. DEMONSTRATIVE PRONOUNS

- “这里 (zheli, here)” as object

Example 17. 我喜欢这里。(I like here.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我</th>
<th>喜欢</th>
<th>这里</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>wo</td>
<td>xihuan</td>
<td>zheli</td>
</tr>
<tr>
<td>English:</td>
<td>I</td>
<td>like</td>
<td>here</td>
</tr>
</tbody>
</table>

Derivation result:

```
sur: 我   sur: 喜欢   sur: 这里
pyn: wo   pyn: xihuan   pyn: zheli
noun: I   verb: like   noun: here
cat: pro   cat: tv mark   cat: dpro
sem: s1 agent   sem:   sem: patient
fnc: like   arg: I here   fnc: like
mdr: mdr: mdr: mdr:
```

The SRG and the signature presentation:

```
a)  like
    I
  here
b)  V
    N
```

- “这里 (zheli, here)” as attributive

“这里 (zheli, here)” sometimes functions as an attributive. In this case, the structure auxiliary “的 (de, DE)” is required.

Example 18. 这里的楼房高。(The buildings here are high.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这里的</th>
<th>楼房</th>
<th>高</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>zheli</td>
<td>de</td>
<td>loufang</td>
</tr>
<tr>
<td>English:</td>
<td>here</td>
<td>-</td>
<td>building</td>
</tr>
</tbody>
</table>

Derivation result:

```
sur: 这里   sur: 楼房   sur: 高
pyn: zheli   pyn: loufang   pyn: gao
noun: here   noun: building   adj: high
cat: dpro   cat: cn   cat: adj mark
sem: sem: object theme   sem: av
fnc: fnc: high   arg: building
mdr: mdr: mdr: mdr:
```

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CHAPTER 4. PRONOUNS  

4.2. DEMONSTRATIVE PRONOUNS

The SRG and the signature presentation:

\[
\begin{align*}
\text{a)} & \quad \text{high} \quad \text{b)} \quad \text{A} \\
\text{building} & \quad \text{N} \\
\text{here} & \quad \text{N}
\end{align*}
\]

4.2.3 这些 (zhexie, these)

“这些 (zhexie, these)” has occurred 42 times in the corpus, only used as subjects or objects.

- “这些 (zhexie, these)” as subject

Example 19. 这些可以运行。(These can run.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这些</th>
<th>可以</th>
<th>运行</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zhexie</td>
<td>keyi</td>
<td>yunxing</td>
</tr>
<tr>
<td>English</td>
<td>these</td>
<td>kan</td>
<td>run</td>
</tr>
</tbody>
</table>

Derivation result:

\[
\begin{align*}
sur: \这些 & \quad sur: \可以 & \quad sur: \运行 \\
pyn: zhexie & \quad pyn: keyi & \quad pyn: yunxing \\
noun: these & \quad verb: can & \quad verb: run \\
cat: dpro & \quad cat: vz mark & \quad cat: iv \\
sem: causer & \quad sem: & \quad sem: \\
fnc: can & \quad arg: these run & \quad fnc: can \\
mdr: & \quad mdr: & \quad arg: # \\
\end{align*}
\]

The SRG and the signature presentation:

\[
\begin{align*}
a) & \quad \text{can} \quad \text{these} \\
b) & \quad \text{run} \quad \text{N} \quad \text{V} \\
\end{align*}
\]

- “这些 (zhexie, these)” as object

Example 20. 我喜欢这些。(I like these.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我</th>
<th>喜欢</th>
<th>这些</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo</td>
<td>xihuan</td>
<td>zhexie</td>
</tr>
<tr>
<td>English</td>
<td>I</td>
<td>like</td>
<td>these</td>
</tr>
</tbody>
</table>
4.2. DEMONSTRATIVE PRONOUNS

Derivation result:

In similar sentences with the above examples, “这些 (zhexie, these)” is applied in the same way as “these” in English.

4.2.4 这样 (zheyang, so)

“这样 (zheyang, so)” has occurred 106 times in the corpus as a subject, an object, attributive or adverbial. Syntactically, it has little difference from other pronouns when used as a subject, an object or an attributive. When used as an adverbial, “这样 (zheyang, so)” only precedes a verb or an adjective to show the manner or degree.

- “这样 (zheyang, so)” modifies a verb

Example 21. 他这样工作。(He works this way.)

The syntactic-semantic analysis of the sentence is as follows:


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CHAPTER 4. PRONOUNS 4.2. DEMONSTRATIVE PRONOUNS

In step 2, the third word “工作 (gongzuo, work)” is read in and the rule of S+V is activated. The functor-argument and modifier-modified relations are presented as values of certain attributes. The “noun” value in the first ss proplet is copied as the “arg” value in the nw proplet. The first “cat” value in the verb proplet is thereafter canceled. In return, the “verb” value from the nw proplet is copied as the “fnc” value in the first ss proplet. The value “agent” is copied into the “sem” slot in the first ss proplet. The “noun” value in the second ss proplet is copied into the “mdr” slot in the nw proplet. The “verb” value from the nw proplet is copied into the “mdd” slot in the second ss proplet.

When the full stop is read in, the analysis comes to the end.

Derivation result:

```
<table>
<thead>
<tr>
<th>sur</th>
<th>work</th>
<th>sur</th>
<th>zheyang</th>
<th>sur</th>
<th>gongzuo</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>ta</td>
<td>pyn</td>
<td>zheyang</td>
<td>pyn</td>
<td>work</td>
</tr>
<tr>
<td>noun</td>
<td>he</td>
<td>noun</td>
<td>so</td>
<td>verb</td>
<td>work</td>
</tr>
<tr>
<td>cat</td>
<td>pro</td>
<td>cat</td>
<td>dpro</td>
<td>cat</td>
<td>iv mark</td>
</tr>
<tr>
<td>sem</td>
<td>s3 agent</td>
<td>sem</td>
<td>manner-degree</td>
<td>sem</td>
<td></td>
</tr>
<tr>
<td>fnc</td>
<td>work</td>
<td>fnc</td>
<td>:</td>
<td>arg</td>
<td>he</td>
</tr>
<tr>
<td>mdr</td>
<td>mdr</td>
<td>mdr</td>
<td>: so</td>
<td>mdr</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd</td>
<td>work</td>
<td>mdd</td>
<td></td>
<td></td>
<td>work</td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

```
a) work
   he
   so
b) V
   /\ N N
```

- “这样 (zheyang, so)” modifies an adjective

Example 22. 他这样年轻。(He is so young.)

```
surface: 他 这样 年轻
pinyin: ta zheyang nianqing
English: he so young
```

The syntactic-semantic analysis of the sentence is as follows:

```
1. sur  | he   | sur  | zheyang |
   pyn  | ta   | pyn  | zheyang |
   noun | he   | noun | so      |
   cat  | pro  | cat  | dpro    |
   sem  | s3   | sem  | manner-degree |
   fnc  |      | fnc  | :       |
   mdr  | mdr  | mdr  | : so    |
   mdd  |      | mdd  |         |
```
The syntactic-semantic analysis of "他这样年轻" is quite similar to that of "他这样工作。". But, because it is an adjective that plays the role of a predicator, the "sem" value in the adjective proplet is set as "av", which means "adjective verb". An "arg" attribute is additionally created for the adjective. The core value from the subject proplet is copied into this new slot. When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

a) young b) A
  he so N N

“这么 (zheme, so)” has occurred 52 times in the corpus, but both its syntactic and semantic meaning resembles that of “这样 (zheyang, so)”, except that it does not appear as predicative independently. For example:

* 她就是这样。(She is so...)  
她就是这么。(She is like this.)

The second one is grammatic but the first one is not acceptable.
4.2.5 Determiners

Among all the demonstrative pronouns, “这 (zhe, this)”, “那 (na, that)” “这些 (zhexie, these)”, “那些 (naxie, those)”, “这样 (zheyang, so)”, “那么 (name, so)”, are also often used in front of noun phrases, resembling determiners in English or German. For example: “这 (zhe, this)” has been seen in this application 1006 times, “这些 (zhexie, these)” 404 times, “这样 (zheyang, so)” and “那么 (name, so)” less than 200 times. “这 (zhe, this)” also has the most variations in such an application. It can precede a noun, a quantifier, a cardinal, etc. During the syntactic-semantic analysis, the determiner proplets are all absorbed by the following noun proplets. But in this LAG-Chinese parsing, the core values of the determiners are copied as “mdr” values in the noun proplets.

For example: “这男孩 (this boy)”

Lexical lookup:

```
sur : 这
pyn : zhe
noum : this
pym : nanhai
pyn : nanhai
cat : det
sem : sem :
fnc : fnc :
mdr : mdr :
```

Syntactic-semantic analysis:

```
sur : 这
pyn : zhe
noum : this
pyn : nanhai
pyn : nanhai
cat : det
sem : sem :
fnc : fnc :
mdr : mdr :
```

```
sur : 男孩
pyn : nanhai
noum : boy
pyn : nanhai
pyn : nanhai
cat : nr
sem : sem :
fnc : fnc :
mdr : mdr :
```

Derivation result:

```
sur : 男孩
pyn : nanhai
noum : boy
pyn : nanhai
pyn : nanhai
cat : nr
sem : sem :
fnc : fnc :
mdr : mdr :
```

The result contains only one proplet, i.e. “男孩 (nanhai, boy)”. The core value of the determiner, i.e. “this” is copied into the “mdr” slot.

“这 (zhe, this)” is very productive in combining with quantifiers. It can be followed by any quantifier, e.g. “个 (ge, GE)”, “种 (zhong, ZHONG)” “辆 (liang, LIANG)” and so on. This combination is often further used as an adnominal modifier.
For example: “这个男孩 (this boy)”. The combinations go as follows:

1. sur : 这 sur : 个
   pyn : zhe pyn : ge
   noun : this noun : GE
   cat : det q cat : nquan
   sem : +N
   fnc :
   mdr :

   The determiner proplet first absorbs the quantifier proplet according to the rule of “DET+N”. The “sur” values and the “pyn” values are combined as new values. The “cat” value in the ss proplet is replaced by “det-q”. The “sem” value from the nw proplet is copied to the ss proplet.

2. sur : 这 sur : 个
   pyn : zhe pyn : nanhai
   noun : this noun : boy
   cat : det-q cat : nr
   sem : +N
   fnc :
   mdr :

   In this step, the rule of DQ+N applies. The “det-q” proplet is finally absorbed by the nw proplet. The original “noun” value in the ss proplet is copied to the “mdr” slot. The result is a single proplet with the “cat” value of “nr”.

   Derivation result:

   sur : 男孩
   pyn : nanhai
   noun : boy
   cat : nr
   sem :
   fnc :
   mdr : this

   When “这 (zhe, this)” precedes a cardinal, the construction may not be complete. Either a quantifier or a noun will be expected. If it is a quantifier, the nw proplet is absorbed by the cardinal proplet. If it is a noun, the cardinal proplet is absorbed by the nw proplet.

   For example: “这三个 (these three)”

   The derivation of this phrase involves first the rule of DET+N, and then the rule of NUM+QUAN. The derivation result is:

   sur : 三个
   pyn : san|ge
   noun : three
   cat : cdn-q
   sem : +N
   fnc :
   mdr : this
CHAPTER 4. PRONOUNS

4.2. DEMONSTRATIVE PRONOUNS

This construction further functions as a modifier, for example: “这三个男孩 (these three boy)”. For the combination of “这三个” and “男孩”, the rule of NQ+NOUN applies, and the result is a single proplet with two “mdr” values of “this” and “three”.

Derivation result:

```
sur : 男孩
pyn : nanhai
noun : boy
cat : nr
sem :
fnc :
mdr : this three
```

The quantifier in such a construction is often omitted, especially when the cardinal is “一 (yi, one)”. For example, “这一男孩 (this boy)”. The derivation result is also a single noun proplet with two “mdr” values.

```
sur : 男孩
pyn : nanhai
noun : boy
cat : nr
sem :
fnc :
mdr : this one
```

“这些 (zhexie, these)” has been found 804 times as a determiner, but only in co-occurrence with a noun. For example: “这些书 (these books)”.

Lexical lookup:

```
sur : 这些
pyn : zhexie
noun : these
cat : det
sem :
fnc :
mdr : mdr :
sur : 书
pyn : shu
noun : book
cat : cn
sem : object
fnc :
mdr :
```

The syntactic-semantic analysis resembles that of “这男孩 (this boy)”. The derivation result is a single noun proplet with the “mdr” value of “these”:

```
sur : 书
pyn : shu
noun : book
cat : cn
sem : object
fnc :
mdr : these
```
“这样 (zheyang, so)” and “这么 (zheme, so)”, as determiners, form the basic pattern of “determiner + cardinal + quantifier + noun”. For example: “这样一个人 (such a person)”.

During the syntactic-semantic analysis, the determiner proplet, the cardinal proplet and the quantifier proplet are all absorbed, leaving merely the core values as the “mdr” values in the resulting single noun proplet.

Derivation result:

```
sur : 人
pyn : ren
noum: person
cat : nr
sem :
fnc :
mdr : such one
```
Chapter 5

Analysis of Nouns Modified by Adverbial Adjectives

In the traditional Chinese grammar, a noun can be modified by an adnominal ADJECTIVE, but not an adverbial ADJECTIVE, such as an adverb. However, nowadays, one of the most often discussed topics in Chinese studies is the collocation of adverbs and nouns, with the former as the modifiers and the latter as the modified. Nouns in such cases are used with either their referential meaning or their connotative meaning. When their connotative meaning is used, the adverbs are mostly those that usually intensify the meaning of adjectives or other adverbs, but do not modify common action verbs. Such adverbs are also called intensifiers. When other adverbs are used as modifiers of nouns, the referential meaning of the nouns applies.

Zhang (2000) says that many nouns can be modified by intensifiers to show their connotative meaning, such as proper nouns and common nouns referring to people or objects. Based on statistics, six kinds of nouns are more often observed in this structure: (1) noun for a certain group of people, e.g. “淑女 (shunv, lady)” and “男人 (nanren, man)”; (2) personal name, e.g. “阿 Q (a-q, Ah-Q)” and “葛朗台 (gelangtai, Grandet)”, which is well-known for a certain feature of the person it refers to; (3) name of a country or a location noun, e.g. “中国 (zhongguo, China)” and “西方 (xifang, West)”; (4) temporal noun, e.g. “现代 (xiandai, modern-times)” and “古代 (gudai, ancient-times)”; (5) abstract noun, e.g. “传统 (chuantong, tradition)” and “青春 (qingchun, youth)”; (6) noun for object, e.g. “铁 (tie, iron)” and “废物 (feiwu, waste)”.

To some degree, number 2 and number 6 depend on the trend of times and the knowledge of the conversation participants. Among the various intensifiers, “很 (hen, very)”, “非常 (feichang, very)”, “相当 (xiangdang, rather)”, “极 (ji, extremely)” and “挺 (ting, very)” are more often seen in this structure.

In case only the referential meaning of a noun is applied, the adverb is usually not an intensifier. The number of such adverbs is also limited. Here is a list of the adverbs found in the corpus:
5.1 A Syntactic View

CHAPTER 5. NOUNS MODIFIED

In both cases, this grammatic phenomenon of “adverb + noun”, exists and prospers in either oral or written Chinese with its advantage in the sense of rhetorical effect. We can have a look at it from the perspectives of grammar and semantics.

5.1 A Syntactic View

Seen from the perspective of syntax, adverbs modifying nouns create more freedom in sentence composition and gives nouns the syntactic function of adjectives.

5.1.1 Variety in Sentence Composition

Generally, nouns have referential meanings. But, when used in the structure of adverbs modifying nouns, they gain the function of predicates and the whole structure gets into the scheme of a sentence. For example:

1. “房间里书 (In the room, book...)”

   Lexical lookup:

   | surface: | 房间 | 里 | 书 |
   | pinyin: | fangjian | li | shu |
   | English: | room | inside | book |

   In 1, the noun “书 (shu, book)” is used independently from any modifier. It has only the referential meaning and cannot be seen as a predicate. Therefore, the meaning of the whole sequence is unclear. In other words, it is not a complete sentence. In 2, “书 (shu, book)” is modified by the adverb “净 (jing, only)”. The referential meaning is changed into connotative meaning, making the noun “书 (shu, book)” a predicate and the whole sentence complete with the meaning of “There are only books in the room”. In the analysis of 2 as a sentence, an additional value of “nv (nominal verb)” is copied into the “sem” slot in the proplet of “书 (shu, book)”.

Example 23. 房间里净书。(There are only books in the room.)

Lexical lookup:

| surface: | 又 | 再 | 才 | 共 | 都 | 净 | 光 | 最 | 顶 |
| pinyin: | you | zai | cai | gong | dou | jing | guang | zui | ding |
| English: | again | again | just | altogether | all | only | merely | most | top |
CHAPTER 5. NOUNS MODIFIED

5.1. A SYNTACTIC VIEW

The syntactic-semantic analysis of “房间里净书。”

1. In step 1, the rule of AN+N is activated when the second word is read in. An “arg” attribute is created and the “noun” value in the ss proplet becomes its value. The whole combination results in one “adj” proplet of “里 (li, inside)” with the “cat” value of “lcp”, which means “localizer phrase”. A localizer phrase only functions as a modifier. That is why the core value of “里 (li, inside)” is changed from “noun” to “adj”.

2. In step 2, an adverb is read in and simply copied into output.

3. In step 3, the noun predicate is read in. The rule of S+NV is activated. The adverb proplet, i.e. the second ss proplet, is absorbed. After the “adj” value is copied to the “mdr” slot, the “sur”, “pyn” and “cat” values are replaced by those from the nw proplet. The core attribute of “adj” is changed into “noun” and the value from the nw proplet is provided. The “sem” valued is replaced.
by a new value of “nv”. The “adj” value in the first ss proplet is copied to the “mdr” slot in the second ss proplet and the “noun” value in the second ss proplet is copied as the “mdd” value in the first.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

Example 24. 他更阿Ｑ. (He is more Ah-Q.)

“阿 Q(a-q, Ah-Q)” is originally a character in Xun Lu’s books, well-known for being optimistic and self-mockery. It is now often quoted to refer to a person who has similar characteristics or shows a similar attitude in a certain situation. The proper noun “阿 Q(a-q, Ah-Q)” can also be used independently, like “他阿 Q (He Ah-Q)”, but pragmatically, it is not enough to provide such a simple description. In the above example sentence, the adverb “更 (geng, more)” modifies the proper noun “阿 Q(a-q, Ah-Q)”. The whole sequence becomes a sentence with a complete meaning.
of “He has more similarity with Ah-Q”. In this sentence, the proper noun functions as a predicador, creating a rhetorical effect. The syntactic-semantic analysis is as follows:

1. 
```
  sur : 他
  pyn : ta  pyn : geng
  noun : he  adj : more
  cat : pro  cat : adv
  sem : s3  sem : +N
  fnc : mdd.
  mdr : 
```

In step 1, the adverb is read in and simply copied into output.

2. 
```
  sur : 他
  pyn : ta  pyn : geng
  noun : he  adj : more
  cat : pro  cat : adv
  sem : s3  sem : +N
  fnc : mdd.
  mdr : 
```

In step 2, the proper noun is read in and the rule of S+NV is activated. The adverb proplet is absorbed, but its “adj” value becomes a “mdr” value. The “noun” value in the proper noun proplet is copied as the “fnc” value in the first ss proplet. Accordingly, the “noun” value in the first ss proplet is copied to the “arg” slot in the proper noun proplet. The value of “nv” is copied to the “sem” slot of the proper noun proplet. Besides, an additional value of “rhetorical” is also copied to it.

3. 
```
  sur : 他
  pyn : ta  pyn : geng
  noun : he  noun : A-Q
  cat : pro  cat : nm
  sem : s3  sem : rhetorical
  fnc : A-Q  arg : he
  mdr : mdr : more
```

When the full stop is read in, the analysis comes to the end.

Derivation result:
The SRG and the signature presentation:

a) A-Q  b) N

\[
\begin{array}{c}
\text{he} \\
N
\end{array}
\]

Actually, in the above two cases and other cases similar to these, the Chinese link verb “像 (xiang, like)” or “是 (shi, be)” can be added to make the sentences more complete in a grammatical sense. Then, the first sample sentence becomes:

“房间里 -净 -是 -书 (There are only books in the room.)”

<table>
<thead>
<tr>
<th>surface:</th>
<th>房间</th>
<th>里</th>
<th>净</th>
<th>是</th>
<th>书</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>fangjian</td>
<td>li</td>
<td>jing</td>
<td>shi</td>
<td>shu</td>
</tr>
<tr>
<td>English:</td>
<td>room inside only be book</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

and the second sample sentence becomes:

“他更 -像 -阿 Q (He is more like Ah-Q)”

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>更</th>
<th>像</th>
<th>阿</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>geng</td>
<td>xiang</td>
<td>a-q</td>
<td></td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>more</td>
<td>be like</td>
<td>Ah-Q</td>
<td></td>
</tr>
</tbody>
</table>

However, based on the descriptive principle of language analysis, the short sentences are not extended to their complete forms before the syntactic-semantic analysis.

Moreover, it is not rare to see nouns used as predicates. The above construction of adverbs modifying nouns should not be taken as contradictory to the fact that sometimes nouns function as predicates without adverb modifiers. For example:

**Example 25.** 明天星期六。(Tomorrow is Saturday.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>明天</th>
<th>星期六</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>mingtian</td>
<td>xingqiliu</td>
</tr>
<tr>
<td>English:</td>
<td>tomorrow</td>
<td>Saturday</td>
</tr>
</tbody>
</table>

**Example 26.** 李明上海人。(Ming Li is from Shanghai.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>李明</th>
<th>上海</th>
<th>人</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>liming</td>
<td>shanghai</td>
<td>ren</td>
</tr>
<tr>
<td>English:</td>
<td>Ming Li</td>
<td>Shanghai</td>
<td>person</td>
</tr>
</tbody>
</table>

In the sentence of “明天星期六”, a temporal noun is followed by another temporal noun. The construction is used for explaining the date and the subject is usually limited to “明天 (mingtian, tomorrow)”, “昨天 (zuotian, yesterday)”, “后天 (houtian, the day after tomorrow)”, “前天
(qiantian, the day before yesterday), etc. The predicate temporal noun is limited to a weekday, weekend, festival or specific date.

The derivation result of “明天星期六。”

<table>
<thead>
<tr>
<th>sur</th>
<th>明天</th>
<th>sur</th>
<th>星期六</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>mingtian</td>
<td>pyn</td>
<td>xingqiliu</td>
</tr>
<tr>
<td>noun:</td>
<td>tomorrow</td>
<td>noun:</td>
<td>Saturday</td>
</tr>
<tr>
<td>cat</td>
<td>nt</td>
<td>cat</td>
<td>nt mark</td>
</tr>
<tr>
<td>sem</td>
<td></td>
<td>sem</td>
<td>nv</td>
</tr>
<tr>
<td>fnc</td>
<td>Saturday</td>
<td>arg</td>
<td>tomorrow</td>
</tr>
<tr>
<td>mdr</td>
<td></td>
<td>mdr</td>
<td></td>
</tr>
<tr>
<td>mdd</td>
<td></td>
<td>mdd</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) Saturday  b) N
tomorrow N

In the sentence of “李明上海人”，a person’s name is followed by a city’s name and then the special word of “人 (ren, person)”. In English, the suffix “-ese” is usually attached to a country’s name to indicate the person/people of the country, e.g. China-Chinese, Japan-Japanese. In Chinese, the common noun “人 (ren, person)” will come immediately after the country’s name to form a noun phrase, e.g. “中国-中国人”. It also comes after a city’s name, e.g. “上海-上海人”. Within such phrases, “人 (ren, person)” is the key word, the country’s or city’s name is the modifier. Therefore, for the combination of “李明 (liming, Ming-Li)” and “上海 (shanghai, Shanghai)”, there is only one rule operation: copy(nw) (copy the nw proplet into output). When it comes to next step, the syntactic-semantic relation becomes clear.

The syntactic-semantic analysis of “李明上海人。”

1. | sur | 李明 | sur | 上海 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>liming</td>
<td>pyn</td>
<td>shanghai</td>
</tr>
<tr>
<td>noun:</td>
<td>MingLi</td>
<td>noun:</td>
<td>Shanghai</td>
</tr>
<tr>
<td>cat</td>
<td>nm</td>
<td>cat</td>
<td>nd</td>
</tr>
<tr>
<td>sem</td>
<td></td>
<td>sem</td>
<td></td>
</tr>
<tr>
<td>fnc</td>
<td></td>
<td>fnc</td>
<td></td>
</tr>
<tr>
<td>mdr</td>
<td></td>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>

2. | sur | 李明 | sur | 上海 | sur | 人 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>liming</td>
<td>pyn</td>
<td>shanghai</td>
<td>pyn</td>
<td>ren</td>
</tr>
<tr>
<td>noun:</td>
<td>MingLi</td>
<td>noun:</td>
<td>Shanghai</td>
<td>noun:</td>
<td>person</td>
</tr>
<tr>
<td>cat</td>
<td>nm</td>
<td>cat</td>
<td>nd</td>
<td>cat</td>
<td>nr</td>
</tr>
<tr>
<td>sem</td>
<td></td>
<td>sem</td>
<td></td>
<td>sem</td>
<td>@</td>
</tr>
<tr>
<td>fnc</td>
<td></td>
<td>fnc</td>
<td></td>
<td>fnc</td>
<td>@</td>
</tr>
<tr>
<td>mdr</td>
<td></td>
<td>mdr</td>
<td></td>
<td>mdr</td>
<td>@</td>
</tr>
</tbody>
</table>

“人 (ren, person)” is the functor and “李明 (liming, Ming-Li)” is the argument. The core values
5.1. A SYNTACTIC VIEW

are copied into related slots. The modifier-modified relation between “上海 (shanghai, Shanghai)” and “人 (ren, person)” is also represented.

The derivation result of “李明上海人。”

The SRG and the signature presentation:

a) person b) N

MingLi Shanghai N N

The above two cases of nouns as predicates may also have adverbs as modifiers. But these adverbs usually do not emphasize on degree, but frequency, possibility, etc. The nouns are still used with their referential meaning. For example:

Example 27. 明天又星期六。 (It is again Saturday tomorrow.)

<table>
<thead>
<tr>
<th>surface: 明天 又 星期六</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin: mingtian you xingqiliu</td>
</tr>
<tr>
<td>English: tomorrow again Saturday</td>
</tr>
</tbody>
</table>

During the syntactic-semantic analysis, the adverb is again absorbed. The “adj” value is copied to the “mdr” slot in the noun predicate proplet.

Derivation result:

The SRG and the signature presentation:

a) Saturday b) N

tomorrow N
Example 28. 李明大概上海人。（Ming Li is probably from Shanghai.）

| surface: | 李明 | 大概 | 上海 | 人 |
| pinyin: | liming | dagai | shanghai | ren |
| English: | Ming Li | probably | Shanghai | person |

The derivation result of “李明大概上海人。”

| sur : 李明 | sur : 人 | sur : 上海 |
| pyn : liming | pyn : ren | pyn : shanghai |
| noun: MingLi | noun: person | noun: Shanghai |
| cat : nm | cat : nr mark | cat : nd |
| sem : | sem : nv | sem : |
| fnc : person | fnc : | |
| mdr : | mdr : probably Shanghai | mdr : |
| mdd : | mdd : person | |

The SRG and the signature presentation:

a) person

\[ \begin{array}{ccc}
   & | & \\
   MingLiShanghai & N & N \\
\end{array} \]

Example 25-28 are grammatical sentences with clear meanings. The difference between Example 25/26 and Example 27/28 lies in that Example 25/26 are static statements while Example 27/28 are subjective appraisal, which shows the speaker’s feelings about or attitude towards the statement. In Example 25/26 the predicate noun describes the concrete features of the subject. In Example 27/28, the adverb varies according to the attitude of the speaker. For example: “明天又星期六。” The adverb “又 (you, again)” shows that the speaker thinks time runs too fast. If we change the adverb to “才 (cai, just)”, then it indicates that the speaker feels time is too slow. In Example 26, a simple static statement is presented, while in Example 28, the adverb “大概 (dagai, probably)” creates a sense of uncertainty. Obviously, the structure of an adverb modifying a noun does not only present a new sentence pattern but more semantic or pragmatic information.

5.1.2 Noun as Adjective

Another rhetorical effect of adverbs modifying nouns lies in that the nouns function as adjectives. From the grammatical view, the nouns modified by adverbs have the complete function of adjectives. From the view of semantics, the meaning of the nouns equals to that of corresponding adjectives.

For example:

Example 29. 我有油。（I have oil.）

| surface: | 我 | 有 | 油 |
| pinyin: | wo | you | you |
| English: | I | have | oil |
Example 30. 他太油。(He is too oily. /He is a really sleazy person.)

| surface: 他 太 油  |
| pinyin: ta tai you  |
| English: he too oil  |

Example 31. 我喜欢艺术。(I like art.)

| surface: 我 喜欢 艺术 |
| pinyin: wo xihuan yishu |
| English: I like art |

Example 32. 这件衣服挺艺术。(This coat is very artistic.)

| surface: 这 件 衣服 挺 艺术 |
| pinyin: zhe jian yifu ting yishu |
| English: this piece coat very art |

Example 33. 他有本事。(He has the ability.)

| surface: 他 有 本事 |
| pinyin: ta you benshi |
| English: he have ability |

Example 34. 他真本事。(He is really capable.)

| surface: 他 真 本事 |
| pinyin: ta zhen benshi |
| English: he really ability |

In the above three groups, the words “油 (you, oil)”, “艺术 (yishu, art)” and “本事 (benshi, ability)” in all the above examples are nouns. But their semantic meanings are much different. In Example 29/31/33, the three words all refer to some specific things, while in Example 30/32/34, the nouns are used to describe the features that the referred have. This means nouns’ function changes with the adverb modifiers. The derivation result of the two sentences in each group is accordingly different.
The derivation result of “我有油。”

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun:</th>
<th>cat:</th>
<th>sem:</th>
<th>fnc:</th>
<th>mdr:</th>
</tr>
</thead>
<tbody>
<tr>
<td>我</td>
<td>有</td>
<td>I</td>
<td>tv</td>
<td>s1</td>
<td>have</td>
<td>mdr:</td>
</tr>
<tr>
<td>有</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mdr:</td>
</tr>
<tr>
<td>油</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mdr:</td>
</tr>
</tbody>
</table>

There are three proplets in the result, namely “我 (wo, I)” , “有 (you, have)” and “油 (you, oil)”.
The first and the third are the two arguments and the second is the functor.

The SRG and the signature presentation:

The derivation result of “他太油。”

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun:</th>
<th>cat:</th>
<th>sem:</th>
<th>fnc:</th>
<th>mdr:</th>
</tr>
</thead>
<tbody>
<tr>
<td>他</td>
<td>油</td>
<td>he</td>
<td>cn</td>
<td>s3</td>
<td>oil</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

Only two proplets are left in the output, with the first being the argument and the second being
the functor. Two additional values, “rhetorical” and “nv” are copied to the “sem” slot in the
functor proplet. The adverb “太 (tai, too)” is absorbed and presented as the “mdr” value in the
functor proplet.

The SRG and the signature presentation:

The derivation result of “我喜欢艺术。”

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun:</th>
<th>cat:</th>
<th>sem:</th>
<th>fnc:</th>
<th>mdr:</th>
</tr>
</thead>
<tbody>
<tr>
<td>我</td>
<td>喜欢</td>
<td>I</td>
<td>tv</td>
<td>sl</td>
<td>like</td>
<td>mdr:</td>
</tr>
<tr>
<td>艺术</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mdr:</td>
</tr>
</tbody>
</table>
Again, in this result are three proplets: the proplets of two arguments and one of the functor.

The SRG and the signature presentation:

\[
\begin{array}{ccc}
\text{a)} & \text{like} & \text{b)} \\
I & \text{art} & N \\
clothes & N & N
\end{array}
\]

The derivation result of “这件衣服挺艺术。”

<table>
<thead>
<tr>
<th>sur</th>
<th>衣服</th>
<th>sur</th>
<th>艺术</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>yifu</td>
<td>pyn</td>
<td>yishu</td>
</tr>
<tr>
<td>noun</td>
<td>clothes</td>
<td>noun</td>
<td>art</td>
</tr>
<tr>
<td>cat</td>
<td>cn</td>
<td>cat</td>
<td>cn mark</td>
</tr>
<tr>
<td>sem</td>
<td>object</td>
<td>sem</td>
<td>abstract rhetorical n</td>
</tr>
<tr>
<td>fnc</td>
<td>art</td>
<td>arg</td>
<td>clothes</td>
</tr>
<tr>
<td>mdr</td>
<td>this</td>
<td>mdr</td>
<td>very</td>
</tr>
</tbody>
</table>

There are only two proplets left in the result. The first one represents the phrase of “这件衣服”。As a determiner-quantifier-noun structure, the determiner and the quantifier are both absorbed and presented as the “mdr” value in the proplet of “衣服 (yifu, clothes)”. The adverb “挺 (ting, very)” is also absorbed and presented as the “mdr” value in the “nv” proplet, i.e. “艺术 (yishu, art)”.

The SRG and the signature presentation:

\[
\begin{array}{ccc}
\text{a)} & \text{art} & \text{b)} \\
& clothes & N \\
& N & N
\end{array}
\]

The derivation result of “他有本事。”

<table>
<thead>
<tr>
<th>sur</th>
<th>他</th>
<th>sur</th>
<th>有</th>
<th>sur</th>
<th>本事</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>ta</td>
<td>pyn</td>
<td>you</td>
<td>pyn</td>
<td>benshi</td>
</tr>
<tr>
<td>noun</td>
<td>he</td>
<td>verb</td>
<td>have</td>
<td>noun</td>
<td>ability</td>
</tr>
<tr>
<td>cat</td>
<td>pro</td>
<td>cat</td>
<td>tv mark</td>
<td>cat</td>
<td>cn</td>
</tr>
<tr>
<td>sem</td>
<td>s3</td>
<td>sem</td>
<td>non-action</td>
<td>sem</td>
<td>abstract</td>
</tr>
<tr>
<td>fnc</td>
<td>have</td>
<td>arg</td>
<td>he ability</td>
<td>fnc</td>
<td>have</td>
</tr>
<tr>
<td>mdr</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Though the noun used in this example is an abstract noun, the structure of the sentence is similar to “我有油。” The final result also contains three proplets.

The SRG and the signature presentation:

\[
\begin{array}{ccc}
\text{a)} & \text{have} & \text{b)} \\
& he & \text{ability} \\
& & N \\
& & N
\end{array}
\]
The derivation result of “他真本事。”

Again, the adverb “真 (zhen, really)” is absorbed and presented as the “mdr” value. Two additional values, “rhetorical” and “nv” are copied to the “sem” slot in the functor proplet.

The SRG and the signature presentation:

a)  ability    b)  N
    he          N

In practice, most frequently used adverbs in this kind of structure are adverbs of degree, such as “很 (hen, very)”,”特 (te, very)” and “绝对 (juedui, absolutely)” etc., which are also called intensifiers. Take “特 (te, very)” as an example.

Example 35. 她的思想特传统。(Her thinking is very traditional.)

<table>
<thead>
<tr>
<th>surface</th>
<th>她 的 思想 特 传统</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta de sixiang te chuantong</td>
</tr>
<tr>
<td>English</td>
<td>she - thinking very tradition</td>
</tr>
</tbody>
</table>

Example 36. 她特淑女。(She is a lady.)

<table>
<thead>
<tr>
<th>surface</th>
<th>她 特 淑女</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta te shunv</td>
</tr>
<tr>
<td>English</td>
<td>she very lady</td>
</tr>
</tbody>
</table>

Example 37. 这个人特青春。(She is very vigorous.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这 个 人 特 青春</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zhe ge ren te qingchun</td>
</tr>
<tr>
<td>English</td>
<td>this - person very youth</td>
</tr>
</tbody>
</table>

Some linguists argue that nouns are used as adjectives in this kind of structures (Diao, 2001). Others think that it is a shift of part of speech (Zhu & Liu, 1997). Hu [1998] argues that it belongs to a special rhetoric. Anyway, modified by adverbs, the nouns are no longer names. They
represent some typical characteristics or status that are related to the originally referred. These nouns are used similarly with adjectives. In this sense, the structure of an adverb modifying a noun is not restricted to the application of predicates. The structure as a whole may also be used as an adnominal or adverbial modifier. For example:

**Example 38.** 他特绅士地打开了门。(He opened the door like a gentleman.)

| surface: | 他特绅士地打开了门 |
| pinyin: | ta te shengshi de dakai le men |
| English: | he very gentleman - open - door |

In this example, the structure of an adverb modifying a noun is used as an adverbial, marked by the particle “地 (de, DE)”. The modified is the verb “打开 (dakai, open)”. In other words, the structure of an adverb modifying a noun is applied to show the manner of the action. Since the front part of the sentence “他特绅士” is possible to be a complete proposition if it continues with a full stop, the derivation result up to this level is similar to a noun used as a predicate.

Lexical lookup:


The syntactic-semantic analysis:

   noun: he adj: very noun: gentleman
   cat: pro cat: adv cat: nr
   sem: s3 sem: +N sem:
   fnc: mdd:

Up to this step, the derivation process is the same with the case that a noun functions as the predicator. The core value from the nw proplet is copied to the “fnc” slot in the first ss proplet,
and the core value from the first ss proplet is copied as the “arg” value in the resulting “nv” proplet. The adverb proplet is absorbed.

3.

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 绅士</th>
<th>sur : 地</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : shengshi</td>
<td>pyn : de</td>
</tr>
<tr>
<td>noun : he</td>
<td>noun : gentleman</td>
<td>adj : De</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : nr</td>
<td>cat : vnr</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem : rhetorical</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : gentleman</td>
<td>arg : he</td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr : very</td>
<td></td>
</tr>
</tbody>
</table>

In step 3, the structure marker “地 (de, DE)” comes with the information that the noun “绅士 (shenshi, gentleman)” is not a predicator. The real predicate word is coming later. The combination “绅士” is in fact an adverbial of manner. Therefore, the “fnc” value in the first ss proplet, is replaced by “#”. The “arg” attribute in the proplet “绅士 (shenshi, gentleman)” is canceled. The value “nv” in the “sem” slot is also removed. An additional temporary value “#” is copied to the “mdd” slot in the proplet “绅士 (shenshi, gentleman)”.

4.

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 绅士</th>
<th>sur : 打开</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : shengshi</td>
<td>pyn : kai</td>
</tr>
<tr>
<td>noun : he</td>
<td>noun : gentleman</td>
<td>verb : open</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : nr</td>
<td>cat : tv</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem : rhetorical</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : #</td>
<td>mdr : very</td>
<td>arg :</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdd :</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

In this step, the real predicate word, a verb, is read in. The temporary value “#” is replaced by the “verb” value in the nw proplet one after another. The “noun” value in the first ss proplet is copied as the first “arg” value in the nw proplet, and the first “cat” value in the nw proplet, i.e. “s”, is accordingly canceled. The “noun” value in the second ss proplet, i.e. “绅士 (shenshi, gentleman)”, is copied to the “mdr” slot in the nw proplet. In return, the “verb” value is copied as the “mdd” value in the proplet “绅士 (shenshi, gentleman)”. The nw proplet is copied into output, waiting for continuation. When the full stop is read in, the analysis comes to the end.

The derivation result:

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : shengshi</td>
<td>pyn : kai</td>
<td>pyn : men</td>
</tr>
<tr>
<td>noun : he</td>
<td>noun : gentleman</td>
<td>verb : open</td>
<td>noun : door</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : nr</td>
<td>cat : tv</td>
<td>cat : cn</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem : rhetorical</td>
<td>sem : perf</td>
<td>sem : object patient</td>
</tr>
<tr>
<td>fnc : open</td>
<td>mdr : very</td>
<td>arg : he</td>
<td>fnc : open</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdd : open</td>
<td>mdr : gentleman</td>
<td>mdr :</td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:
It is also seen in the corpus that the structure of an adverb modifying a noun is used as a complement. “得 (de, DE)” is a typical complement marker. When the structure of an adverb modifying a noun comes after “得 (de, DE)”, it is clear that the core value of the key word in the following construction should be copied as the “mdr” value in the preceding predicate proplet.

For example:

**Example 39.** 他长得非常中国。(He looks very Chinese.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 长 得 非常 中国</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta zhang de feichang zhongguo</td>
</tr>
<tr>
<td>English</td>
<td>he look - very China</td>
</tr>
</tbody>
</table>

It is not possible to define how a Chinese looks like, but it is clear that a Chinese has some difference in his/her appearance from a German, a Japanese or an American. From the sentence, we cannot tell whether he is handsome, tall, or not. The only thing to do is to copy the “noun” value “China” into the “mdr” slot in the verb proplet to show the modifier-modified relation.

Lexical lookup:

The syntactic-semantic analysis:

1. The rule of S+V applies in this step.

2. The rule of S+V applies in this step.
CHAPTER 5. NOUNS MODIFIED

5.1. A SYNTACTIC VIEW

When the structure marker “得 (de, DE)” comes, a complement is expected. The temporary substitute value “#” is copied to the “mdr” slot of the verb proplet.

3.

sur : 他  sur : 长  sur : 非常
pyn : ta  pyn : zhang  pyn : feichang
noun: he  verb: look  adj : very
cat : pro  cat : iv  cat : adv
sem : s3 agent  sem :  sem : +N
fnc : look  arg : he  mdd:  
mdr : mdr: #

In this step, the adverb “非常” is read in and copied to output.

4.

sur : 他  sur : 长  sur : 非常  sur : 中国
pyn : ta  pyn : zhang  pyn : feichang  pyn : zhongguo
noun: he  verb: look  adj : very  noun: China
cat : pro  cat : iv  cat : adv  cat : nd
sem : s3 agent  sem :  sem : +N  sem : rhetorical
fnc : look  arg : he  mdd:  fnc :  
mdr : mdr:  mdr : China

In step 4, “中国 (zhongguo, China)” is read in. The adverb proplet is absorbed. The original “adj” value is copied to the “mdr” slot. The “noun” value of “中国 (zhongguo, China)” is copied as the “mdr” value in the verb proplet and accordingly the “verb” value in the verb proplet is copied as the “mdd” value in the proplet “中国 (zhongguo, China)”. The value of “rhetorical” is copied to the “sem” slot.

5.

sur : 他  sur : 长  sur : 中国  sur : 
pyn : ta  pyn : zhang  pyn : zhongguo  pyn : zhongguo
noun: he  verb: look  noun: China  cat : mark
cat : pro  cat : iv  cat : nd
sem : s3 agent  sem :  sem : rhetorical
fnc : look  arg : he  mdr : very  
mdr : mdr: China

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:
5.2 A Semantic View

From the perspective of semantics, the structure of adverbs modifying nouns enriches semantic expressions. In real communication, we often meet difficulties to find the right adjectives to describe the characteristics or features of something. For example: “他长得非常中国。(He looks very Chinese.)” The noun “中国 (zhongguo, China)” used here is quite impressive by leaving much room for imagination.

Besides filling up the gap of semantic expression, the structure of an adverb modifying a noun represents the flexibility and fuzzy beauty of the language. Because of the extensive implication of nouns, the structure of an adverb modifying a noun has its semantic uncertainty. Generally speaking, adjectives and verbs have abstract meanings while the corresponding nouns enable the readers or listeners to create a concrete view of the referred to. The structure of an adverb modifying a noun provide a more vivid description of the features or characteristics that the referred persons or things have.

For example:

Example 40. 她的穿戴很时髦。(Her clothes are fashionable.)

| surface: 她 的 穿戴 很 时髦 | pinyin: ta de chuandai hen shimao | English: she - clothes very fashionable |

Example 41. 她的穿戴特香港。(Her clothes are fashionable.)

| surface: 她 的 穿戴 特 香港 | pinyin: ta de chuandai te xianggang | English: she - clothes very Hongkong |

Example 42. 他是一个很吝啬的人。(He is very mean.)

| surface: 他 是 一个 很 吝啬 的 人 | pinyin: ta shi yi ge hen linse de ren | English: he be one - very mean - person |

Example 43. 他是一个特葛朗台的人。(He is very mean, like Grandet.)
Though the meaning of Example 40&41, 42&43, is similar, the rhetoric effects are quite different. "时髦 (shimao, fashionable)" is an adjective to describe the feature of clothes. However, "香港 (xianggang, HongKong)" is more vivid and imaginable, since it is well-known that Hong-Kong is a city of fashion. "葛朗台 (gelangtai, Grandet)" is a figure in Balzac’s works, known as an extremely selfish and mean person. The adjective "吝啬 (linse, mean)" will never reach the rhetoric effect of the noun "葛朗台 (gelangtai, Grandet)". Their derivation result reflects the difference in the deep structure.

The derivation result of “她的穿戴很时髦。”

The SRG and the signature presentation:

```
a) fashionable       b) A
   /       /
  clothing  N
 /       /
she  N
```

The derivation result of “她的穿戴香港。”

The SRG and the signature presentation:

```
a) HongKang  b) N
   /       /
  clothing  N
 /       /
she  N
```
The derivation result of “他是一个很吝啬的人。”

```plaintext
| pyn  : ta      | pyn  : shi     | pyn  : ren   | pyn  : linse     |
| noun: he      | verb: be       | noun: person | adj : mean       |
| cat  : pro    | cat  : vx mark | cat  : nr    | cat  : adj       |
| sem  : s3 theme | sem :        | sem :        | sem :          |
| fnc  : be     | arg : he person| fnc : be     | mdr : very      |
| mdr  :        | mdr : one mean | mdd :        | mdd :          |
| mdd : #      |                   |               |               |
```

The SRG and the signature presentation:

```
\[ \text{he} \rightarrow \text{person} \quad \text{N} \quad \text{N} \]
```

The derivation result of “他是一个特别葛朗台的人。”

```plaintext
| pyn  : ta      | pyn  : shi     | pyn  : ren   | pyn  : gelangtai   |
| noun: he      | verb: be       | noun: person | noun: Grandet     |
| cat  : pro    | cat  : vx mark | cat  : nr    | cat  : nm         |
| sem  : s3 theme | sem :        | sem :        | sem : rhetorical   |
| fnc  : be     | arg : he person| fnc : be     | mdr : very       |
| mdr  :        | mdr : one Grandet| mdd :        | mdd :          |
| mdd : #      |                   |               |               |
```

The SRG and the signature presentation:

```
\[ \text{he} \rightarrow \text{person} \quad \text{N} \quad \text{N} \]
```

All in all, the structure of an adverb modifying a noun, first, fills up the gap of expression; secondly, creates imagination; thirdly, changes the abstract to concrete. It also helps to gain the effect of emphasis, exaggeration and light humor. It shows the combination flexibility of Chinese, as well as the variety and distinctiveness of Chinese expressions. The creativity and innovation of language usage is also presented. Nouns in this structure are treated like adjectives. It is out of the principle of analyzing Chinese as it is in practice. From the syntactic relationship, as presented by attribute values, this special structure can be traced and the original distinctiveness is maintained to the largest extent. In respect to the semantic meaning, an additional value of “rhetorical” is appended when a proper noun, an abstract common noun or a noun referring to a certain group of people is modified by an adverb of degree. From the signature presentation, the semantic relations of N/N and N|N are proved available in Chinese.
Chapter 6

Analysis of Nouns in Subject or Object Positions

Nouns are often used as subjects and objects. In Chinese, a noun may also start a sentence and be followed by a main verb. The superficial pattern is similar to that of subject-predicate, but it does not mean that the noun is the logical subject. It may turn out to be an adverbial. The sentence may be one with an omitted subject, or a special “有 (you, there-be)” construction.

In the regular basic structure of S+V+O, nouns are most frequently seen as subjects and objects. For example:

Example 44. 人们欢迎李明。(People welcome Ming Li.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>人</th>
<th>们</th>
<th>欢迎</th>
<th>李明</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ren</td>
<td>men</td>
<td>huanying</td>
<td>liming</td>
</tr>
<tr>
<td>English:</td>
<td>person</td>
<td>-</td>
<td>welcome</td>
<td>Ming Li</td>
</tr>
</tbody>
</table>

In this example, “人 (ren, person)”, followed by a plural marker, is the subject. The proper noun “李明 (liming, Ming-Li)” is the object.

The derivation result of “人们欢迎李明。(People welcome Ming Li.)”

The SRG and the signature presentation:
Example 45. 我不同意你的意见。（I don’t agree to your opinion.）

| surface | 我 不 同意 你 的 意见 |
| pinyin | wo bu tongyi ni de yijian |
| English | I not agree you - opinion |

In this example, the pronoun “我 (wo, I)” is the subject and “意见 (yijian, opinion)” is the object. The pronoun “你 (ni, you)”, followed by the particle “的 (de, DE)” modified the object.

The derivation result of “我不同意你的意见。（I don’t agree to your opinion.）”

The SRG and the signature presentation:

Besides sentential objects, nouns are also used after prepositions, forming preposition-object phrases. For example:

Example 46. 他从北京来。（He comes from Peking.）

| surface | 他 从 北京 来 |
| pinyin | ta cong beijing lai |
| English | he from Peking come |

“北京 (beijing, Peking)” is the name of the capital city of China. “从 (cong, from)” is a preposition. The preposition phrase “从北京” modifies the predicate verb “来 (lai, come)”.
The derivation result of “他从北京来。 (He comes from Peking.)”

\[
\begin{array}{c|c|c}
\text{sur : he} & \text{sur : from} & \text{sur :来} \\
\text{pyn : ta} & \text{pyn : cong} & \text{pyn : lai} \\
noun: he & adj : from & verb: come \\
cat : pro & cat : prep & cat : vq mark \\
sem : s3 agent & sem : & sem : spt \\
fnc : come & arg : Peking & arg : he \\
mdr : & mdr: come & mdr: from \\
\end{array}
\]

In the preposition proplet, the “arg” slot is filled by “Peking”, which presents the syntactic relation that “北京 (beijing, Peking)” is the object.

The SRG and the signature presentation:

\[
\begin{array}{c|c|c}
a) \quad \text{come} & \quad \text{he} & \quad \text{from} \\
b) \quad V & \quad N & \quad A
\end{array}
\]

Generally, the word order of a preposition and its object is the same in Chinese as in English. But a preposition phrase usually comes after a main verb in English. In Chinese, depending on prepositions, the word order may be different. The above sentence “他从北京来。” can serve as a good example. Here is another example.

Example 47. 我和老师讨论问题。(I discussed with the teacher.)

\[
\begin{array}{c|c|c|c|c|c}
surface: & \text{我} & \text{和} & \text{老师} & \text{讨论} & \text{问题} \\
pinyin: & wo & he & laoshi & taolun & wenti \\
English: & I & with & teacher & discuss & question \\
\end{array}
\]

“和 (he, with)” is a preposition. “老师 (laoshi, teacher)” is a common noun used as its object. This relation is presented as the “arg” slot in the preposition proplet is filled by the “noun” value from the proplet of “老师 (laoshi, teacher)”. The whole preposition phrase shows up before the predicate verb “讨论 (taolun, discuss)”, which does not happen in English.

Derivation result:

\[
\begin{array}{c|c|c|c}
\text{sur : 我} & \text{sur : 和} & \text{sur : 讨论} & \text{sur :问题} \\
\text{pyn : wo} & \text{pyn : he} & \text{pyn : taolun} & \text{pyn : wenti} \\
noun: I & adj : with & verb: discuss & noun: question \\
cat : pro & cat : prep & cat : tv mark & cat : cn \\
sem : s1 & sem : & sem : & sem : \\
fnc : discuss & arg : teacher & arg : I question & fnc : discuss \\
mdr : & mdr: discuss & mdr: with & mdr : \\
\end{array}
\]

The SRG and the signature presentation:

\[
\begin{array}{c|c|c}
a) \quad \text{discuss} & \quad \text{I} & \quad \text{with} \\
b) \quad V & \quad N & \quad A
\end{array}
\]
CHAPTER 6. NOUNS AS SO

The above examples are all about simple nouns without modifiers. When they are modified by numeral-quantifier phrases, the new construction of numeral-quantifier-noun serves as one element on a higher level of syntax.

Example 48. 她有一辆车。(She has a car.)

| surface: | 她 有 一 辆 车 |
| pinyin: | ta you yi liang che |
| English: | she have one car |

“一辆车 (a car)” functions as the object of the transitive verb “有 (you, have)”. In the numeral-quantifier-noun construction, “车 (che, car)” is the key word. Therefore, only the “noun” value of the “车 (che, car)” is copied as an argument of the verb. But the derivation process follows the time-linear order of LAG:

1. sur : 她 sur : 有
   pyn : ta pyn : you
   noun: she verb: have
cat : pro cat : p’ tv
sem : s3 - sem : non-action
fnc : 没 arg : she mdr : mdr:

   acopy(nw.verb SS.fnc)
   acopy(SS.noun nw.arg)
   cancel(nw.cat.1)

In step 1, the transitive verb “有 (you, have)” is read in and the rule of “S+V” is activated. The output becomes the sentence start for next step.

2. sur : 她 sur : 有 sur : 一
   pyn : ta pyn : you pyn : yi
   noun: she verb: have noun: one
cat : pro cat : p’ tv cat : cdn
sem : s3 - sem : non-action sem : non-action
fnc : have arg : she fnc : have mdr : mdr:

   acopy(nw.noun SS.arg)
   cancel(SS.cat.1)
   acopy(SS.verb nw.fnc)

In step 2, the cardinal “一 (yi, one)” is read in. The core value of “一 (yi, one)” is copied as the second “arg” value in the verb proplet. In return, the “verb” value is copied to the “fnc” slot in the cardinal proplet.

   pyn : ta pyn : you pyn : yi pyn : liang
   noun: she verb: have noun: one noun: LIANG
cat : pro cat : tv cat : cdn cat : nuan
sem : s3 - sem : non-action sem : non-action sem : +N
fnc : have arg : she fnc : have mdr : mdr:

   append(SS.sur nw.sur SS.sur)
   append(SS.pyn “yi” nw.pyn SS.pyn)
   append(SS.noun SS.arg)
   append(SS.verb SS.fnc)

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CHAPTER 6. NOUNS AS SO

The rule of NUM+QUAN is applied in step 3.

4.

In step 4, a variation of the rule of “NQ+NOUN” is activated. The “cdn-p” proplet is absorbed. The original “noun” value becomes the “mdr” value. The second “arg” value in the verb proplet is replaced by the “noun” value from the nw proplet.

5.

The derivation result of “她有一辆车。(She has a car.)”

The SRG and the signature presentation:

The numeral-quantifier-noun construction may also be used as a subject. For example:

Example 49. 两个人成了朋友。(The two persons became friends.)
The numeral-quantifier-noun construction “两个人” functions as the subject. According to the rule of NUM+QUAN and NQ+NOUN, the derivation result of the construction is a single proplet. The derivation result of “两个人成了朋友。 (The two persons became friends.)”

The SRG and the signature presentation:

The 6.1 Temporal Nouns

Temporal nouns are special in that they have both the common features of nouns and some similarities with adverbs.

Like other common nouns, temporal nouns can be modified by numerals or numeral-quantifier constructions, though there are some restrictions. Some temporal nouns, including “天 (tian, day),” “周 (zhou, week)” and “年 (nian, year),” can only be modified by numerals, e.g. “三天 (three days),” “三周 (three weeks),” “五年 (five years),” or “第三天 (the third day),” “第三周 (the third week),” “第五年 (the fifth year).” But other temporal nouns, including “月 (yue, month),” “星期 (xingqi, week),” “早晨 (zaochen, morning)”, “星期天 (xingqitian, Sunday)” etc. require the quantifier “个 (ge, GE).” For example: “三个早晨 (three mornings)” is acceptable; “三早晨” is not. “第三个早晨 (the third morning)” is acceptable; “第三早晨” is not.

6.1.1 Temporal Noun as Object

Temporal nouns can be used as objects of verbs.

Example 50. 我喜欢星期天。 (I like Sundays.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我</th>
<th>喜欢</th>
<th>星期天</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo</td>
<td>xihuan</td>
<td>xingqitian</td>
</tr>
<tr>
<td>English</td>
<td>I</td>
<td>like</td>
<td>Sunday</td>
</tr>
</tbody>
</table>

In this example, “星期天 (xingqitian, Sunday)” is the object. It is the second argument of the transitive verb “喜欢 (xihuan, like),” as presented in the second place in the “arg” slot of the verb proplet.
The derivation result of “我喜欢星期天。（I like Sundays.）”

<table>
<thead>
<tr>
<th>sur</th>
<th>我</th>
<th>sur</th>
<th>喜欢</th>
<th>sur</th>
<th>星期天</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>wo</td>
<td>pyn</td>
<td>xihuan</td>
<td>pyn</td>
<td>xingqitian</td>
</tr>
<tr>
<td>noun:</td>
<td>I</td>
<td>verb:</td>
<td>like</td>
<td>noun:</td>
<td>Sunday</td>
</tr>
<tr>
<td>cat:</td>
<td>pro</td>
<td>cat:</td>
<td>tv mark</td>
<td>cat:</td>
<td>at</td>
</tr>
<tr>
<td>sem:</td>
<td>sl agent</td>
<td>sem:</td>
<td>sem:</td>
<td>sem:</td>
<td></td>
</tr>
<tr>
<td>fnc:</td>
<td>like</td>
<td>arg:</td>
<td>I Sunday</td>
<td>fnc:</td>
<td>like</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) happen  
\[ I \ \ \ \ Sunday \ \ \ \ N \ \ \ \ N \]

Temporal noun can also be used as objects of prepositions.

**Example 51.** 这件事发生在星期天。（It happened on Sunday.）

<table>
<thead>
<tr>
<th>surface</th>
<th>这 件 事 发生 在 星期天</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>zhe jian shi fasheng zai xingqitian</td>
</tr>
<tr>
<td>English:</td>
<td>this - event happen on Sunday</td>
</tr>
</tbody>
</table>

In this example, “星期天 (xingqitian, Sunday)” is the object of the preposition “在 (zai, in-at-on)”. It is the only argument of the preposition.

The derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>事</th>
<th>sur</th>
<th>发生</th>
<th>sur</th>
<th>在</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>shi</td>
<td>pyn</td>
<td>fasheng</td>
<td>pyn</td>
<td>zai</td>
</tr>
<tr>
<td>noun:</td>
<td>event</td>
<td>verb:</td>
<td>happen</td>
<td>adj:</td>
<td>in-at-on</td>
</tr>
<tr>
<td>cat:</td>
<td>cn</td>
<td>cat:</td>
<td>iv mark</td>
<td>cat:</td>
<td>prep</td>
</tr>
<tr>
<td>sem:</td>
<td>sem:</td>
<td>sem:</td>
<td>sem: complement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fnc:</td>
<td>happen</td>
<td>arg:</td>
<td>event</td>
<td>arg:</td>
<td>Sunday</td>
</tr>
<tr>
<td>mdr:</td>
<td>this</td>
<td>mdr:</td>
<td>in-at-on</td>
<td>mdr:</td>
<td>happen</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) happen  
\[ \text{event} \ \ \ \ \text{in-at-on} \ \ \ \ \text{N} \ \ \ \ \text{A} \]

6.1.2 Temporal Noun as Attributive

Temporal nouns are also used as attributives. In this case, the structure auxiliary “的 (de, DE)” is required.

**Example 52.** 我喜欢星期天的早晨。（I like Sunday morning.）
In this example, the temporal noun “早晨 (zaochen, morning)” is the object, modified by another temporal noun “星期天 (xingqitian, Sunday)”.

Derivation result:

```
sur : 我
pyn : wo
noun: I

sur : 喜欢
pyn : xihuan
verb: like

sur : 星期天
pyn : xingqitian
noun: Sunday

sur : 早晨
pyn : zaochen
noun: morning
```

The SRG and the signature presentation:

```
a)  \ V  \\
I  \ morning \ N \ N \\
   \ Sunday \ N
```

6.1.3 Temporal Noun as Subject

To be subjects is another application of temporal nouns.

Example 53. 星期天是明天。(Sunday is tomorrow.)

In this example, “星期天 (xingqitian, Sunday)” is the subject. It is the first argument of the link verb “是 (shi, be)”.

Derivation result:

```
sur : 星期天
pyn : xingqitian
noun: Sunday

sur : 是
pyn : shi
verb: like

sur : 明天
pyn : mingtian
noun: tomorrow
```

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CHAPTER 6. NOUNS AS SO 6.1. TEMPORAL NOUNS

The SRG and the signature presentation:

a) tomorrow  b) N

Sunday  N

However, it does not mean that a temporal noun, in the position of a subject, is the logic subject
of the sentence.

6.1.4 Temporal Noun in Subject Position

Omission is not rare in Chinese. When it is taken as unimportant, the information can be omitted,
no matter it is a subject or any other element of the sentence. That is to say, it is not necessary
to keep the sentence structure complete, since the semantic meaning and relation plays a more
important role in Chinese. The following examples will help to explain it.

Example 54. 星期天异常寒冷。（It was unusually cold on Sunday.）

<table>
<thead>
<tr>
<th>surface</th>
<th>星期天</th>
<th>异常</th>
<th>寒冷</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>xingqitian</td>
<td>yichang</td>
<td>hanleng</td>
</tr>
<tr>
<td>English</td>
<td>Sunday</td>
<td>unusually</td>
<td>cold</td>
</tr>
</tbody>
</table>

In this example, the logical subject is “天气 (tianqi, weather)”, but it is missing. When the logic
subject “天气 (tianqi, weather)” is omitted, the sentence is still understood and well accepted
in Chinese. It is because only the “weather” can be cold, not “Sunday”. In this case, “星期天
(xingqitian, Sunday)”, though in the position of a subject, is in fact a temporal adverbial. In deep
structure, the example is a sentence without a subject.

Lexical lookup:

Syntactic-semantic analysis:

1. | sur | 星期天 | sur | 异常 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>xingqitian</td>
<td>pinyin</td>
<td>yichang</td>
</tr>
<tr>
<td>noun: Sunday</td>
<td>adj: unusually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cat : nt</td>
<td>cat : adv</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sem :</td>
<td>sem :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fnc : mdd:</td>
<td>mdd:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdd :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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In step 1, the nw proplet “异常 (yichang, unusually)” is read in. The rule of “N+ADJ” is activated and the nw proplet is copied to output.

In step 2, the adjective is read in. A variation of the rule of ADJ+ADJ is activated. The nw proplet absorbs the preceding adverb proplet. The original “adj” value becomes the “mdr” value. The “noun” value of “星期天 (xingqitian, Sunday)” is copied as the second “mdr” value into the adjective proplet. Accordingly, the “adj” value from the proplet “寒冷 (hanleng, cold)” is copied as the “mdd” value into the noun proplet. An additional value “adverbial” is given to the “sem” attribute. Since the logic subject is missing, a substitute value “#” is copied into the “arg” slot in the adjective proplet. An additional value “av” is copied to its “sem” slot.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

Example 55. 星期天去上海了。（X went to Shanghai on Sunday.）
In this example, “星期天 (xingqiitian, Sunday)” is again in the position of a subject, but as a day, “星期天 (xingqiitian, Sunday)” can go nowhere. It cannot be the agent of the verb “去 (qu, go)”. The logic subject must be a person, e.g. “我 (wo, I), “她 (ta, she), “李明 (liming, Ming-Li)”, or anyone else. If the subject is “我 (wo, I)”, then the complete sentence is:

“星期天我去上海了。（I went to Shanghai on Sunday.）”

It can be assumed that, based on the context, both the hearer and the speaker know clearly who is the subject. They think it is not necessary to clarify it. So, the example sentence (b) is again a sentence without a subject in its deep structure.

Lexical lookup of “星期天去上海了。”

Syntactic-semantic analysis:

In this step, the verb “去 (qu, go)” is read in. In Chinese, the subject is usually expected to come before the predicate word if it is a complete sentence. In this example, the appearance of the verb “去” indicates that it must be a sentence with a missing subject. Therefore, a substitute value “#” is copied to the “arg” slot in the verb proplet. The first “cat” value is accordingly canceled. The temporal noun in the sentence start is the modifier. The “noun” value is copied as the “mdr” value in the verb proplet. In return, the “verb” valued is copied to the “mdd” slot in the noun proplet.
6.2 Location Nouns

This group of nouns indicate the relations regarding direction or location. Common nouns for places are excluded, such as “车站 (chezhan, station)”, “机场 (jichang, airport)”, “学校 (xuezhao, school)”, “图书馆 (tushuguan, library)”, etc. The most frequently used simple nouns for direction and location, or location nouns for short, include:

<table>
<thead>
<tr>
<th>Surface</th>
<th>Pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>东 阳 西 北 上 下 左 右</td>
<td>dong nan xi bei shang xia zuo you</td>
<td>east south west north upside downside left right</td>
</tr>
<tr>
<td>前 后 内 外 里 中 间 旁</td>
<td>qian hou nei wai li zhong jian pang</td>
<td>front back inside outside inside middle in-between aside</td>
</tr>
</tbody>
</table>

Compound location nouns are mainly composed of simple nouns and one of the three morphemes: “边 (bian, side)”, “面 (mian, side)” and “头 (tou, end)”. Not every one in the above list can be combined with the three morphemes. In other words, the combination is not free. It follows some customs.

“头 (tou, end)” changes slightly the semantic meaning of simple nouns by emphasizing the end in the concerned direction. It can combine with 10 of the above simple nouns and form the following new words.

<table>
<thead>
<tr>
<th>Surface</th>
<th>Pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>东头 阳头 西头 北头 上头 下头 前头 后头 外头 里头</td>
<td>dongtou nantou xitou beitou shangtou xiatou qiantou houtou waitou litou</td>
<td>east south west north upside downside front back outside inside</td>
</tr>
</tbody>
</table>
“边 (bian, side)” and “面 (mian, side)” are more productive. They can combine with most of the simple nouns. Take “边 (bian, side)” as an example.

Table 6.3: Compound Nouns of Direction & Location 2

<table>
<thead>
<tr>
<th>surface:</th>
<th>东边</th>
<th>南边</th>
<th>西边</th>
<th>北边</th>
<th>上边</th>
<th>下边</th>
<th>左边</th>
<th>右边</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>dongbian</td>
<td>nanbian</td>
<td>xibian</td>
<td>beibian</td>
<td>shangbian</td>
<td>xiabian</td>
<td>zuobian</td>
<td>youbian</td>
</tr>
<tr>
<td>English:</td>
<td>east</td>
<td>south</td>
<td>west</td>
<td>north</td>
<td>upside</td>
<td>downside</td>
<td>left</td>
<td>right</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>surface:</th>
<th>前边</th>
<th>后边</th>
<th>外边</th>
<th>里边</th>
<th>旁边</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>qianbian</td>
<td>houbian</td>
<td>waibian</td>
<td>libian</td>
<td>pangbian</td>
</tr>
<tr>
<td>English:</td>
<td>front</td>
<td>back</td>
<td>outside</td>
<td>inside</td>
<td>aside</td>
</tr>
</tbody>
</table>

Two simple nouns with opposite meanings may also combine together to form a compound noun. For example:

Table 6.4: Compound Nouns of Direction & Location 3

<table>
<thead>
<tr>
<th>surface:</th>
<th>东西</th>
<th>南北</th>
<th>上下</th>
<th>左右</th>
<th>前后</th>
<th>内外</th>
<th>中间</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>dongxi</td>
<td>nanbei</td>
<td>shangxia</td>
<td>zuoyou</td>
<td>qianhou</td>
<td>neiwai</td>
<td>zhongjian</td>
</tr>
<tr>
<td>English:</td>
<td>east&amp;west</td>
<td>south&amp;north</td>
<td>up&amp;down</td>
<td>left&amp;right</td>
<td>front&amp;back</td>
<td>inside&amp;outside</td>
<td>middle</td>
</tr>
</tbody>
</table>

Besides the above, there are still a few more nouns for location, which cannot be grouped into any of the above pattern. But the number is rather limited, including “底下 (dixia, part-below)”, “跟前 (genqian, front)”, “面前 (mianqian, front)”, “当中 (dangzhong, middle)”, “附近 (fujin, neighborhood)”, “周围 (zhouwei, surroundings)”, etc.

Like other nouns, they can be used as subjects and objects. They can also be used as attributives, for which, the structure auxiliary “的 (de, DE)” is required.

6.2.1 Location Noun after Preposition

Location nouns are mostly seen in adverbial constructions. Sometimes they come after prepositions, such as “在 (zai, in-at-on)”, “到 (dao, to)”, “往 (wang, towards)”, forming preposition-object phrases to modify other elements in the same sentence.

Example 56. 李明住在前面。(Ming Li lives in front.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>李明</th>
<th>住</th>
<th>在</th>
<th>前面</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>liming</td>
<td>zhu</td>
<td>zai</td>
<td>qianmian</td>
</tr>
<tr>
<td>English:</td>
<td>Ming Li</td>
<td>live</td>
<td>in/at/on</td>
<td>front</td>
</tr>
</tbody>
</table>

The noun “前面 (qianmian, front)” functions as the object of the preposition “在 (zai, in-at-on)”, and is presented as the “arg” value in the preposition proplet.
6.2. LOCATION NOUNS

The derivation result of “李明住在前面。(Ming Li lives in front.)”

```
sur : 李明 sur : 住 sur : 在
pyn : liming pyn : zhu pyn : zai
noun: MingLi verb: live adj : in-at-on
cat : nm cat : iv mark cat : prep
sem : agent sem : sem : complement
fnc : live arg : MingLi arg : front
mdr : mdr: in-at-on mdd: live
```

The SRG and the signature presentation:

a) live

```
/ | 
in-at-on
```

Example 57. 李明住在学校前面。(Ming Li lives in front of the school.)

The combination of “在...前面” means “in front of”. “学校 (xuexiao, school)” is in fact the modifier of “前面 (qianmian, front)”, but comes before the location noun. In this case, “学校 (xuexiao, school)” is the indirect object of the preposition, and “前面 (qianmian, front)” is the direct object. To clarify the relation between the two objects, “前面 (qianmian, front)” is usually called a “localizer” by natural language processing practitioners. In our analysis, the two objects are both copied into the “arg” slot in the preposition proplet. So, the derivation result of the sentence is as follows:

```
sur : 李明 sur : 住 sur : 在
pyn : liming pyn : zhu pyn : zai
noun: MingLi verb: live adj : in-at-on
cat : nm cat : iv mark cat : prep
sem : agent sem : sem : complement
fnc : live arg : MingLi arg : school front
mdr : mdr: in-at-on mdd: live
```

The SRG and the signature presentation:

a) live

```
/ | 
in-at-on
```

The English translation of the example sentence is “Ming Li lives in front of the school.” In Chinese the word order is different. The word for “school” comes in between the preposition and the location noun. That is to say, location nouns may not follow prepositions immediately. For example:
Location nouns in combination with certain morphemes form the second kind of localizers. For example:

**Example 58.** 李明住在学校以东。（Ming Li lives to the east of the school.）

<table>
<thead>
<tr>
<th>surface</th>
<th>李明</th>
<th>住</th>
<th>在</th>
<th>学校</th>
<th>以东</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>liming</td>
<td>zhu</td>
<td>zai</td>
<td>xuexiao</td>
<td>yidong</td>
</tr>
<tr>
<td>English</td>
<td>Ming Li</td>
<td>live</td>
<td>in/at/on</td>
<td>school</td>
<td>east of</td>
</tr>
</tbody>
</table>

**Example 59.** 李明出现在我之前。（Ming Li appears in front of me.）

<table>
<thead>
<tr>
<th>surface</th>
<th>李明</th>
<th>住</th>
<th>在</th>
<th>我</th>
<th>之前</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>liming</td>
<td>zhu</td>
<td>zai</td>
<td>wo</td>
<td>zhiqian</td>
</tr>
<tr>
<td>English</td>
<td>Ming Li</td>
<td>live</td>
<td>in/at/on</td>
<td>I</td>
<td>before</td>
</tr>
</tbody>
</table>

The word “以东 (yidong, east-of)” and “之前 (zhiqian, before)” are combinations of basic location nouns with the particle “之 (zhi, ZHI)” and “以 (yi, YI).”

“之 (zhi, ZHI)” is one of the few words from ancient Chinese. It is similar to the particle “的 (de, DE)” in the sense that both indicate the possessive relation. For example: “之上 (zhishang, above)” means basically “the upside of”. The extended meaning equals to “on” or “above” in English. The difference is that the object of “on” or “above” follows the preposition in English, while a noun always comes before “之上 (zhishang, above)” in Chinese.

We can not call these words, like “以东 (yidong, east-of)” and “之前 (zhiqian, before)”, location nouns, because they are never used as subjects or objects. Basically, they indicate locative relations instead of referring to some places and they always come after a noun phrase, e.g. “在我之上 (above me)”. In this case, it is more reasonable to call them “localizers” formed by location nouns.

“之 (zhi, ZHI)” is restricted to combine with simple nouns of direction and location. The following combinations are all that have been found in the corpus.

<table>
<thead>
<tr>
<th>surface</th>
<th>之上</th>
<th>之下</th>
<th>之前</th>
<th>之后</th>
<th>之内</th>
<th>之外</th>
<th>之中</th>
<th>之间</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zhishang</td>
<td>zhixia</td>
<td>zhiqian</td>
<td>zhihou</td>
<td>zhihou</td>
<td>zhihou</td>
<td>zhiwai</td>
<td>zhihong</td>
</tr>
<tr>
<td>English</td>
<td>above</td>
<td>below</td>
<td>before</td>
<td>behind</td>
<td>inside</td>
<td>outside</td>
<td>inside</td>
<td>between</td>
</tr>
</tbody>
</table>

Compared with “之 (zhi, ZHI)”, “以 (yi, YI)” is only a little bit more free in combination with the directional nouns.
6.2. LOCATION NOUNS

Table 6.6: 以 + Simple Location Nouns

| surface: | 以东 | 以西 | 以南 | 以北 | 以上 | 以下 |
| pinyin:  | yidong | yixi | yinan | yibe | yishang | yixia |
| English: | east of | west of | south of | north of | above | below |

It has never been observed in collocation with “中 (zhong, middle)”, “间 (jian, in-between)”, “旁 (pang, aside)”, “左 (zuo, left)”, and “右 (you, right)”. The meaning of the combination is “to the ... of”. Again, the object precedes the combination. The preposition “在 (zai, in-at-on)” is also often seen at the beginning of the phrase with “以 (yi, YI)”, e.g. “在中国以南 (to the south of China)”, but it is not a must.

In the derivation process, the localizers are treated in the same way with those location nouns in similar positions.

The derivation result of “李明住在学校以东。” is:

The derivation result of “李明出现在我之前。” is:

6.2.2 Location Noun as Adverbial Independently

Besides following a preposition in any pattern to become an adverbial, location nouns can also function as adverbials independently. For example:

Example 60. 李明住附近。(Ming Li lives in the neighborhood.)
CHAPTER 6. NOUNS AS SO

6.2. LOCATION NOUNS

The preposition is omitted in this sentence, but the semantic meaning does not change with the structure. Syntactically, “住 (zhu, live)” is an intransitive verb. Semantically, “住 (zhu, live)” and “附近 (fujin, neighborhood)” cannot have the relation of an agent with a verb, or a verb with a patient. The only possibility is that “附近 (fujin, neighborhood)” modifies “住 (zhu, live)”. The syntactic-semantic analysis contains the following steps:

1. The preposition is omitted in this sentence, but the semantic meaning does not change with the structure. Syntactically, “住 (zhu, live)” is an intransitive verb. Semantically, “住 (zhu, live)” and “附近 (fujin, neighborhood)” cannot have the relation of an agent with a verb, or a verb with a patient. The only possibility is that “附近 (fujin, neighborhood)” modifies “住 (zhu, live)”. The syntactic-semantic analysis contains the following steps:

   ![Diagram](image)

   In this step, the “noun” value in the nw proplet is copied as the “mdr” value in the verb proplet. Accordingly, the “verb” value in the ss proplet is copied to the “mdd” slot in the nw proplet.

   Derivation result:

   ![Diagram](image)

   The SRG and the signature presentation:

   a) live
   b) V
   MingLi/ neighbourhood
   N

6.2.3 Location Noun as Adverbial in Subject Position

“李明住附近。” can be translated into English as “Ming Li lives (in) the neighborhood.” The word order of the English sentence may be reversed as “In the neighborhood lives Ming Li.” It is also possible to say “附近住着李明。” in Chinese. In this case, the location noun “附近 (fujin, neighborhood)” occupies the position of a subject. In fact, “李明 (liming, Ming-Li)” is the agent, though it comes at the end of the sentence. “附近 (fujin, neighborhood)”, as a noun of location,
cannot move, run or live. Though it is in the position of a subject, the logic subject is “李明 (liming, Ming-Li)”. Again, the only explanation is that “附近 (fujin, neighborhood)” modifies the verb “住 (zhu, live)” by providing locative information.

Example 61. 附近住着李明。(Ming Li lives in the neighborhood.)

| surface: 附近 住 着 李明 | pinyin: fujin zhu zhe liming | English: neighborhood live - Ming Li |

The derivation is as follows:


   In step 1, the verb “住 (zhu, live)” is read in. This is different from the structure of a temporal noun followed by a main verb. In the current case, a reversed word order is expected. In other words, the input of the verb “住 (zhu, live)” does not indicate the missing of the logic subject. Therefore, in this step, no substitute value of “#” is copied.


   A particle is read in and a variation of the rule of “W+MR” is activated.


   When the proper noun is read in, the syntactic-semantic relation becomes clear and complete. The “noun” value in the nw proplet is copied to the “arg” slot in the verb proplet. In return, the
core value in the verb proplet is copied as the “fnc” value in the nw proplet. The first “cat” value in the verb proplet is accordingly canceled.

4. sur: 附近
   pyn: fujin
   noun: neighbourhood
   cat: nl
   sem: cont
   mdr: neighbourhood
   mdd: live

sur: 住
pyn: zhu
noun: verb: live
cat: iv
sem: agent
mdr: live
mdd: live

sur: 李明
pyn: liming
noun: MingLi
cat: mark
sem: agent
mdr: MingLi
mdd: live

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

a) live MingLi neighbourhood
b) V

In the corpus 565 sentences are started with location nouns. 93% of them have these nouns as modifiers. Here is another example.

Example 62. 后面落下几个人。(Several persons lagged behind.)

<table>
<thead>
<tr>
<th>surface</th>
<th>后面</th>
<th>落下</th>
<th>几个人</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>houmian</td>
<td>luoxia</td>
<td>ji</td>
</tr>
<tr>
<td>English:</td>
<td>backside</td>
<td>lag</td>
<td>several</td>
</tr>
</tbody>
</table>

“落 (la, lag)” is a one-valence verb, requiring a human agent. Undoubtedly, “后面 (houmian, backside)” is used as a modifier, and the sentence has a reversed order of “modifier + verb +
subject”. The derivation result represents the deep semantic relation:

The SRG and the signature presentation:

\[
\begin{array}{c c c c}
\text{a)} & \text{lag} & \text{b)} & \text{V} \\
\text{person} & \text{back} & \text{N} & \text{N}
\end{array}
\]

In the above sentences, the subjects come at last, though their formal position is taken by location nouns. Sometimes, the subject does not appear at all. For example:

**Example 63.** 前边建了一座楼房。(A building has been built up in front.)

Though the English translation is a passive sentence, the original Chinese sentence is not. “前边 (qianbian, front)” is in the subject position, but it is impossible for “前边 (qianbian, front)” to perform the action of “建 (jian, build)”.”建 (jian, build)” is a transitive verb and requires two arguments. When it comes immediately after the location noun, we can assume that the sentence will be an incomplete sentence with a missing logic subject. The second noun, coming at the end of the sentence, is “楼房 (loufang, building)”. It serves as the object of the transitive verb “建 (jian, build-up)”.

In this case, the analysis process in the front part resembles that of “星期天去上海了。(X went to Shanghai on Sunday.)”.

Lexical lookup of “前边建了一座楼房。”
Syntactic-semantic analysis:

1. sur : 前边
   pyr : qianbian
   noun: front
   cat : nl
   sem :
   fnc :
   mdr :
   mdd :

In step 1, the second word, “建 (jian, build-up)”, is read in and the rule of S+V is activated. The “cat” value in the ss proplet is “nl” and the “cat” value in the nw proplet is “s’ p’ tv”. Since the ss proplet cannot be the agent, a substitute value “#” is copied into the “arg” slot in the nw proplet. The first “cat” value in the nw proplet is accordingly canceled. The “noun” value in the ss proplet is copied as the “mdr” value in the nw proplet and the “verb” value in the nw proplet is copied as the “mdd” value in the ss proplet.

The derivation result of “前边建了一座楼房。”

The SRG and the signature presentation:

a) build
   (-)  \   \ frontend
   V    \_________
       \   \building
       \  \ (-) N N

In the same pattern with “星期天异常寒冷。 (It was unusually cold on Sunday.)” are found sentences with location nouns. For example:

Example 64. 外面相当冷。(It is rather cold outside.)

<table>
<thead>
<tr>
<th>surface</th>
<th>外面</th>
<th>相当</th>
<th>冷</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>waimian</td>
<td>xiangdang</td>
<td>leng</td>
</tr>
<tr>
<td>English</td>
<td>outside</td>
<td>rather cold</td>
<td></td>
</tr>
</tbody>
</table>

Similarly, “外面 (waimian, outside)” is not the logic subject. The logic subject should be “天气 (tianqi, weather)”. The complete sentence is “外面天气相当冷。(It is rather cold outside.)”

The syntactic-semantic analysis is similar to that of “星期天异常寒冷。”
6.2. LOCATION NOUNS

The derivation result of “外面相当冷。（It is rather cold outside.）” is:

As shown in the result, “外面 (waimian, outside)”, as a location noun, is the modifier. The logic subject is missing. The place in the “arg” slot of the adjective proplet is held by the substitute value “#”.

The SRG and the signature presentation:

a) cold  b) A
   (♯) outside  (-) N

6.2.4 Location Noun in “有 (you)” Construction

In English, there is a special sentence pattern of “there be”, which describes existence. At the same time, there is a transitive verb “have”, which shows the relation of possession. It is not difficult to distinguish them because they have different forms and positions in sentences. But, in Chinese, both of the two cases require the same graphic form of “有 (you)”, i.e. “有 (you)” is used to present the relation of possession, as well as the situation of existence. It is stored in the lexicon as two different entries. But superficially, the sentence structure in both cases is the same in Chinese. For example:

Example 65. 李明有一把椅子。（Ming Li has a chair.）

| surface: | 李明 有 一 把 椅子 |
| pinyin: | liming you yi ba yizi |
| English: | Ming Li have one - chair |

Example 66. 旁边有一把椅子。（There is a chair nearby.）

| surface: | 旁边 有 一 把 椅子 |
| pinyin: | pangbian you yi ba yizi |
| English: | aside there be one - chair |

Except the subject, both examples are composed of the same words in the same order. In Example 65, the verb “有 (you)” equals to “have” in English, which has two valencies and indicates the relation of possession. But in Example 66, the verb “有 (you)” is similar to “there be” in English,
because it describes existence. Semantic information is required in the analysis of these two sentences. In Example 65, the subject is a person, named “李明 (liming, Ming-Li)”. He owns a chair. In Example 66, the subject is a location. A location cannot possess anything. It can only be a modifier.

The derivation result of “李明有一把椅子。” is:

```
sur : 李明 sur : 有 sur : 椅子
pyn : liming pyn : you pyn : yizi
noun: MingLi verb: have noun: chair
cat : nm cat : tv mark cat : cn
sem : sem: non-action sem : object
fnc : have arg : MingLi chair fnc : have
mdr : mdr: mdr : one

The SRG and the signature presentation:
```

```

The syntactic-semantic analysis of “旁边有一把椅子。” is as follows:

1. sur : 旁边 sur : 有 sur : 椅子
   pyn : pangbian pyn : you pyn : yizi
   noun: aside verb: there-be noun: chair
cat : nl cat : s' iv cat : cdn
   sem : sem: sem :
fnc : arg : sur arg :
   mdr : mdr: mdr :

In step 1, the input of the intransitive verb “有 (you, there-be)” indicates the reverse order of the sentence. No operation is activated except copying the nw proplet into output.

2. sur : 旁边 sur : 有 sur : 一把
   pyn : pangbian pyn : you pyn : yi
   noun: aside verb: there-be noun: one
   cat : nl cat : s' iv cat : cdn
   sem : sem: sem :
fnc : arg : fnc :
   mdr : mdr: aside mdr :

   mdd : there-be mdd :
```

```
In step 2, the cardinal is read in and copied into output.

   pyn : pangbian pyn : you pyn : ba
   noun : aside verb : there-be noun : one noun : BA
cat : nl cat : s’ iv cat : cdn @
sem : sem : sem : sem : +N
fnc : arg : fnc : mdr : mdr : aside mdr :
mdd : there-be mdd :

In step 3, the input of the quantifier starts the rule of NUM+QUAN.

   pyn : pangbian pyn : you pyn : yi|ba pyn : yizi
   noun : aside verb : there-be noun : one noun : chair
   cat : nl cat : s’ iv cat : cdn @
   sem : sem : sem : +N sem : object
   fnc : arg : fnc : fnc : mdr : mdr :
mdd : there-be mdd :

When the key word in the subject phrase is read in, a variation of the rule of NQ+NOUN is activated. The “noun” value in the nw proplet is copied as the “arg” value in the verb proplet. The first “cat” value is canceled accordingly. In return, the “verb” value is copied as the “fnc” value. The “cdn-q” proplet is absorbed.

The derivation result is as follows:

```
sur : 旁边 sur : 有 sur : 椅子
pyn : pangbian pyn : you pyn : yizi
noun : aside verb : there-be noun : chair
cat : nl cat : iv mark cat : cn
sem : sem : sem : object
fnc : arg : chair fnc : there-be
mdr : mdr : aside mdr : one
mdd : there-be mdd :
```

The SRG and the signature presentation:

```
a) there-be  b) V
  /
chair aside N N
```
Summary of Part I

The discussion in the part of NOUNs is about the analysis of nouns, pronouns, numerals and quantifiers. Inflection and derivation of Chinese words, as different from that in other languages, is introduced with typical examples. Quantifiers are usually found in combination with numerals and in the patterns of “QQ” and “一 QQ”. They are absorbed into the numeral proplets, due to lack of content. The analysis of pronouns is done with the further categorization of personal pronouns and demonstrative pronouns. Nouns modified by adverbial adjectives have rhetorical meanings and special pragmatic function. They are temporarily taken as adjectives on grammatical level and gain special semantic values. Nouns in the superficial subject or object positions may not be the logical subjects or objects. It often happens to temporal nouns and location nouns. They are represented as modifiers after the analysis according to their semantic relations to other parts of the sentences.
This page intentionally contains only this sentence.
Part II

VERB Application and Analysis
A “correct” sentence is required to follow rules for syntactic composition, and the demand of individual words as well. Thematic Theory (Chomsky [1993], Gao [2004], Shen [1997], Xu and Shen [1998]) is concerned about the relation between syntactics and vocabulary. It is actually a verb-centered theory, according to which, the thematic structure of a verb include the number of arguments, the thematic role and the grammatical category of each argument. It distinguishes itself from the valence theory but they are not contradictory. We follow Hauser’s division of one-valence, two-valence and three-valence verbs, and adopt the expression of “thematic roles” for specific representation of this collocation feature of verbs.

This part is also composed of five chapters, focusing respectively on common verbs, modal verbs, directional verbs, causative verbs and three-valence verbs.

In Chapter 7, the common features of Chinese verbs are generalized as:

- mainly used as predicate;
- can be modified by most adverbs;
- depending on adverbial elements or aspect markers to present tense or aspect;
- can be used in repetition;
- no infinitive or gerund form, no matter in phrase or sentence;

The last point is further explained with the cases of verbs as subjects, objects or attributives.

The topic of Chapter 8 is about modal verbs. As in English, modal verbs in Chinese are functors of other verbs. But, they are often modified by adverbs and used in a continuous sequence before the verb arguments.

Directional verbs, as discussed in Chapter 9, are used independently or in combination with other words. When used in combination with other predicate words, they become complementary modifiers.

Causative verbs in Chapter 10 are distinctive in that they take complete clauses as objects. In this case, the core values of the predicate words in the sub-clauses are copied as the “arg” values of the causative verbs while the subjects in the sub-clauses are given the additional “sem” value of “experiencer”. Three-valence words are introduced in three groups. Group 1 is represented by the word “给 (gei, give)”. Group 2 is represented by “抢 (qiang, rob)”. Group 3 is exemplified by “听 (ting, listen)”. Group 1 is possible to be found in many languages. But group 2 and 3 seems to be particular in Chinese.
This page intentionally contains only this sentence.
Chapter 7

Analysis of Common Verbs

Common verbs describe action or behavior, such as “听 (ting, listen), “游泳 (youyong, swim)” and “道歉 (daqian, apologize)”. They are bestowed with the main grammatical features of verbs and are therefore called typical verbs.

Common verbs are mainly used as predicates. They can be modified by adverbs, such as “不 (bu, not)” and “都 (dou, all)”. But they cannot be modified by adverbs of degree or intensifiers, such as “很 (hen, very)” and “太 (tai, too).” For example:

“他们学德语。(They study German.)”

| surface: 他们学德语 | pinyin: ta men xue deyu |
| English: he study German |

This is the basic sentence. In the following four examples, the verb “学 (xue, study)” is modified respectively by the adverb “不 (bu, not)”, “都 (dou, all)”, “很 (hen, very)” and “太 (tai, too).”

“他们不学德语。(They don’t study German.)”

“他们都学德语。(They all study German.)”

“* 他们很学德语。 ”

“* 他们太学德语。”

The last two sample sentences with the mark of “*” are not accepted in Chinese.

Chinese verbs don’t change their forms to show time or aspect. If there is no context, it is rather easy to have the question “Has it happened already or not?” Sometimes, temporal nouns (see Temporal nouns) or adverbs (see Adverbs) help to clarify the temporal information within sentences. At other times, verbs are complemented/followed by aspect markers, including “着 (zhe, ZHE)”, “了 (le, LE)”, and “过 (guo, GUO).” These aspect markers are stored in the lexicon as follows:
“着 (zhe, ZHE)” indicates the continuous tense, and is therefore marked as “cont” in the “sem” slot. “了 (le, LE)” indicates the perfect tense and is therefore marked as “perf”; “过 (guo, GUO)” indicates the past and there comes “past” as its “sem” value.

The rule for combining a verb with an aspect marker is named “W+ASP”.

Rule: W+ASP {}

ss-pattern: [verb:_, cat:(_ V), sem:_, arg:(_)]
nw-pattern: [adj:_, cat:(asp), sem:_]
operation: acopy(nw.sem ss.sem)

Here are some example sentences:

Example 67. 他总躺着。(He is always lying.)

| surface: | 他 总 躺 着 |
| pinyin: | ta zong tang zhe |
| English: | he always lie - |

The proplet “着 (zhe, ZHE)” is absorbed during the derivation, but the “sem” value of the verb is replaced by the “sem” value of “着 (zhe, ZHE).”

Derivation result:

| sur : 他 | sur : 成 |
| pyn: ta | pyn: tang |
| noun: he | verb: lie |
| cat : pro | cat : iv mark |
| sem : s3 | sem : cont |
| fnr : lie | arg : he |
| mdr : mdr: always |

The SRG and the signature presentation:

a) lie b) V
he N

Example 68. 他学了德语。(He has learnt German.)
CHAPTER 7. COMMON VERBS

<table>
<thead>
<tr>
<th>surface</th>
<th>他 学 了 德语</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta xue le deyu</td>
</tr>
<tr>
<td>English:</td>
<td>he study - German</td>
</tr>
</tbody>
</table>

In this example, “了 (le, LE)” shows that the action has already happened. The “sem” value, i.e. “perf”, is copied to the verb proplet.

Derivation result:

<table>
<thead>
<tr>
<th>sur: 他</th>
<th>sur: 学</th>
<th>sur: 德语</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: xue</td>
<td>pyn: deyu</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: study</td>
<td>noun: German</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: tv mark</td>
<td>cat: cn</td>
</tr>
<tr>
<td>sem: s3 agent</td>
<td>sem: perf</td>
<td>sem: patient</td>
</tr>
<tr>
<td>fnc: study</td>
<td>arg: he German</td>
<td>fnc: study</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) study
   he  German

Example 69. 他学过吉他。(He has learnt playing Guitar.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 学 过 德语</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta xue guo deyu</td>
</tr>
<tr>
<td>English:</td>
<td>he study - German</td>
</tr>
</tbody>
</table>

“过 (guo, GUO)” indicates that the action happened before.

Derivation result:

<table>
<thead>
<tr>
<th>sur: 他</th>
<th>sur: 学</th>
<th>sur: 吉他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: xue</td>
<td>pyn: jita</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: study</td>
<td>noun: guitar</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: tv mark</td>
<td>cat: cn</td>
</tr>
<tr>
<td>sem: s3 agent</td>
<td>sem: past</td>
<td>sem: object patient</td>
</tr>
<tr>
<td>fnc: study</td>
<td>arg: he guitar</td>
<td>fnc: study</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) study
   he  guitar

b) V
   N  N
7.1 Verbs in Repetition

In Chinese, verbs are often used in repetition to show temporary attempt. It is classified by some linguists as the “tentative” aspect of Chinese verbs, in which the time of the action is short and the momentum is small.

7.1.1 AA, AABB and ABAB

A and B represent arbitrary verb morphemes in Chinese. Among these three patterns, “AA” happens to monosyllable verbs. “AABB” applies to compound verbs that are composed of two free verb morphemes. “ABAB” applies to two-syllable simple verbs. For example:

Example 70. 我走走。(I walk a bit.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>我 走 走</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>wo zou zou</td>
</tr>
<tr>
<td>English:</td>
<td>I walk walk</td>
</tr>
</tbody>
</table>

In this example, the monosyllable verb “走 (zou, walk)” is repeated once.

Example 71. 他们说说笑笑。(They talk and laugh.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他 们 说 说 笑 笑</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta men shuo shuo xiao xiao</td>
</tr>
<tr>
<td>English:</td>
<td>he - speak speak laugh laugh</td>
</tr>
</tbody>
</table>

In the traditional grammar, “说笑” is a compound verb that is composed of two monosyllable verbs, i.e. “说 (shuo, speak)” and “笑 (xiao, laugh)”. They can be separated without any change in their syntactic and semantic meanings. In this case, the pattern of “AABB” is handled as two verbs in coordination.

Example 72. 我们讨论讨论这个方案。(Let’s discuss a bit about this program.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>我 们 讨 论 讨 论 这 个 方 案</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>wo men taolun taolun zhe ge fanan</td>
</tr>
<tr>
<td>English:</td>
<td>I - discuss discuss this - program</td>
</tr>
</tbody>
</table>

In this example, “讨论 (taolun, discuss)” is a verb composed of two bound morphemes. It is listed in the lexicon as one entry. Most verbs in the pattern of “ABAB” cannot be separated without changing their syntactic or semantic meaning. Therefore, this pattern is handled in the similar way with monosyllable verbs in repetition: an addition value “try” is copied to the “sem” attribute of the verbs, but the second occurrence of the verb is not copied into next step.
The derivation result of the above examples is as follows:

The derivation result of “我走走。”

```
sur : 我
pyn : wo
noun: I

typ: 走
verb: walk
cat : pro

sem : s1 agent
sem : try

fnc : walk
arg : I
mdr : mdr:
```

The SRG and the signature presentation:

a) walk \(\rightarrow\) b) \(\rightarrow\) V

I \(\rightarrow\) N

The derivation result of “他们说说笑笑。”

```
sur : 他
pyn : ta
noun: he

typ: 说
verb: speak
verb: laugh

cat : pro
cat : iv

cat : iv mark

sem : pl agent
sem : try
sem : try

fnc : speak
arg : he
arg : #
mdr : mdr:

nc : laugh
pc : speak
```

The SRG and the signature presentation:

a) speak \(\rightarrow\) laugh \(\rightarrow\) b) V \(\rightarrow\) V

he \(\rightarrow\) N

The derivation result of “我们讨论讨论这个方案。”

```
sur : 我
pyn : wo
noun: I

verp: 讨论
verb: discuss
noun: plan


cat : pro


cat : tv mark

sem : pl agent
sem : try
sem : patient

fnc : discuss
arg : I plan
arg : this
mdr : mdr:
```

The SRG and the signature presentation:

a) discuss \(\rightarrow\) \(\rightarrow\) b) V

I \(\rightarrow\) plan \(\rightarrow\) N \(\rightarrow\) N

7.1.2 A yi A and A le A
Besides repetition, another two patterns are also adopted to express similar semantic meaning. One is “A yi A”, used when the action is going to happen; the other is “A le A”, used if the action has happened already. The pattern of “A yi A” may also be classified as an expression of the tentative aspect. During the derivation, the value of “try” will be copied into the “sem” slot of the verb proplet. The pattern of “A le A” is different. The aspect marker “了 (le, LE)” brings the value “perf” to the “sem” slot of the verb proplet. Then, because of the repetition, the value of “try” is also added to the “sem” slot. Thus comes another aspect of a verb: perfect tentative. However, this tentative aspect has not been observed in collocation with the other two aspect markers. The pattern of “A yi A” and “A le A” mostly happen to monosyllable verbs. For example:

Example 73. 我走一走。(I walk a bit.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我 走 一 走</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo zou yi zou</td>
</tr>
<tr>
<td>English</td>
<td>I walk - walk</td>
</tr>
</tbody>
</table>

Example 74. 我走了走。(I walked a bit.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我 走 了 走</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo zou le zou</td>
</tr>
<tr>
<td>English</td>
<td>I walk - walk</td>
</tr>
</tbody>
</table>

They also apply to transitive verbs:

Example 75. 我一看一看书。(I read a bit.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我 看 一 看 书</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo kan yi kan shu</td>
</tr>
<tr>
<td>English</td>
<td>I read - read book</td>
</tr>
</tbody>
</table>

Example 76. 我看了看书。(I read a bit.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我 看 了 看 书</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo kan le kan shu</td>
</tr>
<tr>
<td>English</td>
<td>I read - read book</td>
</tr>
</tbody>
</table>

In the above cases, the structure auxiliaries “一 (yi, YI)” and “了 (le, LE)”, as well as the second verb proplet are not copied into output.
7.2 Verbs in Phrases and Sentences

The construction principles for Chinese sentences are in consistency with those of phrases. In English, the infinitive form or participles of verbs are adopted in phrases, while only the finite form is used for the main verb of a sentence. It is substantially different in Chinese. Chinese verbs never change their forms wherever they are, which means they always show up with their basic forms from the lexicon.
7.2. VERBS IN PHRASES AND SENTENCES

7.2.1 Verb as Predicator

Verbs are one of the two main kinds of predicators in Chinese, the other one being adjectives. Here is an example.

**Example 77.** 我听故事。（I listen to stories.）

<table>
<thead>
<tr>
<th>surface</th>
<th>我 听 故事</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo ting gushi</td>
</tr>
<tr>
<td>English</td>
<td>I listen story</td>
</tr>
</tbody>
</table>

In this example, the verb “听 (ting, listen)” is the main verb and serves as the functor. The two arguments are respectively “我 (wo, I)” and “故事 (gushi, story).”

Lexical lookup:

<table>
<thead>
<tr>
<th>sur : 我</th>
<th>sur : 听</th>
<th>sur : 故事</th>
<th>sur : 。</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : wo</td>
<td>pyn : ting</td>
<td>pyn : gushi</td>
<td>cat : mark</td>
</tr>
<tr>
<td>noun : I</td>
<td>verb: listen</td>
<td>noun: story</td>
<td>sem: v’ decl</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : s’ p’ tv</td>
<td>cat : cn</td>
<td></td>
</tr>
<tr>
<td>sem : sl</td>
<td>sem :</td>
<td>sem :</td>
<td></td>
</tr>
<tr>
<td>fnc :</td>
<td>arg :</td>
<td>fnc :</td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

1. sur : 我 sur : 听 sur : 故事 sur : 。

2. sur : 我 sur : 听 sur : 故事 sur : 。

In this step, the functor-argument relation between the subject and the predicate verb is presented. The first “cat” value in the verb proplet is canceled. The value of “agent” is copied into the “sem” slot in the ss proplet.
In this step, the functor-argument relation between the predicate verb and the object is represented. The second “cat” value in the verb proplet is canceled, meaning the two valencies of the verb are both filled. The value of “patient” is copied into the “sem” slot in the nw proplet.

When the full stop is read in the analysis comes to the end.

Derivation result:

```
| sur : 我 | sur : 听 | sur : 故事 |
| pyin : wo | pyin : ting | pyin : gushi |
| noun: I | verb: listen | noun: story |
| cat : pro | cat : tv | cat : cn |
| sem : sl agent | sem : | sem : patient |
| fnc : listen | arg : I story | fnc : listen |
| mdr : | mdr : | mdr : |
```

The SRG and the signature presentation:

```
a) listen   b) V
I
\ story N N
```

7.2.2 Verb as Subject

Example 78. 说更难。 (It is more difficult to speak.)

| surface: 说 更 难 |
| pinyin: shuo geng nan |
| English: speak more difficult |

In this example, the verb “说 (shuo, speak)” plays the role of a subject. The adjective “
难 (nan, difficult)” is the predicator. In English, if a verb is applied in such an occasion, the infinitive form is adopted. Then the translation is “(To) speak (is) more difficult.” The elements in brackets are not available in the original Chinese sentence. In other words, Chinese verbs take their basic lexical forms when they are used as subjects. It is the same when they are used as objects. In this case, an additional value of “vn” is provided to the “sem” attribute of the verb.
7.2. VERBS IN PHRASES AND SENTENCES  

Lexical lookup:

<table>
<thead>
<tr>
<th>sur : 说</th>
<th>sur : 更</th>
<th>sur : 难</th>
<th>sur : 。</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : shuo</td>
<td>pyn : geng</td>
<td>pyn : nan</td>
<td>cat : mark</td>
</tr>
<tr>
<td>verb: speak</td>
<td>adj : more</td>
<td>adj : difficult</td>
<td>sem: v' decl</td>
</tr>
<tr>
<td>cat : s' iv</td>
<td>cat : adv</td>
<td>cat : adj</td>
<td></td>
</tr>
<tr>
<td>sem :</td>
<td>sem : +N</td>
<td>sem :</td>
<td></td>
</tr>
<tr>
<td>arg :</td>
<td>mdd :</td>
<td>mdr :</td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdd :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th>sur : 说</th>
<th>sur : 难</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : shuo</td>
<td>pyn : nan</td>
</tr>
<tr>
<td>verb: speak</td>
<td>adj : difficult</td>
</tr>
<tr>
<td>cat : s' iv</td>
<td>cat : adj mark</td>
</tr>
<tr>
<td>sem : vn</td>
<td>sem : av</td>
</tr>
<tr>
<td>fnc : difficult</td>
<td>arg : speak</td>
</tr>
<tr>
<td>arg :</td>
<td>mdr : more</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdd :</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) difficult

b) A

7.2.3 Verb as Object

Example 79. 她能忍受孩子的闹。(She can stand the noise from the child.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>她 能 忍受 孩子 的 闹</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta neng renshou haizi de nao</td>
</tr>
<tr>
<td>English:</td>
<td>she can stand child - disturb</td>
</tr>
</tbody>
</table>

In this example, the verb “闹 (nao, disturb)” comes after the structure auxiliary “的 (de, DE)”. The structure auxiliary “的 (de, DE)” has the function to nominalize the following verb. The predicate of the sentence is a combination of a modal verb and a common verb. The phrase “孩子的闹” as a whole is the object, the key word being “闹 (nao, disturb)”. During the derivation, the noun “孩子 (haizi, child)” is first analyzed as the object. But, when the structure auxiliary “的 (de, DE)” is read in, an additional “mdd” is created for the noun proplet and a substitute value “#” is provided.
7.2. VERBS IN PHRASES AND SENTENCES

Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>sem: s3</td>
<td>arg:</td>
<td>arg:</td>
<td>arg:</td>
<td>arg:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

Step 0-3 are skipped. In step 3, the verb-object relation between the verb “忍受 (renshou, stand)” and the noun “孩子 (haizi, child)” is represented. The result is copied into output as the sentence start for next step.

4.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: neng</td>
<td>pyn: renshou</td>
<td>pyn: haizi</td>
<td>pyn: de</td>
</tr>
<tr>
<td>noun: she</td>
<td>verb: can</td>
<td>verb: stand</td>
<td>noun: child</td>
<td>adj: DE</td>
</tr>
<tr>
<td>sem: s3</td>
<td>agent</td>
<td></td>
<td>patient</td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

In step 4, the particle provides a substitute value “#” to the attribute “mdd” in the noun proplet.

5.

The input of “闹 (nao, disturb)” activates the rule of “AN+NV”. Though the noun “孩子 (haizi, child)” and the verb “闹 (nao, disturb)” is connected by the structure auxiliary “的 (de, DE)”, their relation is functor-argument instead of possessive. So, in this step, the functor-argument relation is presented through copying the “noun” value into the “arg” slot and the “verb” value into the “fnc” slot in the proplets concerned. The functor-argument relation between the verb “忍受 (renshou, stand)” and the noun “孩子 (haizi, child)” is canceled, because the key word of the object is the verb “闹 (nao, disturb)”. Thereafter, the relation between the two verbs are presented through the rule operations: the core value of “闹 (nao, disturb)” is copied to the “arg” slot in the verb proplet “忍受 (renshou, stand)”; A new “fnc” attribute is set up for the verb “闹 (nao, disturb)” and the core value from “忍受 (renshou, stand)” is provided as its value. The
“sem” values in related proplets are also changed, e.g. “vn” is added into the “sem” slot of the nw proplet.

Derivation result:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Noun: she</td>
<td>Verb: can</td>
<td>Verb: stand</td>
<td>Noun: child</td>
<td>Verb: disturb</td>
</tr>
<tr>
<td>Cat: pro</td>
<td>Cat: vz mark</td>
<td>Cat: tv</td>
<td>Cat: nr</td>
<td>Cat: iv</td>
</tr>
<tr>
<td>Fnc: can</td>
<td>Arg: she</td>
<td>Stand</td>
<td>Fnc: can</td>
<td>Fnc: disturb</td>
</tr>
<tr>
<td>Mdr: mdr:</td>
<td>Arg: # disturb</td>
<td>Mdr:</td>
<td>Arg: child</td>
<td>Mdr:</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

7.2.4 Verb as Purpose Adverbial

Example 80. 她读小说解闷。(She read novels to kill time.)

| Surface: 她 读 小说 解闷 | Pinyin: ta du xiaoshuo jiemen | English: she read novel kill-time |

In this example, the first verb “读 (du, read)” is the main verb. The two arguments are respectively “她 (ta, she)” and “小说 (xiaoshuo, novel)”. The second verb in the sentence, “解闷 (jiemen, kill-time)”, shows the purpose of “读 (du, read)”. This is resulted from the semantic analysis. “读 (du, read)” is an action verb, while “解闷 (jiemen, kill-time)” comes from a different category with the “sem” value of “+manner”. The modifier-modified relation is more reasonable than coordination between the two verbs.

Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat: pro</td>
<td>Cat: s’ tv</td>
<td>Cat: cn</td>
<td>Cat: s’ iv</td>
<td></td>
</tr>
<tr>
<td>Sem: s3</td>
<td>Sem:</td>
<td>Sem: object</td>
<td>Sem:</td>
<td>Sem: +manner</td>
</tr>
<tr>
<td>Fnc:</td>
<td>Arg:</td>
<td>Fnc:</td>
<td>Arg:</td>
<td></td>
</tr>
<tr>
<td>Mdr:</td>
<td>Mdr:</td>
<td>Mdr:</td>
<td>Mdr:</td>
<td></td>
</tr>
</tbody>
</table>

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CHAPTER 7. COMMON VERBS

7.2. VERBS IN PHRASES AND SENTENCES

The syntactics-semantic analysis:

Step 0-2 are skipped. The derivation result is copied into output as the sentence start for step 3.

A variation of the rule of V+V is activated by the input of “解闷 (jiemen, kill-time)”. During the rule application, the “verb” value in the nw proplet is copied as the “mdr” value in the first proplet, and the “verb” value in the ss proplet is copied as the “mdd” value in the nw proplet. When the full stop is read in, the analysis comes the end.

Derivation result:

The SRG and the signature presentation:

7.2.5 Verb as Attributive

Example 81. 流动资产包括现金。(Current assets include cash.)

In English, it is impossible to have a basic verb as an attributive. Usually, the verb is changed into a gerund, an infinitive or an attributive clause. It is not the case in Chinese. In the above example, “流动 (liudong, flow)” is an intransitive verb. When it is followed by a noun, here “资产 (zichan, assets)”, the relation of modifier-modified is established. The phrase “流动资产” may be
translated into English as “assets that flow”, “flowing assets”, or “assets to flow”, but never “flow assets”.

In this case, the core value from the verb proplet is copied as the “mdr” value in the noun proplet and the core value from the noun proplet is copied as the “mdd” value in the verb proplet. An additional value of “av” is added to the “sem” attribute in the verb proplet.

Lexical lookup:

Syntactic-semantic analysis:

In this step, the modifier-modified relation between the first two words is presented. Then both the two proplets are copied into next step.

In this step, the noun “资产 (zichan, assets)” is analyzed as the subject. Its core value is copied to the “arg” slot in the nw proplet. The “verb” value from the nw proplet is copied as the “fnc”
value in the noun proplet. The first “cat” value in the nw proplet is canceled.

In this step, the second argument of the main verb is read in.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

a) \[
\text{include} \quad \text{assets} \quad \text{cash} \quad N \quad N
\]

b) \[
V \quad \text{flow} \quad V
\]

The above example shows the case that a single verb is used as an attributive. When there is an attributive clause, the structure auxiliary “的 (de, DE)” is often required. For example:

Example 82. 上午来找我的是的是我的父亲。(The person who came for me in the morning is my father.)
Lexical lookup:

| sur | 晚上 | sur | 找 | sur | 拿 | sur | 是 | sur | 我 | sur | 父亲 | sur |
|-----|------|-----|----|-----|-----|-----|-----|-----|-----|------|-----|
| pyn | shangwu | pyn | lai | pyn | zhao | pyn | wo | pyn | de | pyn | shi | pyn | wo | pyn | de | pyn | fuqin | cat | mark |
| noun | morning | verb | come | verb | look-for | noun | I | adj | DE | verb | be | noun | I | adj | DE | noun | father | cat | mark |
| cat |  | cat | s’ | qv | cat | s’ | p’ | tv | cat |  | cat | s’ | p’ | tv | cat | pro | cat | smr | cat |  | cat | smr | cat |  |
| sem |  | sem | spt | sem |  | sem | s1 | sem |  | sem |  | sem | s1 | sem |  | sem |  | sem |  | sem |  | sem |  |
| fnc |  | arg |  | arg |  | fnc |  | arg |  | fnc |  | fnc |  | fnc |  | fnc |  | fnc |  | fnc |  | fnc |  | fnc |  |
| mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  | mdr |  |
| mdd |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Syntactic-semantic analysis:

1. In this step, the modifier-modified relation is presented. The missing subject is represented by “#”.

2. In step 2, an action verb is read in. The core values from both the two ss proplets are copied to the “mdr” slot in the nw proplet. Again, the logical subject argument is represented by “#” in the nw proplet. The first “cat” value in the nw proplet is accordingly canceled.
In this step, the rule of V+N is activated by the input of a pronoun.


In step 4, the input of the structure marker brings an additional value “#” to the “mdd” attribute in the preceding pronoun proplet. Because it is possible that the object of the verb “找 (zhao, look for)” is a phrase instead of a single word, i.e. it is not certain yet whether the sentence start is a subject clause, no change happens to the verb proplet.


In step 5, the link verb “是 (shi, be)” is read in and it becomes clear that this is a complex sentence with a subject clause. The “mdd” attribute in the pronoun proplet is removed and a new “mdd” attribute is created in the verb proplet “找 (zhao, look for)”. The core value from the nw proplet is copied as the value of the new “mdd” attribute. In return, the core value from the verb proplet “找 (zhao, look for)” is copied as the “mdr” value in the nw proplet.
In step 6, the rule of VX+P is activated.

sem: sem: spt sem: sem: s1 patient sem: sem: s1 sem:
func: func: # func: be func: look-for arg: look-for I func: be
mdr: mdr: arg: # I mdr: mdr: mdr:
mdr: look-for mdd: look-for mdr: morning come

The input of the structure marker again changes the existing syntactic-semantic relations.

sem: sem: spt sem: sem: s1 patient sem: sem: s1 sem:
func: func: # func: be func: look-for arg: look-for I func: beunc: father
mdr: mdr: arg: # I mdr: mdr: mdr: mdr:
mdr: look-for mdd: look-for mdr: morning come

Up to step 8, the genuine syntactic-semantic relation of the whole sentence is presented. When the full stop is read in, the analysis comes to the end.

Derivation result:

sem: sem: spt sem: sem: s1 patient sem: sem: s1 sem:
func: func: # func: be func: look-for arg: look-for I func: be
mdr: mdr: arg: # I mdr: mdr: mdr:
mdr: look-for mdd: look-for mdr: morning come

The SRG and the signature presentation:

a) b)

The SRG and the signature presentation:
Chapter 8

Analysis of Modal Verbs

Modal verbs are special in that they take verbs or verb phrases as one of their two arguments. All together 10 modal verbs are collected from the corpus.

<table>
<thead>
<tr>
<th>Table 8.1: Modal Verbs in Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface: 原意 可能 会 能 应该 可以 敢 得 必须 肯</td>
</tr>
<tr>
<td>pinyin: yuanyi keneng hui neng yinggai keyi gan dei bixu ken</td>
</tr>
<tr>
<td>English: be willing to may will/can can should can dare have to must agree to</td>
</tr>
</tbody>
</table>

Most of the modal verbs have one counterpart in English, but “会 (hui)” has two alternatives: “will” and “can”. This is dependent on the context. When it is used as an equivalent to “can”, “会 (hui)” stresses on the ability of the subject. When used as “will”, it stresses on the possibility.

Example 83. 他会跑。He will/can run.

| surface: 他 会 跑 |
| pinyin: ta hui pao |
| English: he can/will run |

This sentence can be translated as “He can run,” or “He will run.” The first one will be chosen if the context indicates that he is a small child and is able to do something. If there is a preceding sentence that is a question, like “If he meets a tiger, then?” The second interpretation may be a better answer.

Another two modal verbs are also translated as “can”. “能 (neng, can)” is used to express ability or possibility. “可以 (keyi, can)” is more like “be allowed to”.

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8.1 Modified by Adverbs

Zhu [1982], Li and Thompson [1981], Tang [1984] have all discussed about the grammatical features of modal verbs in Chinese. Some of them argue that modal verbs cannot be modified by intensifiers, such as “很 (hen, very)”. Others have different opinions. The fact is, on one hand, it is not difficult to find examples that Chinese modal verbs are modified by adverbs. In the corpus, “愿意 (yuanyi, be-willing-to)”, “可能 (keneng, may)”, “会 (hui, will-can)”, “能 (neng, can)”, “应该 (yinggai, should)”, “可以 (keyi, may)” and “得 (dei, have-to)” are found modified by “很 (hen, very)”, “更 (geng, more)” or “真 (zhen, really)”. But, on the other hand, the number of adverbs in such an application is rather limited. Most of them are intensifiers but not all intensifiers are applied in such cases. “很 (hen, very)”, “更 (geng, more)” and “真 (zhen, really)” are the top three on the list. Here are some examples:

他很会弹吉他。(He can play guitar very well.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>很</th>
<th>会</th>
<th>弹</th>
<th>吉他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>hen</td>
<td>hui</td>
<td>tan</td>
<td>jita</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>very</td>
<td>can</td>
<td>play</td>
<td>guitar</td>
</tr>
</tbody>
</table>

他更会弹吉他。(He can play guitar better.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>更</th>
<th>会</th>
<th>弹</th>
<th>吉他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>geng</td>
<td>hui</td>
<td>tan</td>
<td>jita</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>more</td>
<td>can</td>
<td>play</td>
<td>guitar</td>
</tr>
</tbody>
</table>

他真会弹吉他。(He really can play guitar.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>真</th>
<th>会</th>
<th>弹</th>
<th>吉他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>zhen</td>
<td>hui</td>
<td>tan</td>
<td>jita</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>really</td>
<td>can</td>
<td>play</td>
<td>guitar</td>
</tr>
</tbody>
</table>

In this case, the adverb proplet is absorbed during the derivation process, but its core value is copied as the “mdr” value in the resulting proplet. Take the following sentence as an example.

Example 84. 他很会弹吉他。(He can play guitar very well.)

The syntactic-semantic analysis involves several times of combination:

In this step, the adverb proplet is read in and simply copied to output.

When the modal verb is read in, the functor-argument relation with the subject and the modification relation with the adverb is represented. The adverb proplet is absorbed. Two proplets, namely “他 (ta, he)” and “会 (hui, will-can)”, are copied into output.

In this step, the common verb “弹 (tan, play)” is read in. The “verb” value becomes the “arg” value in the modal verb proplet. An “fnc” attribute is created in the nw proplet, and provided with the “verb” value from the preceding proplet. The substitute value “#” is copied to the “arg” slot in the nw proplet. The first “cat” value in the nw proplet is accordingly removed.

In this step, the object noun is read in. The functor-argument relation between the common verb and the common noun is represented through the rule operations.

When the full stop is read in, the analysis comes to the end.
8.2 Modal Verbs in Combination

In English, it is possible to see two modal verbs in a continuous sequence, as in a conjunction construction. For example: “He should and will come.” Or, “He should, can, and will come.” But if there is no conjunctive, like “and”, in between, it is not a grammatical sentence, i.e. it is not correct to say “He should will come.” It is different in Chinese. Two modal verbs in a continuous sequence are accepted in either way.

- Modal verbs in coordination

Here is an example.

**Example 85.** 他应该而且会来。(He should and will come.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他</th>
<th>应该</th>
<th>而且</th>
<th>会</th>
<th>来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta</td>
<td>yinggai</td>
<td>erqie</td>
<td>hui</td>
<td>lai</td>
</tr>
<tr>
<td>English</td>
<td>he</td>
<td>should</td>
<td>and</td>
<td>can/will</td>
<td>come</td>
</tr>
</tbody>
</table>

The conjunction “而且 (erqie, and)” connects the two modal verbs, forming a coordination construction. The first modal verb is called the previous conjunct and the second is called next conjunct.
Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>noun: he</td>
<td>verb: should</td>
<td>adj: and</td>
<td>verb: will-can</td>
<td>verb: come</td>
<td></td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: s' p vz</td>
<td>cat: conj</td>
<td>cat: s' p vz</td>
<td>cat: s' vq</td>
<td></td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem:</td>
<td>sem:</td>
<td>sem: sq</td>
<td></td>
</tr>
<tr>
<td>fnc:</td>
<td>arg:</td>
<td>arg:</td>
<td>arg:</td>
<td>arg:</td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

1. sur: 他 | sur: 应该 | sur: 而且 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: yinggai</td>
<td>pyn: erqie</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: should</td>
<td>verb: will-can</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: s' p vz</td>
<td>cat: conj</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem:</td>
</tr>
<tr>
<td>fnc: should</td>
<td>arg: he</td>
<td>arg:</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

In this step, the functor-argument relation is represented between the proplet “他 (ta, he)” and “应该 (yinggai, should)”.

2. sur: 他 | sur: 应该 | sur: 而且 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: yinggai</td>
<td>pyn: erqie</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: should</td>
<td>verb: will-can</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: s' p vz</td>
<td>cat: conj</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem:</td>
</tr>
<tr>
<td>fnc: should</td>
<td>arg: he</td>
<td>arg:</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

In this step, the conjunction is read in. The “nc (next conjunct)” attribute is created for the modal verb proplet. A substitute value “#” is provided, indicating a next conjunct is expected.

3. sur: 他 | sur: 应该 | sur: 会 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: yinggai</td>
<td>pyn: lue</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: should</td>
<td>verb: will-can</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: s' p vz</td>
<td>cat: s' vq</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem:</td>
</tr>
<tr>
<td>fnc: should</td>
<td>arg: he</td>
<td>arg:</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

In this step, a second modal verb is read in, the core value of which replaces the “nc” value in the second ss proplet. At the same time, the “pc (previous conjunct)” attribute is created for the nw
proplet and the core value from the second ss proplet is copied as its value.

4. sur : 他
   pym : ta
   noun: he
   cat : pro
   sem : s3 agent
   mdr : 
   sc : will-can
   [sur : 应该
   pym : yinggai
   verb: should
   cat : p' vz
   sem: sem: sem: spt
   fnc : should will-can
   arg : he
   mdr: mdr:
   sc : will-can
   pc : should]

   sur : 会
   pym : hui
   verb: will-can
   cat : p' vz
   sem: sem: sem: spt
   fnc : will-can
   arg : #
   mdr: mdr
   sc : will-can
   pc : should
   [sur : 来
   pym : lai
   verb: come
   cat : vz mark
   sem: sem: spt
   fnc : will-can
   arg : #
   mdr: mdr
   sc : will-can
   pc : should]

   sur : 来
   pym : lai
   verb: come
   cat : vz mark
   sem: sem: spt
   fnc : will-can
   arg : #
   mdr: mdr
   sc : will-can
   pc : should
   [sur : 应该
   pym : yinggai
   verb: should
   cat : p' vz
   sem: sem: sem: spt
   fnc : should will-can
   arg : he
   mdr: mdr:
   sc : will-can
   pc : should]

In step 4, the common verb is read in as the second argument of the modal verb.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

a) should will-can
   he come
   V
   V

b) V —— V

- Modal verbs in a continuous sequence

The second case is also possible in Chinese. But, without the conjunction, the relation between the two modal verbs is no longer coordination. Generally speaking, the second modal verb maintains its meaning and function, but the syntactic and semantic meaning of the first modal verb is weakened. From the perspective of semantics, it is proper to take the first modal verb as a modifier. For example:

Example 86. 他应该会来。(He is probably coming.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>应该</th>
<th>会</th>
<th>来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>yinggai</td>
<td>hui</td>
<td>lai</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>should</td>
<td>can/will</td>
<td>come</td>
</tr>
</tbody>
</table>

The conjunction is missing and the meaning of the sentence is different. In this case, the first modal word is absorbed when the second modal verb is read in.
The syntactic-semantic analysis of "他应该会来。"

1. sur: 他  pyn: ta  noun: he
   sur: 应该  pyn: yinggai  verb: should
   cat: pro  sem: s3  fnc: should  mdr: mdr:

In this step, the first modal verb is read in and the functor-argument relation between the subject and the modal verb is represented.

2. sur: 他  pyn: ta  noun: he
   sur: 会  pyn: hui  verb: will-can
   cat: pro  sem: s3  fnc: will-can  mdr: mdr:

When the second modal verb is read in, a variation of the rule of “V+V” is activated. The “fnc” value in the noun proplet is replaced by the “verb” value from the nw proplet. The “verb” value in the first modal verb proplet is copied to the “mdr” slot. Then all the “sur”, “pyn” and “verb” attributes in the first modal verb proplet gain new values from the nw proplet, i.e. the modal verb proplet in the sentence start is absorbed by the nw proplet.

3. sur: 他  pyn: ta  noun: he
   sur: 来  pyn: lai  verb: come
   cat: pro  sem: s3  fnc: will-can  mdr: should

The rule of “V+VO” is activated when the common verb is read in.

When the full stop is read in, the analysis comes to the end.
8.2. MODAL VERBS IN COMBINATION

Derivation result:

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 会</th>
<th>sur : 来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : hui</td>
<td>pyn : lai</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: will-can</td>
<td>verb: come</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : vz mark</td>
<td>cat : vq</td>
</tr>
<tr>
<td>sem : s3 agent</td>
<td>sem :</td>
<td>sem : spt</td>
</tr>
<tr>
<td>fnc : will-can</td>
<td>arg : he come</td>
<td>arg : #</td>
</tr>
<tr>
<td>mdr : mdr: should</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

\[
\text{a)} \quad \text{will-can} \quad \text{b)} \quad V \\
\quad \text{he} \quad \text{come} \quad \text{N} \quad \text{V}
\]

The combination with conjunctions, like in (a), is relatively free and arbitrary, but the combination without conjunctions is restricted with respect to language customs. The following patterns are found in the corpus:

Patterns of two modal verbs in a sequence:

- 可能 (keneng, may) + 会 (hui, will/can)
- 可能 (keneng, may) + 能 (neng, can)
- 可能 (keneng, may) + 愿意 (yuanyi, be willing to)
- 可能 (keneng, may) + 必须 (bixu, must)
- 可能 (keneng, may) + 得 (dei, have to)
- 可能 (keneng, may) + 敢 (gan, dare)
- 应该 (yinggai, should) + 会 (hui, will/can)
- 应该 (yinggai, should) + 能 (neng, can)
- 应该 (yinggai, should) + 愿意 (yuanyi, be willing to)
- 应该 (yinggai, should) + 肯 (ken, agree to)
- 应该 (yinggai, should) + 可以 (keyi, can)
- 得 (dei, have to) + 能 (neng, can)
- 得 (dei, have to) + 愿意 (yuanyi, be willing to)
- 得 (dei, have to) + 肯 (ken, agree to)
- 得 (dei, have to) + 敢 (gan, dare)
• 能 (neng, can) + 愿意 (yuanyí, be willing to)
• 必须 (bixu, must) + 得 (dei, have to)

The number of modal verbs in a continuous sequence without conjunctions can reach three, though the frequency of such patterns is not high. For example:

Example 87. 他应该会愿意来。(He is probably willing to come.)

| surface: | 他 应该 会 愿意 来 |
| pinyin: | ta yinggai hui yuanyi lai |
| English: | he should can/will be willing to come |

In this case, the first two modal verbs are both handled as modifiers and absorbed by the third modal verb proplet.

Derivation result:

```
sur: 他  sur: 愿意  sur: 来
pyn: ta  pyn: yuanyi  pyn: lai
noun: he verb: be-willing-to verb: come
cat: pro cat: vz mark cat: vq
sem: s3 agent sem: sem: s3 sem: sp
fnc: be-willing-to arg: he come fnc: be-willing-to
mdr: mdr: should will-can arg: #
```

The SRG and the signature presentation:

a)  

```
be-willing-to  
he  
```

b)  

```
V  
com e  N  V  
```

The number of such patterns is also limited. In fact, only four are collected as follows.

Patterns of three modal verbs in a sequence:

• 可能 (keneng, may) + 会 (hui, will/can) + 愿意 (yuanyí, be willing to)
• 可能 (keneng, may) + 能 (neng, can) + 愿意 (yuanyí, be willing to)
• 可能 (keneng, may) + 必须 (bixu, must) + 得 (dei, have to)
• 应该 (yinggai, should) + 会 (hui, will/can) + 愿意 (yuanyí, be willing to)
This page intentionally contains only this sentence.
Chapter 9

Analysis of Directional Verbs

Directional verbs belong to a sub-class of verbs. They indicate direction, e.g. from near to far, from high to low, from inside to outside, or other similar meanings. They can be further divided into simple words and compound words.

Simple directional verbs in Chinese are usually monosyllables, including:

<table>
<thead>
<tr>
<th>Surface</th>
<th>汉字</th>
<th>Pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>上</td>
<td>shang</td>
<td>shang</td>
<td>go up</td>
</tr>
<tr>
<td>下</td>
<td>xia</td>
<td>xia</td>
<td>go down</td>
</tr>
<tr>
<td>进</td>
<td>jin</td>
<td>jin</td>
<td>go in</td>
</tr>
<tr>
<td>出</td>
<td>chu</td>
<td>chu</td>
<td>go out</td>
</tr>
<tr>
<td>回</td>
<td>hui</td>
<td>hui</td>
<td>go back</td>
</tr>
<tr>
<td>起</td>
<td>qi</td>
<td>qi</td>
<td>start</td>
</tr>
<tr>
<td>来</td>
<td>lai</td>
<td>lai</td>
<td>come</td>
</tr>
<tr>
<td>去</td>
<td>qu</td>
<td>qu</td>
<td>go</td>
</tr>
</tbody>
</table>

Among the above eight directional verbs, the last two can follow any one of the preceding five (the sixth is excluded) to form two-syllable compound directional verbs:

<table>
<thead>
<tr>
<th>Surface</th>
<th>汉字</th>
<th>Pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>上来</td>
<td>shanglai</td>
<td>shanglai</td>
<td>go up start</td>
</tr>
<tr>
<td>下来</td>
<td>xialai</td>
<td>xialai</td>
<td>go down start</td>
</tr>
<tr>
<td>进来</td>
<td>jinlai</td>
<td>jinlai</td>
<td>go in start</td>
</tr>
<tr>
<td>出来</td>
<td>chulai</td>
<td>chulai</td>
<td>go out start</td>
</tr>
<tr>
<td>回来</td>
<td>huilai</td>
<td>huilai</td>
<td>go back start</td>
</tr>
<tr>
<td>起来</td>
<td>qilai</td>
<td>qilai</td>
<td>start come</td>
</tr>
</tbody>
</table>

The sixth word “起 (qi, start)” is only seen in collocation with “来 (lai, come)”, but not with “去 (qu, go)” i.e., “起来 (qilai, start)” is accepted while “去起” is not.
9.1 Verb + Directional Verb

Directional verbs can be used as predicators independently or follow common verb predicates to indicate directions. For example:

Example 88. 他来了。（He has come.）

| surface: | 他 来 了 |
| pinyin: | ta lai le |
| English: | he come - |

In this example, the directional verb “来（lai, come）” plays the role of a functor.

Derivation result:

Example 89. 眼泪要掉下来了。（Tears are going to drop down.）

| surface: | 眼泪 要 掉 下来 了 |
| pinyin: | yanlei yao diao xialai le |
| English: | tear be going to drop go down - |

In this example, the directional verb “下来（xialai, go-down）” follows the common verb “掉（diao, drop）” to indicate direction. It is treated as a complementary modifier.

Lexical lookup:
CHAPTER 9. DIRECTIONAL VERBS

9.1. VERB + DIRECTIONAL VERB

Syntactic-semantic analysis:

The previous steps are skipped. The result is copied as the ss part for step 3.

```
3.

<table>
<thead>
<tr>
<th>sur</th>
<th>眼泪</th>
<th>sur</th>
<th>要</th>
<th>sur</th>
<th>下来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>yanlei</td>
<td>pyn</td>
<td>yao</td>
<td>pyn</td>
<td>xialai</td>
</tr>
<tr>
<td>noun:</td>
<td>tear</td>
<td>verb:</td>
<td>be-going-to</td>
<td>verb:</td>
<td>drop</td>
</tr>
<tr>
<td>cat :</td>
<td>cn</td>
<td>cat :</td>
<td>vz</td>
<td>cat :</td>
<td>iv</td>
</tr>
<tr>
<td>sem :</td>
<td>agent</td>
<td>sem :</td>
<td></td>
<td>sem:</td>
<td>spt</td>
</tr>
<tr>
<td>fnc :</td>
<td>be-going-to</td>
<td>fnc :</td>
<td>be-going-to</td>
<td>arg :</td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td></td>
<td>mdr :</td>
<td>come-down</td>
<td>arg :</td>
<td></td>
</tr>
</tbody>
</table>
```

The “verb” value in the directional verb proplet is copied to the “mdr” slot in the common verb proplet. The directional verb proplet is not copied into output.

Derivation result:

```
3.

<table>
<thead>
<tr>
<th>sur</th>
<th>眼泪</th>
<th>sur</th>
<th>要</th>
<th>sur</th>
<th>下来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>yanlei</td>
<td>pyn</td>
<td>yao</td>
<td>pyn</td>
<td>diao</td>
</tr>
<tr>
<td>noun:</td>
<td>tear</td>
<td>verb:</td>
<td>be-going-to</td>
<td>verb:</td>
<td>drop</td>
</tr>
<tr>
<td>cat :</td>
<td>cn</td>
<td>cat :</td>
<td>vz</td>
<td>cat :</td>
<td>iv</td>
</tr>
<tr>
<td>sem :</td>
<td>agent</td>
<td>sem :</td>
<td></td>
<td>sem:</td>
<td>spt</td>
</tr>
<tr>
<td>fnc :</td>
<td>be-going-to</td>
<td>fnc :</td>
<td>be-going-to</td>
<td>arg :</td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td></td>
<td>mdr :</td>
<td>come-down</td>
<td>arg :</td>
<td></td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

```
a) be-going-to  b) V
    tear     \  \  N  V
      \    \  drop
```

In the sentences with directional verbs as complements, the aspect marker “了 (le, LE)”, if required by context, may come after the directional verb, like in the above example, or before the directional verb. For example:

Example 90. 他笑了起来。（He has started laughing.）
9.1. VERB + DIRECTIONAL VERB

Lexical lookup:

<table>
<thead>
<tr>
<th>sur</th>
<th>sur</th>
<th>sur</th>
<th>sur</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: xiao</td>
<td>pyn: le</td>
<td>pyn: qilai</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: laugh</td>
<td>adj: LE</td>
<td>verb: start</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: s'iv</td>
<td>cat: asp</td>
<td>cat: s'eq</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem: perf</td>
<td>sem: spt</td>
</tr>
<tr>
<td>fnc:</td>
<td>arg:</td>
<td>arg:</td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>sur</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: xiao</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: laugh</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: s'iv</td>
</tr>
<tr>
<td>sem: s3 agent</td>
<td>sem: perf</td>
</tr>
<tr>
<td>fnc: laugh</td>
<td>arg: he</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr: start</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

<table>
<thead>
<tr>
<th>a)</th>
<th>b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>laugh</td>
<td>V</td>
</tr>
</tbody>
</table>

he

But the aspect marker “过 (guo, GUO)” comes only after directional verbs. For example:

**Example 91.** 眼泪掉下来过. (Tears dropped down once.)

<table>
<thead>
<tr>
<th>surface</th>
<th>pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>眼泪</td>
<td>落下</td>
<td>teardown</td>
</tr>
<tr>
<td>滑下</td>
<td>guo</td>
<td>-</td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>sur</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: yanlei</td>
<td>pyn: diao</td>
</tr>
<tr>
<td>noun: tear</td>
<td>verb: drop</td>
</tr>
<tr>
<td>cat: cn</td>
<td>cat: s'iv mark</td>
</tr>
<tr>
<td>sem:</td>
<td>sem: past</td>
</tr>
<tr>
<td>fnc: drop</td>
<td>arg: tear</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr: come-down</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

<table>
<thead>
<tr>
<th>a)</th>
<th>b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>drop</td>
<td>V</td>
</tr>
<tr>
<td>tear</td>
<td>N</td>
</tr>
</tbody>
</table>

The combination of verb + directional verb may be further used as a conjunct in a coordination construction. For example:
Example 92. 两个主要政党已经联合起来组成政府。(Two main parties have united to organize a government.)

<table>
<thead>
<tr>
<th>surface</th>
<th>两个 主要 政党 已经 联合 起来 组成 政府</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>liang ge zhuyao zhengdang yijing lianhe qilai zucheng zhengfu</td>
</tr>
<tr>
<td>English</td>
<td>two - main party already unite start organize government</td>
</tr>
</tbody>
</table>

Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mdr :</td>
<td>mdd :</td>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : zhengdang</td>
<td>pyn : zhuyao</td>
<td>pyn : lianhe</td>
<td>pyn : zucheng</td>
<td>pyn : zhengfu</td>
</tr>
<tr>
<td>noun : party</td>
<td>adj : main</td>
<td>verb : unite</td>
<td>verb : organize</td>
<td>noun : government</td>
</tr>
<tr>
<td>cat : cn</td>
<td>cat : adj</td>
<td>cat : iv</td>
<td>cat : tv mark</td>
<td>cat : cn</td>
</tr>
<tr>
<td>sem :</td>
<td>sem : perfect</td>
<td>sem :</td>
<td>sem : patient</td>
<td></td>
</tr>
<tr>
<td>fnc : unite</td>
<td>mdr :</td>
<td>arg : party</td>
<td>arg : # government</td>
<td>fnc : organize</td>
</tr>
<tr>
<td>mdr : two main</td>
<td>mdd : party</td>
<td>mdr : start</td>
<td>mdr :</td>
<td></td>
</tr>
<tr>
<td>mdd :</td>
<td>sc : organize</td>
<td>pc : unite</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) unite → organize
   party | government
   main

b) V → V
   N |
   A

9.2 Adjective + Directional Verb

Directional verbs are also seen as modifiers of adjectives. In such an application, their core values are also copied into the “mdr” slot in the adjective proplet. For example:

Example 93. 她的脸红起来。(Her face is becoming red.)

<table>
<thead>
<tr>
<th>surface</th>
<th>她 的 脸 红 起来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta de lian hong qilai</td>
</tr>
<tr>
<td>English</td>
<td>she - face red start</td>
</tr>
</tbody>
</table>
Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>noun: she</td>
<td>adj: DE</td>
<td>noun: face</td>
<td>adj: red</td>
<td>verb: start</td>
<td>sem: v' decl</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: sur</td>
<td>cat: cn</td>
<td>cat: adj</td>
<td>cat: s'vq</td>
<td></td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem: object</td>
<td>sem:</td>
<td>sem: spt</td>
<td></td>
</tr>
<tr>
<td>fnc:</td>
<td>fnc:</td>
<td>mdr:</td>
<td>arg:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th>sur: 她</th>
<th>sur: 脸</th>
<th>sur: 红</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: lian</td>
<td>pyn: hong</td>
</tr>
<tr>
<td>noun: she</td>
<td>noun: face</td>
<td>adj: red</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: cn</td>
<td>cat: adj mark</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem: object theme</td>
<td>sem: av</td>
</tr>
<tr>
<td>fnc:</td>
<td>fnc: red</td>
<td>arg: face</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr: she</td>
<td>mdr: start</td>
</tr>
<tr>
<td>mdd: face</td>
<td>mdd:</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) red
   
   face
   
   she

b) A
   
   N

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Chapter 10

Analysis of Causative and Three-valence Verbs

Causative verbs express command or requirement. They are distinctive in that they take complete clauses as objects. Three-valence words can be further divided into three groups. Group 1 is represented by the word “给 (gei, give)”. Group 2 is represented by “抢 (qiang, rob)”. Group 3 is exemplified by “听 (ting, listen)”. Group 1 is possible to be found in many languages. But group 2 and 3 seems to be particular in Chinese.

10.1 Causative Verbs

Similar to transitive verbs, they require two arguments, one as the subject and the other as the object. But the object may not be limited to a nominal phrase. It is often a clause. In other words, the core value of the main verb in the object clause should be copied as the second “arg” value in the causative verb proplet. Here lies the difference of causative verbs from modal verbs. Modal verbs share the same subjects with their verb arguments. In the sentences with causative verbs, the subjects in the subclauses are usually different from those in the main clauses.

The number of monosyllable causative verbs is limited, mainly including:

<table>
<thead>
<tr>
<th>surface</th>
<th>pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>使</td>
<td>shi</td>
<td>make</td>
</tr>
<tr>
<td>令</td>
<td>ling</td>
<td>order</td>
</tr>
<tr>
<td>叫</td>
<td>jiao</td>
<td>ask</td>
</tr>
<tr>
<td>请</td>
<td>qing</td>
<td>request</td>
</tr>
<tr>
<td>让</td>
<td>rang</td>
<td>let</td>
</tr>
<tr>
<td>教</td>
<td>jiao</td>
<td>teach</td>
</tr>
<tr>
<td>派</td>
<td>pai</td>
<td>dispatch</td>
</tr>
<tr>
<td>催</td>
<td>cui</td>
<td>urge</td>
</tr>
<tr>
<td>迫</td>
<td>bi</td>
<td>force</td>
</tr>
<tr>
<td>求</td>
<td>qiu</td>
<td>beg</td>
</tr>
<tr>
<td>托</td>
<td>tuo</td>
<td>entrust</td>
</tr>
</tbody>
</table>
Two-syllable causative verbs mainly include the following:

<table>
<thead>
<tr>
<th>Two-syllable Causative Verbs</th>
<th>Pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>命令</td>
<td>mingling</td>
<td>command</td>
</tr>
<tr>
<td>请求</td>
<td>qingqiu</td>
<td>request</td>
</tr>
<tr>
<td>呱咐</td>
<td>fenfu</td>
<td>order</td>
</tr>
<tr>
<td>发动</td>
<td>fadong</td>
<td>initiate</td>
</tr>
<tr>
<td>鼓励</td>
<td>guli</td>
<td>encourage</td>
</tr>
<tr>
<td>迫使</td>
<td>poshi</td>
<td>force</td>
</tr>
<tr>
<td>动员</td>
<td>dongyuan</td>
<td>motivate</td>
</tr>
<tr>
<td>组织</td>
<td>zuzhi</td>
<td>organize</td>
</tr>
<tr>
<td>号召</td>
<td>haozhao</td>
<td>call on</td>
</tr>
<tr>
<td>禁止</td>
<td>jinzhi</td>
<td>forbid</td>
</tr>
</tbody>
</table>

Example 94. 我会吩咐她准备咖啡。（I will order her to prepare coffee.）

In this sentence, the subject of the main clause is “我 (wo, I)”, but the subject in the sub-clause is “她 (ta, she)”. The modal verb “会 (hui, will-can)” and the causative verb “吩咐 (fenfu, order)” share the same subject “我 (wo, I)”. But the common verb “准备 (zunbei, prepare)” in the sub-clause is the functor of “她 (ta, she)”, instead of “我 (wo, I)”.

Lexical lookup:

Syntactic-semantic analysis:

First, the subject of the main clause “我 (wo, I)” is read in as the sentence start.
With the input of the modal verb “会 (hui, will-can)”, the rule of “S+V” is activated.

2. sur : 我
  pyn : wo
  noun: I
  cat : pro
  sem : s1 agent @ 0
  fnc : will-can
  mdr :

In this step, the rule of “V+VO” is activated when the causative verb “吩咐 (fenfu, order)” is read in. “吩咐 (fenfu, order)” is a two-valence verb. Only the first “cat” value is canceled in this step. Because the “sem” value of “吩咐 (fenfu, order)” is “causative”, the second “sem” value in the subject proplet is changed from “agent” to “causer”.

3. sur : 我
  pyn : wo
  noun: I
  cat : pro
  sem : s1 causer
  fnc : will-can
  mdr :

The second pronoun is read in. The rule of “V+N” is applied. The “verb” value in the preceding proplet is copied to the “fnc” slot in the nw proplet, and the “noun” value in the nw proplet is copied as the second “arg” value in the verb proplet. An additional value, “experiencer”, is copied to the “sem” slot in the nw proplet.

4. sur : 我
  pyn : wo
  noun: I
  cat : pro
  sem : s1 causer
  fnc : will-can
  mdr :

When the main verb in the sub-clause is read in, the functor-argument relation between “吩咐 (fenfu, order)” and “她 (ta, she)” is canceled. The “verb” value in the nw proplet is copied as the second “arg” value in the causative verb proplet. Accordingly, the “verb” value, “require”, is copied as the “fnc” value in the nw proplet. The “fnc” value in the proplet of “她 (ta, she)” is replaced by the “verb” value from the nw proplet. An additional value “agent” is copied to the “sem” slot in the the proplet of “她 (ta, she)”. Accordingly, the “noun” value in the proplet of “她 (ta, she)” is copied as the first “arg” value in the nw proplet. After the rule operations in this step, the nw proplet, as a verb proplet with both the “fnc” attribute and the “arg” attribute, is
10.2 Three-valence Verbs

The three-valence verbs in Chinese are classified into two groups. One is represented by “给 (gei, give)”. The other one is represented by “抢 (qiang, rob)”. Many other verbs, such as “听 (ting, listen)”, are also found is similar patterns. Though they are different in semantic composition, they are analyzed similarly with the words from the second group.

10.2.1 “给 (gei, give)” Construction

The three-valence “给 (gei, give)” construction, is found in other languages as well, such as English. Generally, it shows up as a construction with two objects. For example, in Chinese, there is...
CHAPTER 10. SPECIAL VERBS

10.2. THREE-VALENCE VERBS

Example 95. 他给了我一本书。(He gave me a book.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他 给 了 我 一 本 书</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta gei le wo yi ben shu</td>
</tr>
<tr>
<td>English:</td>
<td>he give - I one - book</td>
</tr>
</tbody>
</table>

In English, there is “He gave me a book.”

This double-object construction is taken by Oehrle [1976], Harley [2003], Cheng et al. [1999] as a causative construction. In fact, the verb “给 (gei, give)” has two semantic elements: cause and have. Basically, 他给了我一本书。(He gave me a book.)” equals to “他使我有了一本书。(He made me have a book.)” The second sentence is a causative sentence with the typical causative verb “使 (shi, make)”. The subject is the causer, and the indirect object is the experiencer.

Verbs in this group mainly include:

<table>
<thead>
<tr>
<th>surface:</th>
<th>给 送 卖 交给 寄给 租</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>gei song mai jiaogei jigei zu</td>
</tr>
<tr>
<td>English:</td>
<td>give offer sell deliver send rent</td>
</tr>
</tbody>
</table>

In the derivation of sentences with such verbs, the value of “experiencer” is provided, as in causative sentences.

Lexical lookup:

The syntactic-semantic analysis of “他给了我一本书。”
When the three-valence verb is read in, the functor-argument relation between the noun and the verb is represented after the operations of the rule of S+V. The first “cat” value is canceled in the verb proplet. The value of “agent” is copied to the “sem” slot in the noun proplet.

2. sur : 他 sur : 给 sur : 了 ★ acopy(nw.sem SS.sem)
   pyn : ta pyn : gei pyn : le
   noun: he verb: give adj : LE
   cat : pro cat : i’ d’ tv cat : asp
   sem : s3 agent sem: unaccusative sem: perf
   fnc : arg : he 0
   mdr : mdr:

The input of the aspect marker activates the rule of W+MR.

3. sur : 他 sur : 给 sur : 我 ★ acopy(nw.noun SS.arg)
   sur : 给 sur : 我
   pyn : ta pyn : gei pyn : wo
   noun: he verb: give noun: I
   cat : pro cat : i’ d’ tv @ cat : pro
   cat : cdn
   sem : s3 agent sem: unaccusative perf sem : s1 @
   sem: patient sem : +N
   fnc : arg : he I 0 fnc : give fnc :
   mdr : mdr: mdr: mdr : mdr:

When the indirect object, a pronoun, is read in, the rule of V+N is activated. The “noun” value from the nw proplet is copied to the “arg” slot of the verb proplet. The first “cat” value, i.e. “i’”, is accordingly canceled. The “verb” value is copied as the “fnc” value in the nw proplet. The value of “experiencer” is copied to the “sem” slot in the nw proplet.

   sur : 我
   sur : —
   pyn : ta pyn : gei pyn : wo pyn : yi
   noun: he verb: give noun: I noun: one
   noun: one
   cat : pro cat : d’ tv @ cat : pro cat : cdn
   cat : cdn
   sem : s3 agent sem: unaccusative perf sem : s1 experiencer sem : +N
   sem: patient sem : +N
   fnc : arg : he I one fnc : give fnc :
   fnc : give
   mdr : mdr:
   mdr:
   mdr: mdd:

In this step, the cardinal is read in. The “verb” value is copied to the “fnc” slot of the nw proplet, and the “noun” value from the nw proplet is copied to the “arg” slot in the verb proplet. The value of “patient” is added to the “sem” slot in the nw proplet.

5. sur : 他 sur : 给 sur : 我 sur : 本 ★ acopy(nw.noun SS.arg)
   sur : 本
   sur: 本
   sur: 本
   sur: 本
   sur: 本
   pyn : ta pyn : gei pyn : wo pyn : yi pyn : ben
   noun: he verb: give noun: I noun: one noun: BEN
   noun: BEN
   cat : pro cat : tv cat : pro cat : cdn @ cat : nquan
   cat : cdn @
   sem : s3 agent sem: unaccusative perf sem : s1 experiencer sem : patient sem : +N
   sem : patient sem : +N
   fnc : arg : he I one fnc : give fnc :
   fnc : give
   mdr : mdr:
   mdr:
   mdr: mdd:

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The input of the quantifier activates the rule of NUM+QUAN.

pyn: ta  pym: gei  pym: wo  pym: yi  pym: shu
cat: pro  cat: tv  cat: pro  cat: cdn-q  cat: cn
sem: s3 agent  sem: unaccusative perf  sem: s1 exper  sem: patient +N  sem: object
fnc: arg: he I one  fnc: give  fnc: give  fnc: give
mdr: mdr: mdr: mdr: one

When the common noun, “书 (shu, book)”, is read in, the preceding “cdn-q” proplet is absorbed. The third “arg” value in the verb proplet is replaced by the “noun” value from the nw proplet. The derivation result is copied into output as four proplets.

pyn: ta  pym: gei  pym: wo  pym: shu  cat: mark
sem: s3 agent  sem: unaccusative perf  sem: s1 exper  sem: patient object
fnc: arg: he I book  fnc: give  fnc: give  fnc: give
mdr: mdr: mdr: mdr: one

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

```
a)      b) V
   he \   I \ book \ N \ N \ N
```

10.2.2 “抢 (qiang, rob)” Construction

Superficially, the verbs in the “给 (gei, give)” construction have one subject and two objects, direct and indirect. In deep structure, the indirect object is the subject in the sub-clause, or the smaller subject (the subject of the main clause being the larger one). So the three arguments are respectively the agent, the experiencer and the patient. In the “抢 (qiang, rob)” construction, the subject in the main clause is also the agent, but the two objects are respectively the affectee and
the patient. This is because, in the “抢 (qiang, rob)” construction, the middle argument is not the neutral or initiative experiencer but the passive indirect patient.

Take the following sentence as an example.

Example 96. 他抢了我一本书。（He robbed me of a book.）

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>抢</th>
<th>了</th>
<th>我</th>
<th>一</th>
<th>本</th>
<th>书</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>qiang</td>
<td>le</td>
<td>wo</td>
<td>yi</td>
<td>ben</td>
<td>shu</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>rob</td>
<td>-</td>
<td>I</td>
<td>one</td>
<td>-</td>
<td>book</td>
</tr>
</tbody>
</table>

If the words in Group 1 have two semantic elements: cause and have, then the verbs in Group 2 also have two: cause and lose. “他抢了我一本书。（He robbed me of a book.）” can be interpreted as “他使我丢了一本书。（He made me lose a book.）”

The derivation result of “他抢了我一本书。” is also composed of four proplets:

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 抢</th>
<th>sur : 我</th>
<th>sur : 书</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>qiang</td>
<td>wo</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : tv mark</td>
<td>cat : pro</td>
<td>cat : cn</td>
</tr>
<tr>
<td>sem : s3 agent</td>
<td>sem : unergative perf</td>
<td>sem : s1 affectee</td>
<td>sem : patient object</td>
</tr>
<tr>
<td>fnc : arg : he</td>
<td>fnc :rob</td>
<td>fnc : rob</td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr : one</td>
<td>mdr :</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

```
a) rob
   he    I     book
   N   N   N
```

The most frequently used words in this pattern also include “偷 (tou, steal)”,”盗 (dao, steal)”,”夺 (duo, rob)” and “拿 (na, take)”, etc.

10.2.3 “听 (ting, listen)” Construction

“吃 (chi, eat)”,”打 (da, beat)”,”听 (ting, listen)” and many other words are observed in the pattern of “verb + personal pronoun + (numeral + quantifier) + common noun”, i.e. the same pattern with the words in the above two groups. But semantically, these words cannot be assigned the two elements of “cause” and “have”, or “cause” and “lose”. Take the following sentence as an example.

Example 97. 我听了他两堂课。(I attended to two of his lessons.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>我</th>
<th>听</th>
<th>了</th>
<th>他</th>
<th>两</th>
<th>堂</th>
<th>课</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>wo</td>
<td>ting</td>
<td>le</td>
<td>ta</td>
<td>liang</td>
<td>tang</td>
<td>ke</td>
</tr>
<tr>
<td>English:</td>
<td>I</td>
<td>listen</td>
<td>-</td>
<td>he</td>
<td>two</td>
<td>-</td>
<td>lesson</td>
</tr>
</tbody>
</table>
CHAPTER 10. SPECIAL VERBS

10.2. THREE-VALENCE VERBS

Note: the aspect marker “了 (le, LE)” is not required in this pattern. Its main function here is to make all the examples balanced in the number of words.

The action “听 (ting, listen)” is not possible to make the middle argument have or lose anything. However, the indirect object “他 (ta, he)” is also passively affected. It is proper to give the value of “affectee” to its attribute “sem”. Therefore, the syntactic-semantic analysis of this example resembles that of the “抢 (qiang, rob)” construction.

Lexical lookup:

Derivation result:

The SRG and the signature presentation:

a)  
\[ \text{listen} \]

b)  
\[ V \]

I \quad \text{he} \quad \text{lesson} \quad \text{N} \quad \text{N} \quad \text{N} \]
This page intentionally contains only this sentence.
VERBs include common verbs with one, two or three valences, modal verbs, directional verbs, and causative verbs. Chinese verbs don’t have formal changes when used in different tense or aspect. The combination of verbs with aspect markers is analyzed. During the automatic derivation, the semantic value of the aspect marker replaces the original value of the verb regarding tense or aspect. The patterns of AA, AABB, ABAB, A yi A and A le A are generalized as frequent grammatic phenomena in Chinese. Verbs as predicators gain values for their “arg” attribute. Verbs as subjects or objects receive the additional attribute-value pair of “fnc”. Their semantic attribute has a special value of “vn”. When verbs are used as adverbials or attributives, they have the attribute-value pair of “mdd” to indicate the relation with the elements they modify. In addition, their semantic attribute gets the value of “va”. Modal verbs may be modified by adverbs. They may also be used in combination with one another. The patterns are generalized. Their semantic meaning is discussed and presented. Directional verbs may be used independently or in combination with other verbs and adjectives. When following other verbs or adjectives, they are complementary and therefore treated as modifiers and absorbed by the preceding words.
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Part III

ADJECTIVE Application and Analysis
Adjective is one of the traditional eight English parts of speech. But in LAG-Chinese, we distinguish ADJECTIVE from adjective. The upper case ADJECTIVE refers to one of the three basic parts of speech. Below ADJECTIVE, we have sub-classes of adjective, adverb, conjunction, preposition and other function words, including structure auxiliaries, markers, etc. This part includes three chapters, namely adjective, adverb, preposition and conjunctive.

Adjectives in Chinese can be used as adnominal modifiers, the same as in English. But, they are also used as adverbial modifiers. In this case they are sometimes supported by auxiliaries, other times not. In Chinese, adjectives and verbs are known as the two main predicate words. In other words, adjectives can be used as predicators as verbs can. Based on this functional similarity with verbs, adjectives are also seen in collocation with aspect markers. They take objects, too. The repetition of adjectives are discussed in the last section of Chapter 11.

An overview of adverbs in Chinese is presented at the beginning of Chapter 12. The most frequently found 9 sentence patterns with adverbs are exemplified. Among all the adverbs, only “很 (hen, very)” and “极 (ji, extremely)” are observed as independent complementary modifiers. This is discussed in the second section. The third section presents some adverbs, such as “又 (you, again)” and “越 (yue, more)”, which can be used in coordination and function as conjunctives.

Chapter 13 focuses on the analysis of prepositions and conjunctives. Prepositions are never used independently. They require nominal constructions as objects. Then the preposition phrases, as a whole, serve as adnominal or adverbial modifiers. When preposition phrases are used as attributives, the particle “的 (de, DE)” is usually required. Prepositions are also observed in collocation with aspect markers. “把 (ba, BA)” and “被 (bei, by)” constructions are introduced as special application of prepositions. “把 (ba, BA)” has the function of object-fronting while “被 (bei, by)” generally indicates the passive voice. In superficial structure, they have the modifier-modified relation with the predicators. But semantically, the arguments of “把 (ba, BA)” and “被 (bei, by)” are respectively patients and agents. Conjunctives are exemplified on both phrasal and sentential level. On sentential level, Chinese conjunctives tend to occur in pairs. Within a proposition, they can come after or before the subject.

Particles, including aspect markers “着 (zhe, ZHE)”, “了 (le, LE)”, and “过 (guo, GUO)”, structural auxiliaries “的 (de, DE)”, “地 (de, DE)”, “得 (de, DE)”, “给 (gei, GEI)” and “所 (suo, SUO)”, etc. also belong to this family of ADJECTIVE. They are spread here and there at proper places instead of being collected in a separate chapter.
This page intentionally contains only this sentence.
Chapter 11

Analysis of Adjectives

Adjectives in Chinese form an open class. Generally speaking, an adjective can be modified by an adverb of degree, i.e. intensifier. In English, an adjective modifies a nominal phrase, giving more information about the modified. Chinese adjectives have more functions. Besides attributive, an adjective in Chinese also plays the role of a predicate and an adverbial modifier.

11.1 Overview

A common usage of adjectives is attributive. In English, there is “He is a clever boy.” In Chinese, we have:

Example 98. 他是一个聪明孩子。(He is a clever boy.)

<table>
<thead>
<tr>
<th>surface: 他 是 一 个 聪明 孩子</th>
<th>pinyin: ta shi yi ge congming haizi</th>
</tr>
</thead>
<tbody>
<tr>
<td>English: he be one - clever child</td>
<td></td>
</tr>
</tbody>
</table>

Except the quantifier “个 (ge, GE)”, the two sentences are equivalent word by word.

Lexical lookup: “个 (ge, GE)”, the two sentences are equivalent word by word.
The pattern of “numeral + quantifier + adjective + noun” is rather common in Chinese. During the derivation, the numeral and the quantifier are absorbed.

The syntactic-semantic analysis of “他是一个聪明孩子。”

1. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : arg :
   mdr : [ ]

2. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : be
   mdr : [ ]

3. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : be
   mdr : [ ]

4. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : be
   mdr : [ ]

5. sur : 他
   pyn : ta
   noun: he
   cat : pro
   sem : s3
   fnc : be
   mdr : [ ]
The rules of S+VX, VX+P, NUM+QUAN, N+ADJ, ADJ+N and S+IP are applied one after another.

Derivation result:

The SRG and the signature presentation:

Theoretically, the particle “的 (de, DE)” can follow all adjectives when they are used as adnominal modifiers. The above example equals to

**Example 99. 他 一 个 聪明 的 孩子。 (He is a clever boy.)**

The syntactic-semantic analysis for the front part is the same with the above example. The result of step 4 is copied into output as the sentence start for next step.
In step 5, the particle “的 (de, DE)” is read in. A substitute value “#” is copied to the “mdd” slot in the adjective proplet.

When the noun “孩子 (haizi, child)” is read in, the substitute value “#” is replaced. The “cdn-q” proplet is absorbed.

The derivation result of this sentence is the same as that of the above example.

When there is an adverb, it usually precedes the adjective, as in English. For example:

**Example 100.** 他是一个很聪明的孩子。（He is a very clever boy.)

The adverb “很 (hen, very)” is absorbed by the adjective during derivation, but its core value is copied as the “mdr” value in the adjective proplet.

The derivation result is as follows:
One more difference of Chinese adjectives from English ones is that Chinese adjectives can be used as adverbial modifiers. Normally there are two variations of this application: with or without the adverbial marker “地 (de, DE)”. In English, adjectives change to adverbs before modifying verbs. In other words, adjectives in English are only modifiers of nominal phrases while adverbs modify verbs. This is not the same in Chinese. The particle “地 (de, DE)” is taken as an adverbial marker. When an adjective is followed by the particle “地 (de, DE)”, it becomes an adverbial modifier. But, the particle “地 (de, DE)” is not mandatory. For example:

Example 101. 他平安地回来了。(He came back safe.)

| surface: | 他 平安 地 回来 了 |
| pinyin:  | ta pingan de huilai le |
| English: | he safe - return - |

Example 102. 他平安回来了。(He came back safe.)

| surface: | 他 平安 回来 了 |
| pinyin:  | ta pingan huilai le |
| English: | he safe return - |

Both sentences are grammatical with clear meaning. Syntactically, the first sentence has an additional particle. Semantically, the two sentences have the same meaning. The derivation process of the two sentences is slightly different due to the particle “地 (de, DE)”, but the derivation result is the same:

```
sur : 他   | sur : 平安   | sur : 回来
pyn : ta   | pyn : pingan | pyn : huilai
nom: he    | adj : safe   | verb: return
cat : pro   | cat : adj    | cat : iv mark
sem : s3    | sem :        | sem : perf
fnc : return|mdr :        | arg : he
mdr :       | mdd: return  | mdr: safe
```

The SRG and the signature presentation:

a) return b) V
   /   \    /   /
  he   safe N  A

11.2 Adjectives as Predicators

The two most common predicators in Chinese are verbs and adjectives. This is different from English. Adjectives are never used as predicators in English. For example, the Chinese sentence
Example 103. 他聪明。（He is clever.）

<table>
<thead>
<tr>
<th>surface: 他 聪明</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin: ta congming</td>
</tr>
<tr>
<td>English: he clever</td>
</tr>
</tbody>
</table>

is composed of a pronoun and an adjective. The equivalent English translation is

“He is clever.”

which is composed of three words: a pronoun, a link verb and an adjective.

Based on the principle of descriptive analysis, adjectives in such applications are provided the value “av” for their attribute “sem”. At the same time, an additional attribute “arg” is created in the adjective proplet.

The syntactic-semantic analysis of “他聪明。”

1. sur : 他
   sur : 聪明
   pyn : ta pyn : congming
   noun: he adj : clever
cat : pro cat : adj
sem : s3 arg
fnc : 根
mdr :

In this step, the rule of S+AV is activated and the functor-argument relation is represented. The “adj” value in the nw proplet is copied into the “fnc” slot in the ss proplet. In return, the core value from the ss proplet is copied as the “arg” value in the nw proplet. The value of “theme” is copied to the “sem” slot in the ss proplet, and the value of “av” is copied to the “sem” slot in the nw proplet.

2. sur : 他
   sur : 聪明
   pyn : ta pyn : congming
   noun: he adj : clever
cat : pro cat : adj
sem : s3 theme
fnc : clever
mdr : mdr:

When the full stop is read in, the analysis comes to the end.
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Derivation result:

| sur : 他    | sur : 聪明   |
| pyn : ta    | pyn : congming |
| noun: he    | adj : clever   |
| cat : pro   | cat : adj mark |
| sem : s3 theme | sem : av     |
| fnc : clever | arg : he      |
| mdr :       | mdr:         |

The SRG and the signature presentation:

a) clever  b) A
he N

Actually, it is also possible to see the link verb “是 (shi, be)” between the subject and the adjective predicate, e.g. “他是聪明”, but the pragmatic meaning changes significantly. “他聪明” means “He is clever”, while “他是聪明” means “He is clever, but...". In other words, if there is a “是 (shi, be)” in between, the sentence will be taken as incomplete and something negative about the subject is expected.

When an adjective is used as a predicate, there may also be an adverb as its modifier. For example:

Example 104. 他很聪明。(He is very clever.)

| surface: 他 很 聪明 |
| pinyin: ta hen congming |
| English: he very clever |

The adverb proplet is absorbed during derivation.

Derivation result:

| sur : 他    | sur : 聪明   |
| pyn : ta    | pyn : congming |
| noun: he    | adj : clever   |
| cat : pro   | cat : adj mark |
| sem : s3 theme | sem : av     |
| fnc : clever | arg : he      |
| mdr :       | mdr: very     |

Because of the absorption of the adverb, the SRG and the signature presentation of this example are the same as those of the above sentence.

11.2.1 Adjective + asp
Since adjectives are also used as predicators, they are similar to verbs in several aspects. As discussed earlier, Chinese verbs don’t have any formal changes with respect to tense or aspect. The information of tense and aspect is provided by context, adverbs or aspect markers. This is the same with adjectives. When adjectives are used as predicators, they can be further modified by aspect markers. For example:

**Example 105.** 这台电脑坏了。(This computer has broken down.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>这 台 电脑 坏 了</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>zhe tai diannao huai le</td>
</tr>
<tr>
<td>English:</td>
<td>this - computer broken -</td>
</tr>
</tbody>
</table>

In this example, “坏 (huai, broken)” is an adjective and used as a predicator. It is followed by the aspect marker “了 (le, LE)”. The combination of “坏 (huai, broken)” with the aspect marker “了 (le, LE)” follows the rule of W+ASP.

Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : zhe</td>
<td>pyn : tai</td>
<td>pyn : diannao</td>
<td>pyn : huai</td>
<td>pyn : le</td>
<td>cat : mark</td>
</tr>
<tr>
<td>sem :</td>
<td>sem : +N</td>
<td>sem : object</td>
<td>sem :</td>
<td>sem: perf</td>
<td></td>
</tr>
<tr>
<td>fnc :</td>
<td>fnc :</td>
<td>mdr :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

In step 1-2, the derivation of “这台电脑” follows the rule of DET+N and DP+N. The derivation result is a simple proplet of “电脑 (diannao, computer)”, which is copied into output as the sentence start for step 3.

3. | sur : 电脑 | sur : 坏 | ecopy(SS noun nw.arg) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : diannao</td>
<td>pyn : huai</td>
<td>acopy(nw adj SS.fnc)</td>
</tr>
<tr>
<td>noun : computer</td>
<td>adj : broken</td>
<td>acopy(theme SS.sem)</td>
</tr>
<tr>
<td>cat : cn</td>
<td>cat : adj</td>
<td>acopy(av nw.sem)</td>
</tr>
<tr>
<td>sem : object</td>
<td>sem : ⊕</td>
<td></td>
</tr>
<tr>
<td>fnc :</td>
<td>mdr :</td>
<td>mdr : ⊕</td>
</tr>
<tr>
<td>mdr : this</td>
<td>mdr :</td>
<td></td>
</tr>
</tbody>
</table>

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In step 3, the rule of S+AV is activated when the adjective “坏 (huai, broken)” is read in.

4. sur: 电脑  
    pyn: diannao  
    noun: computer  
    cat: cn  
    sem: object theme  
    fnc: broken  
    mdr: this  
    
    sur: 坏  
    pyn: huai  
    adj: broken  
    cat: adj  
    sem: av  
    fnc: broken  
    mdr:  

In step 4, the rule of W+ASP applies. The “sem” value of the aspect marker is copied into the adjective proplet.

Derivation result:

The SRG and the signature presentation:

a) broken  b) A

/  /  
computer N

The other two aspect markers can also modify adjective predicates. For example:

Example 106. 这台电脑坏过。(This computer was broken before.)

Derivation result:
Example 107. 这台电脑还坏着。(This computer is still broken.)

| surface: 这 台 电 脑 还 坏 着 |
|---------|---------|---------|---------|
| pinyin: zhe tai diannao hai huai zhe |
| English: this - computer still broken - |

Derivation result:

```
sur : 电脑  sur : 坏
pyn : diannao pyn : huai
noun: computer adj : broken
cat : cn cat : adj mark
sem : object theme sem : av cont
fnc : broken arg : computer
mdr : this mdr: still
```

The SRG and the signature presentation are the same as those of the example with “了 (le, LE)”.

11.2.2 Adjective + Object

Another similarity between verbs and adjectives lies in that adjective predicates also take objects. Dexi Zhu (1982) defines adjectives as words that can be modified by “很 (hen, very)” and do not take any object. But in real practice, structures like “活跃 (huoyue, active) 气氛 (qifen, atmosphere)” and “方便 (fanbian, convenient) 群众 (qunzhong, people)” are frequently used. This grammatical phenomenon was discussed as early as in Chinese Grammar of Mr. Ma, which is considered as the first grammar book in China. Li Wang (1947) also listed this phenomenon in his Modern Chinese Grammar. Such analysis was extended in his Theory of Chinese Grammar (1947). With the development of research in Chinese grammar after 1940s, significant process has been seen in the study of adjectives taking objects. Generally speaking, there are 4 opinions about this grammatical phenomenon.

Some linguists argue that adjectives cannot take objects. When followed by objects, they are transformed into verbs, i.e. these words have two parts of speech: adjective and verb. Representatives of this group include: Dexi Zhu (2000:56), Shuxiang Lv (1966), Changyin Ye (1996), Qilong Wang (1995), Quan Li (1996), Rui Guo (2002) and Jianming Lu (2005). But, Yiping Lv (2000), Li Wang (1989) and Fuyi Xing (2004) only take it as a temporary shift in part of speech.

A third opinion is that an adjective is still an adjective when it is followed by an object. Zhigong Zhang (1982), Xiaolong Shen (2001), Xiao Fan (1983) and Xilun Shen (1984) support this view by saying that both the graphical form and the core meaning of the adjective is not changed after it takes any object. Shuxin Liu (2002) and Jingchun Tan (1997) don’t agree with any one of them. Liu calls the adjectives with objects “adjective-verbs” and Tan calls them “causative verbs”. The former one is a completely new grammatical category and the later is a sub-category of verbs.

In this LAG-Chinese research: adjectives are adjectives, no matter where they are or what role they play. Based on the relations between an adjective and its object, the A+O structure has
two varieties. One is that the object is the agent, with the adjective representing its property or status. The other one is that the object is associated with the property or status the adjective represents. Generally, the adjectives used in the second occasion describes people’s psychological status.

(1) A+O case 1

There are more than a hundred adjectives that can be used in the first occasion. 90% of them have the meaning of making the objects have the property or status they represent. For example:

**Example 108.** 这项工程方便了生活。(This project made life convenient.)

| surface | 这 项 工程 方便 了 生活 |
| pinyin: zhe xiang gongcheng fanbian le shenghuo |
| English: this - project convenient - life |

“方便了生活 (convenient life)” equals to “使生活方便了 (made life convenient).” “稳定情绪 (stable mood)” equals to “使情绪稳定 (make mood stable).” Though adjectives are not stored in the lexicon as two-valence words, they are allowed to have two arguments during the derivation.

The syntactic-semantic analysis is similar to that of a verb used as a predicator.

Lexical lookup:

The derivation result:
11.2. ADJECTIVES AS PREDICATORS

The SRG and the signature presentation:

a) convenient  b) A

project life

In the example sentence “我们应该稳定情绪。（We should make our mood stable.）”, the adjective “稳定” (wending, stable) is first the argument of the preceding modal verb, and then the functor of the following common noun.

Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cat : pro</td>
<td>cat : pmr</td>
<td>cat : s' p' vz</td>
<td>cat : adj</td>
<td>cat : cn</td>
<td></td>
</tr>
<tr>
<td>sem : s1</td>
<td>sem: pl</td>
<td>sem : sem</td>
<td>sem : sem : abstract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fnc :</td>
<td>arg :</td>
<td>mdr :</td>
<td>fnc :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td>mdr :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

1. sur : 我 sur : 们
   pym : wo pym : men
   noun: I adj : MEN
   cat : pro cat : pmr
   sem : s1 sem: pl
   fnc : mdr :

   The input of the plural morpheme starts the rule of W+MR.

2. sur : 我 sur : 应该
   pym : wo pym : yinggai
   noun: I verb: should
   cat : pro cat : s' p' vz
   sem : pl arg:
   fnc : mdr:

   In this step, the rule of S+V is applied.

3. sur : 我 sur : 稳定
   pym : wo pym : wending
   noun: I verb: should adj : stable
   cat : pro cat : s' p' vz cat : adj
   sem : pl agent sem : sem :
   fnc : should arg : I mdr :
   mdr : mdr : mdd :

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The adjective is read in and analyzed as the second argument of the modal verb. The “adj” value is copied to the “arg” slot in the preceding modal verb proplet. Then, an additional attribute “fnc” is created in the nw proplet and the core value from the modal verb proplet is copied to it.

When the common noun is read in, the rule of ADJ+N is started. The core value from the nw proplet is copied as the second “arg” value in the adjective proplet. Accordingly, the core value from the adjective proplet is appended to the “fnc” attribute in the nw proplet.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

(2) A+O case 2
Only less than 30 adjectives show up in the second occasion and most of them are related to human being’s psychological status. For example:

**Example 110. 他热心公益。** *(He is keen on public benefits.)*

<table>
<thead>
<tr>
<th>surface</th>
<th>他</th>
<th>热心</th>
<th>公益</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta</td>
<td>rexin</td>
<td>gongyi</td>
</tr>
<tr>
<td>English</td>
<td>he</td>
<td>warm-hearted</td>
<td>public benefits</td>
</tr>
</tbody>
</table>

**Example 111. 我可怜他。** *(I have pity on him.)*

<table>
<thead>
<tr>
<th>surface</th>
<th>我</th>
<th>可怜</th>
<th>他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo</td>
<td>kelian</td>
<td>ta</td>
</tr>
<tr>
<td>English</td>
<td>I</td>
<td>pitiful</td>
<td>he</td>
</tr>
</tbody>
</table>

“热心 *(rexin, warm-hearted)*” and “可怜 *(kelian, pitiful)*” are both adjectives used as predicates with objects. Their meaning is changed from descriptive to actively showing certain emotions to the objects.

The syntactic-semantic analysis process is similar to A+O case 1. The derivation result of the above sample sentences is as follows:

The derivation result of “他热心公益。”

The SRG and the signature presentation:

The derivation result of “我可怜他。”

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11.3. ADJECTIVES IN REPETITION

The SRG and the signature presentation:

a) pitiful  
   I be N N

   b) A

Semantically, these adjectives in the A+O structure have the feature of [+human]. The property they describe is people’s attitude towards or feelings about the object. Since the human agent is able to control his or her initiative, as they can control their actions, adjectives in this group gain some similarities with verbs in their grammatical functions.

11.3 Adjectives in Repetition

Another point worth mentioning is that Chinese adjectives are often used in repetition. For example:

Example 112. 她的脸红红的。(Her face is red.)

<table>
<thead>
<tr>
<th>surface</th>
<th>她 的 脸 红 红 的</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta de lian hong hong de</td>
</tr>
<tr>
<td>English</td>
<td>she - face red red -</td>
</tr>
</tbody>
</table>

As in the example sentence, almost all monosyllable adjectives can be used in the pattern of “AA” to give a sense of emphasis. In this case, an additional value of “emphasized” is copied to the “sem” slot in the adjective proplet.

The syntactic-semantic analysis of “她的脸红红的。”

1. sur : 她  
   pyn : ta  
   noun: she  
   cat : pro  
   sem : s3  
   fnc :  
   mdr :  
   0 copy("#" SS.mdd)

2. sur : 她  
   pyn : ta  
   noun: she  
   cat : pro  
   sem : s3  
   fnc :  
   mdr :  
   0 copy(nw.noun SS.mdd)  
   9 copy(nw.noun nw.mdr)  
   9 copy(nw.noun nw.mdr)  

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These two steps follow the rules of W+MR and AN+N.

When the first adjective is read in, the rule of “S+AV” is activated. The functor-argument relation is represented.

When the second adjective is read in, an additional value “emphasized” is copied into the “sem” slot in the first adjective proplet, but the nw proplet is not copied into output.

When the particle “的 (de, DE)” is read in, the rule of “W+MR” is activated again. A substitute value “♯” is copied to the “mdd” slot in the adjective proplet.

When the full stop is read in, the analysis comes to the end.
Derivation result:

```
<table>
<thead>
<tr>
<th>sur: 她</th>
<th>sur: 面</th>
<th>sur: 红</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyin: ta</td>
<td>pyin: lian</td>
<td>pyin: hong</td>
</tr>
<tr>
<td>noun: she</td>
<td>noun: face</td>
<td>adj: red</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: cn</td>
<td>cat: adj mark</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem: object theme</td>
<td>sem: av emphasized</td>
</tr>
<tr>
<td>fnc:</td>
<td>fnc: red</td>
<td>arg: face</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr: she</td>
<td>mdr:</td>
</tr>
<tr>
<td>mdd: #</td>
<td>mdd:</td>
<td></td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

```
a) red | b) A

  face

  she
```

A gap is left as indicated by the “mdd” value in the adjective proplet. This is because the particle “的 (de, DE)” is generally a marker of an adnominal modifier. This is consistent with the case of “AA 的” as an adnominal modifier. For example:

**Example 113.** 他有一双冰冷冰冷的手。（*He has a pair of ice-cold hands.*）

| surface: 他 有 一 双 冰冷 冰冷 的 手 |
| pinyin: ta you yi shuang bingleng bingleng de shou |
| English: he have one pair ice-cold ice-cold - hand |

Lexical lookup:

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>noun: he</td>
<td>noun: one</td>
<td>noun: pair</td>
<td>adj: ice-cold</td>
<td>adj: ice-cold</td>
<td>adj: DE</td>
<td>noun: hand</td>
</tr>
<tr>
<td>fnc:</td>
<td>arg:</td>
<td>fnc:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>fnc:</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdd:</td>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
</tr>
</tbody>
</table>
```

Syntactic-semantic analysis:

Step 0-3 are skipped.
In this step, the adjective is read in for the first time and copied into output.

   pyn: ta pyn: you pyn: yi|shuang pyn: bingleng pyn: bingleng
   noun: he verb: have noun: one adj: ice-cold adj: ice-cold
   cat: pro cat: tv cat: cdn-q cat: adj cat: adj
   sem: s3 sem: non-action sem: +N sem: @ sem:
   fnc: have arg: he one fnc: have mdr: mdr:
   mdr: mdr: mdd: mdd:

In this step, the adjective is read in for the second time. The repetition activates the rule of “X+X”. The value of “emphasized” is appended to the “sem” attribute in the adjective proplet in the sentence start.

   pyn: ta pyn: you pyn: yi|shuang pyn: bingleng pyn: de
   noun: he verb: have noun: one adj: ice-cold adj: DE
   cat: pro cat: tv cat: cdn-q cat: adj cat: sur
   sem: s3 sem: non-action sem: +N sem: emphasized sem:
   fnc: have arg: he one fnc: have mdr:
   mdr: mdr: mdd:

The particle “的 (de, DE)” activates the rule of W+MR. The substitute value “#” is appended to the “mdd” attribute.

   pyn: ta pyn: you pyn: yi|shuang pyn: bingleng pyn: shou
   noun: he verb: have noun: one adj: ice-cold noun: hand
   cat: pro cat: tv cat: cdn-q cat: adj cat: cn
   sem: s3 sem: non-action sem: +N sem: emphasized sem: object
   fnc: have arg: he one fnc: have mdr:
   mdr: mdr: mdd:
   mdd: mdd:

When the modified noun is read in, the value “#” is replaced by the “noun” value from the nw proplet. The “cdn-p” proplet is absorbed.
Derivation result:

```
<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 有</th>
<th>sur : 手</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : you</td>
<td>pyn : shou</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: have</td>
<td>noun: hand</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : tv mark</td>
<td>cat : cn</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem: non-action</td>
<td>sem: adj</td>
</tr>
<tr>
<td>fnc : have</td>
<td>arg: he hand</td>
<td>fnc : have</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr : one ice-cold</td>
<td>mdr: hand</td>
</tr>
<tr>
<td>mdd: #</td>
<td>mdd:</td>
<td></td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

```
a) \(\text{have} \quad \text{hand} \quad \text{ice-cold} \quad \text{A}\)
b) \(\text{V} \quad \text{NN} \quad \text{N}\)
```

In fact, the particle “的 (de, DE)” is necessary when adjectives are used as predications or adnominal modifiers in the pattern of “AA”. But, when adjectives are used in the pattern of “AA” to modify verbs, the adverbial marker “地 (de, DE)” is not compulsory. For example:

**Example 114.** 他慢慢走着。(He is walking slowly.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 慢 慢 走 着</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta man man zou zhe</td>
</tr>
<tr>
<td>English</td>
<td>he slow slow walk -</td>
</tr>
</tbody>
</table>

**Example 115.** 他慢慢地走着。(He is walking slowly.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 慢 慢 地 走 着</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta man man de zou zhe</td>
</tr>
<tr>
<td>English</td>
<td>he slow slow - walk -</td>
</tr>
</tbody>
</table>

In this case, the syntactic-semantic analysis of the two sentences is slightly different due to the particle “地 (de, DE)”, but the result is the same.

Derivation result:

```
<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 慢</th>
<th>sur : 走</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : man</td>
<td>pyn : zou</td>
</tr>
<tr>
<td>noun: he</td>
<td>adj : slow</td>
<td>verb: walk</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : adj</td>
<td>cat : iv mark</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem: emphasized</td>
<td>sem: cont</td>
</tr>
<tr>
<td>fnc : walk</td>
<td>mdr:</td>
<td>arg: he</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdd: walk</td>
<td>mdr: slow</td>
</tr>
</tbody>
</table>
```
The SRG and the signature presentation:

a) walk       b) V
    \_        /\  
 he slow   N A
Chapter 12

Analysis of Adverbs

12.1 Overview

The definition of Chinese adverbs varies from person to person. Chen [1982] says that adverbs are modifiers of adjectives or verbs. Chen [1978] takes adverbs as content words that show manner, degree or tone of the statements. Ding [1982] agrees to some extent with Chengze Chen by saying that adverbs are modifiers of verbs, auxiliary verbs and adjectives. Wang [1943] defines them as words that will never be the core elements of sentences, i.e. subjects or predicates. Zhu [1982] argues that adverbs are function words only used as adverbials.

The above definitions have different foundations. Some are based on the lexical meaning, and others are based on the grammatical function or both. In the book of Modern Chinese, Huang and Liao [1991] have integrated the previous definitions and defined adverbs as modifiers of verbs and adjectives in the sense of degree, scope, time, frequency, etc.

Adverbs in Chinese, with only two exceptions (see 13.2), always precede the modified words. It is proper to say that adverbs are usually used to modify verbs and adjectives. However, as found in the corpus and also proved in some research articles, Chinese adverbs sometimes modify nouns as well. Therefore, the application of adverbs is classified into two cases in LAG-Chinese: one is to modify verbs or adjectives, and the other is to modify nouns. The phenomenon of adverbs modifying nouns is discussed in Chapter 5. Among all the sentence patterns with adverbs modifying verbs or adjectives, the following 9 are the most frequently found:

12.1.1 Adverb + verb/adjective

Example 116. 他只惦记钱。(*He is only concerned about money.*)

<table>
<thead>
<tr>
<th>surface</th>
<th>他</th>
<th>只</th>
<th>惦记</th>
<th>钱</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta</td>
<td>zhi</td>
<td>dianji</td>
<td>qian</td>
</tr>
<tr>
<td>English</td>
<td>he</td>
<td>only</td>
<td>concern</td>
<td>money</td>
</tr>
</tbody>
</table>
12.1. OVERVIEW

CHAPTER 12. ADVERBS

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>he</th>
<th>sur</th>
<th>惦记</th>
<th>sur</th>
<th>钱</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>ta</td>
<td>pyn</td>
<td>dianji</td>
<td>pyn</td>
<td>qian</td>
</tr>
<tr>
<td>noun</td>
<td>he</td>
<td>verb</td>
<td>concern</td>
<td>noun</td>
<td>money</td>
</tr>
<tr>
<td>cat</td>
<td>pro</td>
<td>cat</td>
<td>tv mark</td>
<td>cat</td>
<td>cn</td>
</tr>
<tr>
<td>sem</td>
<td>s3</td>
<td>sem</td>
<td></td>
<td>sem</td>
<td>object patient</td>
</tr>
<tr>
<td>func</td>
<td>concern</td>
<td>arg</td>
<td>he money</td>
<td>func</td>
<td>concern</td>
</tr>
<tr>
<td>mdr</td>
<td>only</td>
<td>mdr</td>
<td></td>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

Example 117. 方法很重要。(The method is important.)

<table>
<thead>
<tr>
<th>surface</th>
<th>方法</th>
<th>很</th>
<th>重要</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>fangfa</td>
<td>hen</td>
<td>zhongyao</td>
</tr>
<tr>
<td>English</td>
<td>method</td>
<td>very</td>
<td>important</td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>方法</th>
<th>sur</th>
<th>重要</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>fangfa</td>
<td>pyn</td>
<td>zhongyao</td>
</tr>
<tr>
<td>noun</td>
<td>method</td>
<td>adj</td>
<td>important</td>
</tr>
<tr>
<td>cat</td>
<td>cn</td>
<td>cat</td>
<td>adj mark</td>
</tr>
<tr>
<td>sem</td>
<td>theme</td>
<td>sem</td>
<td>av</td>
</tr>
<tr>
<td>func</td>
<td>important</td>
<td>arg</td>
<td>method</td>
</tr>
<tr>
<td>mdr</td>
<td>only</td>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

Example 118. 我们真应该学习英语。(We should learn English.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我 们</th>
<th>真</th>
<th>应该</th>
<th>学习</th>
<th>英语</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo</td>
<td>men</td>
<td>zhen</td>
<td>yinggai</td>
<td>xuexi</td>
</tr>
<tr>
<td>English</td>
<td>I</td>
<td>really</td>
<td>should</td>
<td>study</td>
<td>English</td>
</tr>
</tbody>
</table>
12.1.3 Adverb + adverb + verb/adjective

**Example 119.** 她不十分了解他。(She does not know him very well.)

<table>
<thead>
<tr>
<th>surface</th>
<th>她不十分了解他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta bu shifen liaojie ta</td>
</tr>
<tr>
<td>English</td>
<td>she not much know he</td>
</tr>
</tbody>
</table>

Derivation result:

```
<table>
<thead>
<tr>
<th>sur : 她</th>
<th>sur : 了解</th>
<th>sur : 他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : liaojie</td>
<td>pyn : ta</td>
</tr>
<tr>
<td>noun : she</td>
<td>verb : know</td>
<td>noun : he</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : tv mark</td>
<td>cat : pro</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem :</td>
<td>sem : s3 patient</td>
</tr>
<tr>
<td>fnc : know</td>
<td>arg : she he</td>
<td>fnc : know</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr : not much</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

a) \( \text{should} \) \( \text{I} \) \( \text{study} \)

b) \( \text{V} \) \( \text{N} \) \( \text{V} \) \( \text{English} \) \( \text{N} \)

**Example 120.** 头发几乎全白了。(The hair is almost all white.)

<table>
<thead>
<tr>
<th>surface</th>
<th>头发几乎全白了</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>toufa jihu quan bai le</td>
</tr>
<tr>
<td>English:</td>
<td>hair almost all white</td>
</tr>
</tbody>
</table>

Derivation result:

```
<table>
<thead>
<tr>
<th>sur : 头发</th>
<th>sur : 十分</th>
<th>sur : 他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : toufa</td>
<td>pyn : shifen</td>
<td>pyn : toufa</td>
</tr>
<tr>
<td>noun : he</td>
<td>verb : not much know</td>
<td>noun : he</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : tv mark</td>
<td>cat : pro</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem :</td>
<td>sem : s3 patient</td>
</tr>
<tr>
<td>fnc : know</td>
<td>arg : he he</td>
<td>fnc : know</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr : not much know</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

a) \( \text{know} \) \( \text{she} \) \( \text{he} \)

b) \( \text{V} \) \( \text{N} \) \( \text{N} \)
12.1. OVERVIEW

CHAPTER 12. ADVERBS

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>头发</th>
<th>sur</th>
<th>白</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>toufa</td>
<td>pyn</td>
<td>bai</td>
</tr>
<tr>
<td>noun</td>
<td>hair</td>
<td>adj</td>
<td>white</td>
</tr>
<tr>
<td>cat</td>
<td>cn</td>
<td>cat</td>
<td>adj mark</td>
</tr>
<tr>
<td>sem</td>
<td>object theme</td>
<td>sem</td>
<td>av perf</td>
</tr>
<tr>
<td>func</td>
<td>white</td>
<td>arg</td>
<td>hair</td>
</tr>
<tr>
<td>mdr</td>
<td>mdr: almost all</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) white b) A

hair

12.1.4 Adverb + adjective + verb

Example 121. 她很快振作起来。(She recovered soon.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>她</th>
<th>很</th>
<th>快</th>
<th>振作</th>
<th>起来</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>hen</td>
<td>kuai</td>
<td>zhenzuo</td>
<td>qilai</td>
</tr>
<tr>
<td>English:</td>
<td>she</td>
<td>very</td>
<td>fast</td>
<td>recover</td>
<td>start</td>
</tr>
</tbody>
</table>

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>她</th>
<th>sur</th>
<th>快</th>
<th>sur</th>
<th>振作</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>ta</td>
<td>pyn</td>
<td>kuai</td>
<td>pyn</td>
<td>zhenzuo</td>
</tr>
<tr>
<td>noun</td>
<td>she</td>
<td>adj</td>
<td>fast</td>
<td>verb: recover</td>
<td></td>
</tr>
<tr>
<td>cat</td>
<td>pro</td>
<td>cat</td>
<td>adj</td>
<td>cat</td>
<td>iv mark</td>
</tr>
<tr>
<td>sem</td>
<td>s3</td>
<td>sem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>func</td>
<td>recover</td>
<td>mdr: very</td>
<td>arg: she</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr</td>
<td>mdd: recover</td>
<td>mdr: fast start</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) recover b) V

she fast

12.1.5 Adverb + modal verb + adverb + verb

Example 122. 他肯定会格外生气。(He will certainly be extremely angry.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>肯定</th>
<th>会</th>
<th>格外</th>
<th>生气</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>kending</td>
<td>hui</td>
<td>gewai</td>
<td>shengqi</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>certainly</td>
<td>will</td>
<td>extremely</td>
<td>get angry</td>
</tr>
</tbody>
</table>
CHAPTER 12. ADVERBS

12.1. OVERVIEW

Derivation result:

<table>
<thead>
<tr>
<th>sur : 他</th>
<th>sur : 会</th>
<th>sur : 生气</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : hui</td>
<td>pyn : shengqi</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: will-can</td>
<td>verb: get-angry</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : vz mark</td>
<td>cat : iv</td>
</tr>
<tr>
<td>sem : s3</td>
<td>sem :</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : will-can</td>
<td>arg : he get-angry</td>
<td>fnc : will-can</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr: certainly</td>
<td>mdr: come</td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td>mdd:</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) \( \text{will-can} \) \( \text{get-angry} \) b) \( N \) \( V \)

12.1.6 Adverb + directional verb + verb

Example 123. 医生又来探视。(The doctor pays a visit again.)

| surface: 医生 又 来 探视 |
|-------|-----|-----|-----|
| pinyin: yisheng you lai tanshi |
| English: doctor again come visit |

Derivation result:

<table>
<thead>
<tr>
<th>sur : 医生</th>
<th>sur : 来</th>
<th>sur : 探视</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : yisheng</td>
<td>pyn : lai</td>
<td>pyn : tanshi</td>
</tr>
<tr>
<td>noun: doctor</td>
<td>verb: come</td>
<td>verb: visit</td>
</tr>
<tr>
<td>cat : nr</td>
<td>cat : vz</td>
<td>cat : iv mark</td>
</tr>
<tr>
<td>sem :</td>
<td>sem : spt</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : visit</td>
<td>arg : #</td>
<td>arg : doctor</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr: again</td>
<td>mdr: come</td>
</tr>
<tr>
<td>mdd: visit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) visit b) \( N \) \( V \)

12.1.7 Adverb + preposition phrase + verb

Example 124. 他正经由丝绸之路去巴基斯坦。(He is going to Pakistan through the Silk Road.)

| surface: 他 正 经由 丝绸之路 去 巴基斯坦 |
|-------|-----|-----|-----|-----|
| pinyin: ta zheng jingyou sichouzhilu qu bajisitan |
| English: he right now through Silk Road go Pakistan |
12.1. OVERVIEW

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Derivation result:

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : jingyou</td>
<td>pyn : qu</td>
<td>pyn : bajisitan</td>
</tr>
<tr>
<td>noun: he</td>
<td>adj : through</td>
<td>verb: go</td>
<td>noun: Pakistan</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : prep</td>
<td>cat : vq mark</td>
<td>cat : nd</td>
</tr>
<tr>
<td>sem : s3 agent</td>
<td>sem : tense</td>
<td>sem : spt</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : go</td>
<td>arg : Silk-Road</td>
<td>arg : he</td>
<td>fnc :</td>
</tr>
<tr>
<td>mdr : mdr: right-now</td>
<td>mdr: through Pakistan</td>
<td>mdr :</td>
<td>mdd: go</td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

```
a) / | go | b) / | V
 he        through     Pakistan      N     A     N
```

12.1.8 Adverb + adverb + preposition phrase + directional verb + verb

**Example 125.** 他就没按照要求去做。（He didn’t follow the requirement.）

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>就</th>
<th>没</th>
<th>按照</th>
<th>要求</th>
<th>去</th>
<th>做</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>jiu</td>
<td>mei</td>
<td>anzhao</td>
<td>yaoqiu</td>
<td>qu</td>
<td>zuo</td>
</tr>
</tbody>
</table>

**English:** he just not according to requirement go do

Derivation result:

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ta</td>
<td>pyn : anzhao</td>
<td>pyn : qu</td>
<td>pyn : zuo</td>
</tr>
<tr>
<td>noun: he</td>
<td>adj : according-to</td>
<td>verb: go</td>
<td>verb: do</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : prep</td>
<td>cat : vq</td>
<td>cat : iv mark</td>
</tr>
<tr>
<td>sem : s3 agent</td>
<td>sem :</td>
<td>sem : spt</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : do</td>
<td>arg : requirement</td>
<td>arg : #</td>
<td>arg : he</td>
</tr>
<tr>
<td>mdr : mdr: not just</td>
<td>mdr: according-to</td>
<td>mdr :</td>
<td>mdd: do</td>
</tr>
<tr>
<td>mdd: go</td>
<td>mdd: do</td>
<td>mdd :</td>
<td>mdd : go</td>
</tr>
</tbody>
</table>
```

The SRG and the signature presentation:

```
a) / | do | b) / | V
 he       go        N     V
 according-to       A
```

12.1.9 Adverb + adverb + adverb + modal verb + verb

**Example 126.** 他永远也不会理解。（He will never understand.）

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>永远</th>
<th>也</th>
<th>不会</th>
<th>理解</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>yongyuan</td>
<td>ye</td>
<td>bu</td>
<td>hui</td>
</tr>
</tbody>
</table>

**English:** he forever also not will understand
As shown above, adverbs may modify verbs and adjectives directly or indirectly. It is possible to have up to three adverbs in a continuous sequence before an adjective or a verb. During the syntactic-semantic analysis, adverbs are absorbed by common verbs, modal verbs or adjectives that they modify. However, the absorption is not complete as in the original DBS. Instead, their core value is maintained and copied to the “mdr” attribute of the modified. Content representation is not affected while a more direct indication of the surface is guaranteed.

12.2 Adverbs as Complement

Among all the adverbs, only “很 (hen, very)” and “极 (ji, extremely)” have been observed as independent complements after verbs or adjectives.

12.2.1 很 (hen, very)

For “很 (hen, very)”, there is always the pattern of “adjective + 得 (de, DE) + 很 (hen, very)”. “得 (de, DE)” is the only complement marker in Chinese. It is well-known as one of the three main structure auxiliaries in Chinese, the other two being “的 (de, DE)” and “地 (de, DE)”. For example:

Example 127. 我开心得很。 (I am very happy.)
Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn:</td>
<td>wo</td>
<td>pyn: kaixin</td>
<td>pyn: de</td>
<td>pyn:  hen</td>
</tr>
<tr>
<td>noun:</td>
<td>I</td>
<td>adj: happy</td>
<td>adj: DE</td>
<td>adj: very</td>
</tr>
<tr>
<td>cat:</td>
<td>pro</td>
<td>cat: adj</td>
<td>cat: cmr</td>
<td>cat: adv</td>
</tr>
<tr>
<td>sem:</td>
<td>s1</td>
<td>sem:</td>
<td>sem:</td>
<td>sem:</td>
</tr>
<tr>
<td>fnc:</td>
<td>mdr:</td>
<td>mdd:</td>
<td>mdd:</td>
<td>mdd:</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdd:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

In the first step, the first word in the sentence, “我 (wo, I)”, is read in.

1. 

In this step, the input of the adjective activates the rule of “S+AV”. The functor-argument relation between the two proplets is represented.

2. 

A variation of the rule of W+MR is activated by the complement marker “得 (de, DE)”. The substitute value “#” is copied into the “mdr” slot of the adjective proplet.

3. 

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When the adverb “很 (hen, very)” is read in, the substitute value “#” is replaced by the core value of the adverb. The adverb proplet is not copied into output.

When the full stop is read in, the analysis comes to the end.

Derivation result:

The SRG and the signature presentation:

a) happy  b) A

I

12.2.2 极 (ji, extremely)

For “极 (ji, extremely)”, it is always in the pattern of “adjective/verb + 极 (ji, extremely) + 了 (le, LE)”. For example:

Example 128. 我开心极了。(I am very happy.)

Lexical lookup:

Syntactic-semantic analysis:

1.
2. **sur:** 我  
**pyn:** wo  
noun: I  
cat: pro  
sem: sl theme  
fnc: happy  
mdr:  

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>我</td>
<td>wo</td>
<td>I</td>
<td>pro</td>
<td>sl theme</td>
<td>happy</td>
<td></td>
</tr>
</tbody>
</table>

**sur:** 开心  
**pyn:** kaixin  
adj: happy  
sem: av | +N  
fnc: happy  
mdr: extremely  

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>开心</td>
<td>kaixin</td>
<td>adj</td>
<td>happy</td>
<td>av</td>
<td></td>
<td>extremely</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>极</td>
<td>ji</td>
<td>adj</td>
<td>extremely</td>
<td>av</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In step 2, the input of the adverb “极 (ji, extremely)” activates a variation of the rule of V+COMP. The core value of the adverb is copied to the “mdr” slot in the preceding proplet.

3. **sur:** 我  
**pyn:** wo  
noun: I  
cat: pro  
sem: sl theme  
fnc: happy  
mdr:  

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>我</td>
<td>wo</td>
<td>I</td>
<td>pro</td>
<td>sl theme</td>
<td>happy</td>
<td></td>
</tr>
</tbody>
</table>

**sur:** 开心  
**pyn:** kaixin  
adj: happy  
sem: av | +N  
fnc: happy  
mdr: extremely  

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>开心</td>
<td>kaixin</td>
<td>adj</td>
<td>happy</td>
<td>av</td>
<td></td>
<td>extremely</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>了</td>
<td>le</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Then the aspect marker is read in. The rule of W+ASP is activated. When the full stop is read in, the analysis comes to the end.

Derivation result:

<table>
<thead>
<tr>
<th>sur</th>
<th>pyn</th>
<th>noun</th>
<th>cat</th>
<th>sem</th>
<th>fnc</th>
<th>mdr</th>
</tr>
</thead>
<tbody>
<tr>
<td>我</td>
<td>wo</td>
<td>I</td>
<td>pro</td>
<td>sl theme</td>
<td>happy</td>
<td>extremely</td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) happy  
b) A

I  
N

“极 (ji, extremely)” is used in the same pattern to modify verbs. For example:

**Example 129.** 我感动极了。(I am deeply moved.)

<table>
<thead>
<tr>
<th>surface</th>
<th>pinyin</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>我感动极了</td>
<td>wo gandong ji le</td>
<td>I move extremely -</td>
</tr>
</tbody>
</table>
12.3 Adverbs in Coordination

Some adverbs, though in the position of adverbials, function like conjunctives, e.g. “又 (you, again)” and “越 (yue, more)”. In this case, they are often used in coordination. For example:

**Example 130.** 他们又说又笑。(They talk and laugh.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>们</th>
<th>有 说</th>
<th>有笑</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>men</td>
<td>you</td>
<td>shuo</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>-</td>
<td>again</td>
<td>speak</td>
</tr>
</tbody>
</table>

**Example 131.** 他越走越累。(The more he walks, the more he gets tired.)

<table>
<thead>
<tr>
<th>surface:</th>
<th>他</th>
<th>越</th>
<th>走</th>
<th>越</th>
<th>累</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta</td>
<td>yue</td>
<td>zou</td>
<td>yue</td>
<td>lei</td>
</tr>
<tr>
<td>English:</td>
<td>he</td>
<td>more</td>
<td>walk</td>
<td>more</td>
<td>tired</td>
</tr>
</tbody>
</table>

Only a few adverbs are used in this pattern, among which the above two are the most frequent. During the syntactic-semantic analysis, the adverbs are absorbed and the two verbs or the two predicates from any part of speech are treated as conjuncts.
The derivation result of “他们又说又笑。”

<table>
<thead>
<tr>
<th>sur: 他</th>
<th>sur: 说</th>
<th>sur: 笑</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: shuo</td>
<td>pyn: xiao</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: speak</td>
<td>verb: laugh</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: iv</td>
<td>cat: iv mark</td>
</tr>
<tr>
<td>sem: pl</td>
<td>sem:</td>
<td>sem:</td>
</tr>
<tr>
<td>fun: speak</td>
<td>arg: he</td>
<td>arg: #</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr: again</td>
<td>mdr:</td>
</tr>
<tr>
<td>mdd:</td>
<td>pc: speak</td>
<td></td>
</tr>
<tr>
<td>nc: laugh</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) speak —— laugh  
b) V —— V

he N

The derivation result of “他越走越累。”

<table>
<thead>
<tr>
<th>sur: 他</th>
<th>sur: 走</th>
<th>sur: 累</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: zou</td>
<td>pyn: lei</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: walk</td>
<td>adj: tired</td>
</tr>
<tr>
<td>cat: pro</td>
<td>cat: iv</td>
<td>cat: adj mark</td>
</tr>
<tr>
<td>sem: s3</td>
<td>sem:</td>
<td>sem: av</td>
</tr>
<tr>
<td>fun: walk</td>
<td>arg: he</td>
<td>arg: #</td>
</tr>
<tr>
<td>mdr:</td>
<td>mdr: the-more</td>
<td>mdr:</td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
</tr>
<tr>
<td>nc: tired</td>
<td>pc: walk</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

a) speak —— tired  
b) V —— A

he N
Chapter 13

Analysis of Prepositions

13.1 Overview

Most of the modern Chinese prepositions result from the delexical use of verbs in ancient Chinese. Some of them are no longer used as verbs while some others are still verbs in parallel. For example:

在 (zài)

verb: 他不在学校。(He is not at school.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 不 在 学校</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta bu zai xuexiao</td>
</tr>
<tr>
<td>English</td>
<td>he not be at school</td>
</tr>
</tbody>
</table>

prep: 他在学校学习。(He studies at school.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 在 学校 学习</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta zai xuexiao xuexi</td>
</tr>
<tr>
<td>English</td>
<td>he at school study</td>
</tr>
</tbody>
</table>

朝 (chāo)

verb: 这扇窗户朝北。(This window faces north.)

<table>
<thead>
<tr>
<th>surface</th>
<th>这 扇 窗户 朝 北</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zhe shan chuanghu chao bei</td>
</tr>
<tr>
<td>English</td>
<td>this - window face north</td>
</tr>
</tbody>
</table>

prep: 他朝南走。(He walks towards the south.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 朝 南 走</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta chao nan zou</td>
</tr>
<tr>
<td>English</td>
<td>he toward south walk</td>
</tr>
</tbody>
</table>
13.1. OVERVIEW

CHAPTER 13. PREPOSITIONS

比 (bi)  verb: 他们比身高及体重。(They compare height and weight.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 们 比 身高 及 体重</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta men bi shengao ji tizhong</td>
</tr>
<tr>
<td>English:</td>
<td>he - compare height and weight</td>
</tr>
</tbody>
</table>

prep: 他比她强壮。(He is stronger than her.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 比 她 强壮</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>ta bi ta qiangzhuang</td>
</tr>
<tr>
<td>English:</td>
<td>he than she strong</td>
</tr>
</tbody>
</table>

Modern Chinese prepositions are generally classified into the following groups:

1. to indicate time or location:

<table>
<thead>
<tr>
<th>surface</th>
<th>从 自 于 到 往 在 当</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>cong zi yu dao wang zai dang</td>
</tr>
<tr>
<td>English:</td>
<td>from from on-at-in till towards on-at-in when</td>
</tr>
</tbody>
</table>

2. to indicate manner:

<table>
<thead>
<tr>
<th>surface</th>
<th>按 照 按照 依 依照</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>an zhao anzhao yi yizhao</td>
</tr>
<tr>
<td>English:</td>
<td>according-to according to according to according to according to</td>
</tr>
</tbody>
</table>

3. to indicate purpose or cause:

<table>
<thead>
<tr>
<th>surface</th>
<th>为 因 因为 由于</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>wei yin yinwei youyu</td>
</tr>
<tr>
<td>English:</td>
<td>for because of because of because of</td>
</tr>
</tbody>
</table>

4. to indicate object or range:

<table>
<thead>
<tr>
<th>surface</th>
<th>对 对于 把 向 跟 与 同 关于</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>dui duiyu ba xiang gen yu tong guanyu</td>
</tr>
<tr>
<td>English:</td>
<td>for for - towards with with with about</td>
</tr>
</tbody>
</table>

5. to indicate exception:
6. to indicate passive voice:

<table>
<thead>
<tr>
<th>surface</th>
<th>被 叫 让 给</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>bei jiao rang gei</td>
</tr>
<tr>
<td>English</td>
<td>by by by by</td>
</tr>
</tbody>
</table>

7. to indicate comparison:

<table>
<thead>
<tr>
<th>surface</th>
<th>比</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>bi</td>
</tr>
<tr>
<td>English</td>
<td>compared with</td>
</tr>
</tbody>
</table>

Prepositions are not used independently. They combine with other words to form preposition phrases. One of the most basic applications of these preposition phrases are adverbial modifiers, e.g. “他从北京来。(He comes from Beijing.)” (as in 6.1). In addition, they are also used as adnominal modifiers and complements.

13.1.1 Preposition as Attributive:

Adnominal preposition phrases in Chinese come before the modified nouns. In this case, the structure auxiliary “的 (de, DE)” is compulsory. For example:

**Example 132.** 在北京的人是他就。(It is him who is in Beijing.)

<table>
<thead>
<tr>
<th>surface</th>
<th>在 北京 的 人 是 他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>zai beijing de ren shi ta</td>
</tr>
<tr>
<td>English</td>
<td>in/at/on Peking - person be he</td>
</tr>
</tbody>
</table>

In this example, “在北京的人” is the subject. Within the phrase, “人 (ren, person)” is the key word and “在北京” is a preposition phrase as attributive. This modifier-modified relation is guaranteed by the structure auxiliary “的 (de, DE)”.

Lexical lookup:
13.1. OVERVIEW

CHAPTER 13. PREPOSITIONS

Syntactic-semantic analysis:

1. sur: 在  
   pyn: zai  
   adj: in-at-on  
   cat: prep  
   sem:  
   arg:  
   mdd: 

   sur: 北京  
   pyn: beijing  
   noun: Peking  
   cat: prep  
   sem:  
   arg:  
   mdd: 

   In step 1, the rule of PREP+O is activated by the input of “北京 (beijing, Peking)”.

2. sur: 在  
   pyn: zai  
   adj: in-at-on  
   cat: prep  
   sem:  
   arg: Peking  
   mdd:  

   sur: 的  
   pyn: de  
   adj: DE  
   cat: prep  
   sem:  
   arg: Peking  
   mdd: 

   In step 2, the input of the particle “的 (de, DE)” provides the “mdd” attribute in the preposition proplet with the substitute value “#”.

3. sur: 在  
   pyn: zai  
   adj: in-at-on  
   cat: prep  
   sem:  
   arg: Peking  
   mdd: #  

   sur: 人  
   pyn: ren  
   noun: person  
   cat: nr  
   sem:  
   arg:  
   mdd: 

   In step 3, the rule of ADJ+N is activated by the input of “人 (ren, person)”. The substitute value “#” is replaced by the “noun” value from the nw proplet. The “adj” value in the preposition proplet is copied to the “mdr” slot in the nw proplet.

4. sur: 在  
   pyn: zai  
   adj: in-at-on  
   cat: prep  
   sem:  
   arg: Peking  
   mdd: person  

   sur: 是  
   pyn: shi  
   verb: be  
   cat: s' p' vx  
   sem:  
   arg:  
   mdd: in-at-on  

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When the link verb “是 (shi, be)” is read in, the rule of S+VX is applied.

The rule of VX+P is activated in this step. The “noun” value from the nw proplet is copied as the second “arg” value in the link verb proplet. In return, the “verb” value is copied to the “fnc” slot in the nw proplet.

When the full stop is read in, the rule of S+IP is activated and the analysis comes to the end.

Derivation result:

```
[13.1.2 Preposition as Complement:]
The complementary preposition phrases always come after the modified verbs. Generally speaking, prepositions observed in this application indicate location or direction. The most frequently found include “在 (zai, in-at-on)”, “到 (dao, till)”, “往 (wang, towards)”, “向 (xiang, towards)”, “于 (yu, on-at-in)”, “自 (zi, from)”. For example:

Example 133. 他出差到北京。(He goes on a business trip to Beijing.)
```

In this example, “他出差” is the main structure of the sentence, i.e. the subject and the predicate. “到北京” is a preposition phrase used as complement, which gives information about the location.
Lexical lookup:

<table>
<thead>
<tr>
<th>sur</th>
<th>he</th>
<th>sur</th>
<th>出差</th>
<th>sur</th>
<th>到</th>
<th>sur</th>
<th>北京</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn</td>
<td>ta</td>
<td>pyn</td>
<td>chuchai</td>
<td>pyn</td>
<td>dao</td>
<td>pyn</td>
<td>beijing</td>
</tr>
<tr>
<td>noun</td>
<td>he</td>
<td>verb</td>
<td>travel-for-business</td>
<td>adj</td>
<td>to</td>
<td>noun</td>
<td>Peking</td>
</tr>
<tr>
<td>cat</td>
<td>pro</td>
<td>cat</td>
<td>prep</td>
<td>cat</td>
<td></td>
<td>cat</td>
<td>n/</td>
</tr>
<tr>
<td>sem</td>
<td>s3</td>
<td>sem</td>
<td></td>
<td>sem</td>
<td></td>
<td>sem</td>
<td></td>
</tr>
<tr>
<td>fnc</td>
<td></td>
<td>arg</td>
<td></td>
<td>arg</td>
<td></td>
<td>fnc</td>
<td></td>
</tr>
<tr>
<td>mdr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mdr</td>
<td></td>
</tr>
</tbody>
</table>

The syntactic-semantic analysis:

1. In this step, the rule of S+V is activated by the input of “出差 (chuchai, travel-for-business)".

2. In step 3, the input of the preposition starts the rule of V+COMP. The “adj” value from the nw proplet is copied to the “mdr” slot in the preceding verb proplet and an additional value, “complement” is copied to the “sem” slot in the nw proplet.

3. Then the rule of PREP+O is activated with the input of “北京 (beijing, Peking)".

When the full stop is read in, the rule of S+IP is activated.
CHAPTER 13. PREPOSITIONS

13.1. OVERVIEW

Derivation result:

\[
\begin{array}{c|c|c}
\text{sur} : 他 & \text{sur} : 出差 & \text{sur} : 到 \\
\text{pyn} : ta & \text{pyn} : chuchai & \text{pyn} : dao \\
\text{nou}n: he & \text{verb: travel-for-business} & \text{adj : to} \\
\text{cat} : pro & \text{cat : iv mark} & \text{cat : prep} \\
\text{sem} : s3 agent & \text{sem : complement} & \\
\text{fnc} : travel-for-business & \text{arg : he} & \text{arg : Peking} \\
\text{mdr} : & \text{mdr: to} & \text{mdd: travel-for-business} \\
\end{array}
\]

The SRG and the signature presentation:

\[
\begin{array}{c|c}
\text{a)} & \text{b)} \\
\text{travel-for-business} & \text{V} \\
\text{he} & \text{to} \\
\end{array}
\]

13.1.3 Preposition with ASP:

Prepositions do not function as predicates. They do not appear as sentence elements independently. They are also not used in repetition, e.g. we have “看 (kan, read) 看 (kan, read)” but not “在 (zai, at-in-on) 在 (zai, at-in-on)” These are two of the main differences between verbs and prepositions in Chinese. However, both prepositions and verbs take objects, and their similarities are not limited to this. For instance, prepositions in Chinese are also observed in collocation with aspect markers. Here are some examples.

Example 134. 他朝着汽车跑。(He runs towards the car.)

\[
\begin{array}{c|c|c|c|c|c}
\text{surface:} & 他 & 朝 & 着 & 汽车 & 跑 \\
\text{pinyin:} & ta & chao & zhe & qiche & pao \\
\text{English:} & he & towards & - & car & run \\
\end{array}
\]

Example 135. 他出差到过北京。(He has been in Beijing for a business trip.)

\[
\begin{array}{c|c|c|c|c|c}
\text{surface:} & 他 & 出差 & 到 & 过 & 北京 \\
\text{pinyin:} & ta & chuchai & dao & guo & beijing \\
\text{English:} & he & travel for business & to & - & Peking \\
\end{array}
\]

Example 136. 他已经睡在了床上。(He is already sleeping in the bed.)

\[
\begin{array}{c|c|c|c|c|c}
\text{surface:} & 他 & 已经 & 睡 & 在 & 了 & 床 & 上 \\
\text{pinyin:} & ta & yijing & shui & zai & le & chang & shang \\
\text{English:} & he & already sleep & in & - & bed & upside \\
\end{array}
\]

It is possible for all the three aspect markers “着 (zhe, ZHE)”, “了 (le, LE)”, and “过 (guo, GUO)” to modify prepositions. Their semantic function is the same as they modify verbs or adjectives. In this case, the rule of W+ASP also applies. The “sem” value of the aspect marker is copied to the “sem” attribute of the preposition. The derivation result of the above three sentences is as follows:
13.2 BA AND BEI CONSTRUCTIONS

The derivation result of “他朝着汽车跑。”

The SRG and the signature presentation:

The derivation result of “他出差到过北京。”

The SRG and the signature presentation is the same as that of “他出差到过北京。”

The derivation result of “他已经睡在了床上。”

The SRG and the signature presentation:

13.2 Ba and Bei Constructions

Sentences with the preposition “把 (ba, BA)” are well-known as “Ba Construction”, and those with the preposition “被 (bei, by)” are called “Bei Construction”. Both of them have attracted high interest because of their distinction from other prepositions.
CHAPTER 13. PREPOSITIONS

The basic Ba Construction can be generalized as

“N1 Ba N2 V”.

The basic Bei Construction can be generalized as

“N1 Bei N2 V”.

In the syntactic point of view, if we say the most basic sentence pattern is

“S V O (subject-verb-object)”,

then the basic Ba Construction is

“S Ba O V”,

and the basic Bei Construction is

“O Bei S V”.

The pattern of SVO, the Ba Construction and the Bei Construction represent three different perspectives to describe the relation among the agent, the patient and the action. For example:

- **SVO: 他取消合同了。** *(He has canceled the contract.)*
  
  | Surface: 他 取消 合同 了 |
  |---|---|---|
  | Pinyin: ta quxiao hetong le |
  | English: he cancel contract - |

- **Ba: 他把合同取消了。** *(He has canceled the contract.)*
  
  | Surface: 他 把 合同 取消 了 |
  |---|---|---|
  | Pinyin: ta ba hetong quxiao le |
  | English: he - contract cancel - |

- **Bei: 合同被他取消了。** *(The contract has been canceled by him.)*
  
  | Surface: 合同 被 他 取消 了 |
  |---|---|---|
  | Pinyin: hetong bei ta quxiao le |
  | English: contract by he cancel - |

All the three examples provide two messages: the contract has been canceled and he has done it.

The preposition “把 (ba, BA)” moves the object from behind the verb to before the verb. The preposition “被 (bei, by)” moves the object to the formal position of the subject, while the logic subject becomes the object of the preposition “被 (bei, by)”. From the perspective of semantics, the preposition object in the Bei construction plays the role of the causative or responsible agent, and the formal subject is the affected.
Bojiang Zhang (2000) says that the Ba construction represents a similar semantic relation with the preposition object as the affected and the subject as the causative actor. According to Hopper and Thompson [1980], Taylor [1995] and Dowty [1991], it is a strong feature of transitivity that the patient is completely affected. Taylor pointed out that in the typical transitivity the patient has obvious change in their status after the affection. This is mandatory in the Ba and the Bei construction, which are not adopted if the patient is not affected. Compared with the pattern of SVO, the Ba and the Bei construction have a stronger expression of the semantic meaning of being “affected”. This results from the sentence pattern instead of the predicate verb itself, though the verb in these two constructions is supposed to have a strong sense of disposition.

13.2.1 Ba Construction

In the syntactic view, the Ba Construction is concerned with a preposition phrase used as an adverbial modifier. But in the semantic view, Li [1924] states that the normal position of an object is after the predicate verb, and the function of “把 (ba, BA)” is to move the object in front of the verb for emphasis. According to Wang [1943] and Song [1991], the subject in the Ba construction must be an agent, who causes the action of disposal, and the object must be known already. They emphasize that the predicate verb must be a verb of disposal. This condition can be understood as the verb describes the agent’s meaningful action of purpose. Though Lv [1985] and Hu and Wen [1990] argue that the verbs in the Ba Construction have much more varieties, their examples are taken from literary works or oral Chinese. Based on our statistics, the verbs of judgement, such as “是 (shi, be)” and “为 (wei, be)” have never appeared in the Ba Construction. The verbs of perception, such as “讨厌 (taoyan, hate)” and “知道 (zhidao, know)”, are also not used in similar situations. Intransitive verbs, such as “跑 (pao, run)” and “哭 (ku, cry)”, are excluded as well from the Ba Construction. It is proved that transitive verbs, especially verbs with the sense of disposal, are commonly adopted in the Ba Construction. However, the disposal may not be physical, such as displacement of the object or change in its status. It also refers to the change of image in the subject’s cognition.

- Physical disposal

Example 137. 我把书借他了。(I lent the book to him.)

<table>
<thead>
<tr>
<th>surface</th>
<th>我 把 书 借 他 了</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>wo ba shu jie ta le</td>
</tr>
<tr>
<td>English</td>
<td>I - book lend he -</td>
</tr>
</tbody>
</table>

The SVO pattern of this example is “我借书给他.” (I lend books to him.)” The verb “借 (jie, lend)” is a three-valence verb which requires three arguments. It has a strong sense of transitivity and represents the action of changing the location of the object. Here, “书 (shu, book)” is displaced from “我 (wo, I)” to “他 (ta, he)”. Superficially, it is the object of the preposition, but semantically it is the object of the verb “借 (jie, lend)”. Therefore, during the derivation, the preposition “把 (ba, BA)” is absorbed by the verb proplet. The deep functor-argument relation, instead of the modifier-modified relation, is represented.
Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: wo</td>
<td>pyn: ba</td>
<td>pyn: shu</td>
<td>pyn: jie</td>
<td>pyn: le</td>
<td>cat: 了</td>
</tr>
<tr>
<td>sem: s1</td>
<td>sem: object</td>
<td>sem: unaccusative</td>
<td>sem: s3</td>
<td>sem: perf</td>
<td></td>
</tr>
<tr>
<td>fnc: arg</td>
<td>fnc:</td>
<td>arg:</td>
<td>fnc:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr:</td>
<td>mdd:</td>
<td>mdr:</td>
<td>mdr:</td>
<td>mdr:</td>
<td></td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

   pyn: wo pyn: ba pyn: shu pyn: jie pyn: le cat: 了
   sem: s1 sem: object sem: unaccusative sem: s3 sem: perf
   acopy(SS.noun nw.arg)

   In step 1, the preposition 把 (ba, BA) is read in and given the “arg” value of “I”, which is the core value of the ss proplet. But the core value of the nw proplet is not copied in return as the “fnc” value in the ss proplet. Then both proplets are copied into output.

   pyn: wo pyn: ba pyn: shu pyn: jie pyn: le cat: 了
   sem: s1 sem: object sem: unaccusative sem: s3 sem: perf
   acopy(SS.noun nw.arg) acopy(patient nw.sem)

   In step 2, the object is read in and its core value is copied as the second “arg” value in the preposition proplet. Again, the “fnc” slot in the nw proplet remains empty.

   pyn: wo pyn: ba pyn: shu pyn: jie pyn: le cat: 了
   sem: s1 sem: object sem: unaccusative sem: s3 sem: perf
   acopy(SS.noun nw.arg) acopy(SS.2.arg) acopy(nw.noun SS.arg) acopy(nw.sur SS.2.sur) acopy(nw.pyn SS.2.pyn) acopy(nw.verb SS.2.verb) cancel(SS.2.adj) cancel(nw.cat 1) acopy(nw.cat SS.2.cat) acopy(nw.sem SS.2.sem) acopy(nw.verb SS.fnc) acopy(agent SS.sem) acopy(nw.verb SS.3.fnc) acopy(patient SS.3.sem) acopy(nw.sem SS.3.sem)

   With the input of the predicate verb, both “fnc” slots are filled with the “verb” value from the nw proplet. After the replacement of the “sur”, “pyn”, “cat” and “sem” values, the preposition
proplet is completely absorbed.

pyn: wo | pyn: jie | pyn: shu | pyn: ta | pyn: le
cat: pro | cat: d' tv | cat: cn | cat: pro | cat: asp
sem: sl agent | sem: unaccusative | sem: object patient | sem: s3 experiencer | sem: perf
mdr: mdd: mdr: mdr:

In step 4, the rule of V+N is activated by the input of the indirect object “他 (ta, he)”.

pyn: wo | pyn: jie | pyn: shu | pyn: ta | pyn: le
cat: pro | cat: tv | cat: cn | cat: pro | cat: asp
sem: sl agent | sem: unaccusative | sem: object patient | sem: s3 experiencer | sem: perf
mdr: mdd: mdr: mdr:

In step 5, the aspect marker is read in.

With the input of the full stop, the analysis comes to the end.

The derivation result:

The functor-argument relation is more explicit in the DBS graphs. The SRG and the signature presentation is as follows:

a) lend
   \   \   
   I book he

b) V
   \   \   
   N N N

When a modal verb is adopted in the sentence, “把 (ba, BA)” is usually inserted between the modal verb and the common verb. For example:

Example 138. 我想把门打开。(I want to open the door.)

| surface: | 我 想 把 门 打开 |
| pinyin: | wo xiang ba men dakai |
| English: | I want - door open |
In this example, the object “门 (men, door)” will change the status from being closed to open if the subject “我 (wo, I)” do as “我 (wo, I)” want. Again, the preposition “把 (ba, BA)” is absorbed and the functor-argument relation is represented.

Derivation result:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : wo</td>
<td>pyn : xiang</td>
<td>pyn : ba</td>
<td>pyn : men</td>
<td>pyn : kai</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : p’ vx</td>
<td>cat : prep</td>
<td>cat : cn</td>
<td>cat : p’ tv mark</td>
</tr>
<tr>
<td>sem : sl agent</td>
<td>sem :</td>
<td>sem : object patient agent</td>
<td>sem :</td>
<td></td>
</tr>
<tr>
<td>fnc : want</td>
<td>arg : I</td>
<td>arg : # door</td>
<td>fnc : open</td>
<td>arg : door</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr: mdd:</td>
<td>mdr :</td>
<td>mdr :</td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:

```
a)  want  
    I  open
    
    door  N

b)  V
      N  V
```

- Psychological disposal

There is another kind of verbs of disposal, which change image in one’s cognition. For example:

**Example 139.** 你别把我当孩子。(Don’t take me as a child.)

<table>
<thead>
<tr>
<th>surface: 你 别 把 我 当 孩子</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin: ni bie ba wo dang haizi</td>
</tr>
<tr>
<td>English: you not - I take as child</td>
</tr>
</tbody>
</table>

The verb “当 (dang)” means “to take...as”. This kind of verbs do not change the physical status or position of the object, but they represent disposition in one’s cognition.

In the current example, the object, “我 (wo, I)”, is obviously not a child any more, but in the subject’s cognition, the image of “我 (wo, I)” is still a child.

Derivation result:

<table>
<thead>
<tr>
<th>sur : 你</th>
<th>sur : 当</th>
<th>sur : 我</th>
<th>sur : 孩子</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ni</td>
<td>pyn : dang</td>
<td>pyn : wo</td>
<td>pyn : haizi</td>
</tr>
<tr>
<td>noun: you</td>
<td>verb: take-as</td>
<td>noun: I</td>
<td>noun: child</td>
</tr>
<tr>
<td>cat : pro</td>
<td>cat : tv mark</td>
<td>cat : pro</td>
<td>cat : nr</td>
</tr>
<tr>
<td>sem : sl agent</td>
<td>sem : unaccusative</td>
<td>sem : sl patient agent</td>
<td>sem :</td>
</tr>
<tr>
<td>fnc : take-as</td>
<td>arg : you I child</td>
<td>fnc : take-as</td>
<td>fnc : take-as</td>
</tr>
<tr>
<td>mdr :</td>
<td>mdr : not</td>
<td>mdr :</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd :</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:
13.2. BA AND BEI CONSTRUCTIONS

CHAPTER 13. PREPOSITIONS

a) take-as

\[
\begin{array}{c}
\text{you} \quad I \\
\text{child}
\end{array}
\]

b) V

\[
\begin{array}{c}
N \\
N \\
N
\end{array}
\]

This example also shows that adverbs come before the word “把 (ba, BA)”. During the derivation, the adverb proplet is absorbed.

- Ba Construction with complement

In the Ba Construction, a complement is also observed after the verb. The complement may be an adverb or an adjective to show a certain feature of the verb, or the object. In any case, the core value of the complement is copied as the “mdr” value in the modified verb proplet. For example:

Example 140. 我把衣服洗干净了。（I have washed the clothes clean.）

| surface: | 我 | 把 | 衣服 | 洗 | 干净 | 了 |
| pinyin:  | wo | ba | yifu | xi | ganjing | le |
| English:  | I  | -  | clothes | wash | clean | -  |

In the above example, the adjective “干净 (ganjing, clean)” shows the status of the object after the action “洗 (xi, wash)”. The result of the action “洗 (xi, wash)” is “衣服干净 (the clothes is clean)”. Though the adjective modifies the status of the object, the whole subject-adjective structure (“衣服干净”) complement the predicate verb. Therefore, the core value of the adjective “干净 (ganjing, clean)”, is copied as the “mdr” value in the verb proplet.

Derivation result:

| sur: 我 | sur: 洗 | sur: 衣服 | sur: 干净 |
| pyn: wo | pyn: xi | pyn: yifu | pyn: ganjing |
| noun: I | verb: wash | noun: clothes | adj: clean |
| cat: pro | cat: tv mark | cat: cn | cat: adj |
| sem: s1 agent | sem: perf | sem: object patient | sem: |
| fnc: wash | arg: I clothes | fnc: wash | mdr: |
| mdr: mdr: clean | mdr: |

The SRG and the signature presentation:

\[
\begin{array}{c}
\text{wash} \\
I \\
\text{clean clothes}
\end{array}
\]

\[
\begin{array}{c}
N \\
A \\
N
\end{array}
\]

13.2.2 Bei Construction

About the Bei Construction, Yang [1995], Yang [1999], Sun [1995] and Zhang [2001] have done a lot of research. It is generally agreed that the Bei Construction is a typical passive structure in Chinese. Actually, the marker of the Bei Construction is not limited to the word “被 (bei)”. “叫 (jiao)”, “让 (rang)” and “给 (gei)” are the other three well accepted in this pattern. Among all the variation of the Bei Construction, the following 4 are the most frequently found.
CHAPTER 13. PREPOSITIONS  

13.2. BA AND BEI CONSTRUCTIONS

- N1+bei+N2+V

Example 141. 一个人被他谋杀了。（A man was murdered by him.）

<table>
<thead>
<tr>
<th>surface</th>
<th>个 人 被 他 谋杀 了</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>yi ge bei ta mousha le</td>
</tr>
<tr>
<td>English</td>
<td>one - person by he murder -</td>
</tr>
</tbody>
</table>

Lexical lookup:

This is the most basic pattern of the Bei Construction.

The syntactic-semantic analysis of “一个人被他谋杀了。”
In this step, the preposition “被 (bei, by)” is read in and copied into output.

4.

<table>
<thead>
<tr>
<th>sur : 人</th>
<th>sur : 被</th>
<th>sur : 他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ren</td>
<td>pyn : bei</td>
<td>pyn : ta</td>
</tr>
<tr>
<td>noun: person</td>
<td>adj : by</td>
<td>noun: he</td>
</tr>
<tr>
<td>cat : nr</td>
<td>cat : prep</td>
<td>cat : pro</td>
</tr>
<tr>
<td>sem :</td>
<td>sem :</td>
<td>sem : s3 @</td>
</tr>
<tr>
<td>fnc : arg :</td>
<td>fnc :</td>
<td></td>
</tr>
<tr>
<td>mdr : one</td>
<td>mdd:</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


The rule of PREP+O is activated in this step and the core value from the nw proplet is copied into the “arg” slot in the preposition proplet. But, different from other cases of prepositions plus object, the nw proplet is copied into output together with the preposition proplet.

5.

<table>
<thead>
<tr>
<th>sur : 人</th>
<th>sur : 被</th>
<th>sur : 他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ren</td>
<td>pyn : bei</td>
<td>pyn : ta</td>
</tr>
<tr>
<td>noun: person</td>
<td>adj : by</td>
<td>noun: he</td>
</tr>
<tr>
<td>cat : nr</td>
<td>cat : prep</td>
<td>cat : pro</td>
</tr>
<tr>
<td>sem :</td>
<td>sem :</td>
<td>sem : s3 @</td>
</tr>
<tr>
<td>fnc : arg :</td>
<td>fnc :</td>
<td></td>
</tr>
<tr>
<td>mdr : one</td>
<td>mdd:</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the verb is read in, the preposition proplet is first absorbed by the nw proplet after the replacement of certain attributes. Then, the functor-argument relation between the verb and the two noun proplets is represented.

6.

<table>
<thead>
<tr>
<th>sur : 人</th>
<th>sur : 被</th>
<th>sur : 他</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn : ren</td>
<td>pyn : bei</td>
<td>pyn : ta</td>
</tr>
<tr>
<td>noun: person</td>
<td>verb: murder</td>
<td>noun: he</td>
</tr>
<tr>
<td>cat : nr</td>
<td>cat : tv</td>
<td>cat : pro</td>
</tr>
<tr>
<td>sem : patient</td>
<td>sem :</td>
<td>sem : s3 agent</td>
</tr>
<tr>
<td>fnc : murder</td>
<td>arg : he person</td>
<td>fnc : murder</td>
</tr>
<tr>
<td>mdr : one</td>
<td>mdd:</td>
<td>mdr :</td>
</tr>
<tr>
<td>mdd :</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The rule of W+ASP is applied when the aspect marker is read in.

When the full stop is read in, the analysis comes to the end.

Derivation result:
The SRG and the signature presentation:

- a) murder
- b) V

Though the derivation process of the Bei Construction is different from the Ba Construction, the two signatures are both the same with that of SVO.

- N1+bei+V

**Example 142. 一个人被谋杀了。 (A man was murdered.)**

<table>
<thead>
<tr>
<th>surface:</th>
<th>一 个 人 被 谋杀 了</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin:</td>
<td>yi ge ren bei mousha le</td>
</tr>
<tr>
<td>English:</td>
<td>one - person by murder -</td>
</tr>
</tbody>
</table>

The agent, also the object of the preposition “被 (bei, by)” is often omitted, indicating the information is unknown or not important to the conversation participants. In this case a gap is left in the “arg” slot when the verb is read in.

The syntactic-semantic analysis of “一个人被谋杀了。”

Step 0-3 are the same with the above sentence. In step 4 comes the combination of the preposition and the predicate verb.

In this step, a substitute value “#” is copied to the “arg” slot in the verb proplet. The preposition proplet is absorbed.

Derivation result:

The SRG and the signature presentation:
a) murder  b) V

( # )  person  (- )  N

- N1+bei+N2+suo+V

Example 143. 一个人被他所杀。(A man was murdered by him.)

surface: 一 个 人 被 他 所 杀
pinyin: yi ge ren bei ta suo sha
English: one - person by he - kill

“所 (suo, SUO)” is a special structure auxiliary derived from an ancient pronoun. It is often used in the Bei Construction. In this case, the agent, i.e. the object of the preposition “被 (bei, by)”, is mandatory.

Lexical lookup:

The syntactic-semantic analysis:

Step 0-4 are skipped.

When the particle “所 (suo, SUO)” is read in, the substitute value “#” is copied to the “fnc” slot in the last ss proplet, i.e. the pronoun proplet. The nw proplet is not copied into output.
In step 6, the verb "proplet absorbs the preposition proplet. The core value from the verb proplet is copied to the two “fnc” slots in the two noun proplets. The functor-argument relation is presented.

Derivation result:

```
sur : 人  sur : 杀  sur : 他
pyn : ren  pyn : sha  pyn : ta
noun: person  verb: kill  noun: he
cat : nr  cat : tv mark  cat : pro
sem : patient  sem :  sem : s3 agent
fnc : kill  arg : he person  fnc : kill
mdr : one  mdd: mdr : mdd:
```

The SRG and the signature presentation:

a) kill he b) V person

If the preposition “被 (bei, by)” is replaced by another word with the same function, such as “为 (wei, by)”, the pattern of the construction is the same. For example:

Example 144. 他们为歌声所吸引。(They are all attracted by the song.)

<table>
<thead>
<tr>
<th>surface</th>
<th>他 们 为 歌声 所 吸引</th>
</tr>
</thead>
<tbody>
<tr>
<td>pinyin</td>
<td>ta men wei gesheng suo xiyin</td>
</tr>
<tr>
<td>English</td>
<td>he - by song - attract</td>
</tr>
</tbody>
</table>

Lexical lookup:

```
noun: he  adj : MEN  adj : by  noun: song  adj : SUO  verb: attract
sem : s3  sem : pl  sem :  sem :  sem : +V  sem : v' decl
fnc :  mdd: mdr : mdr : mdr : mdr :
mdr :
```

The derivation result:

```
sur : 他  sur : 吸引  sur : 歌声
pyn : ta  pyn : xiyin  pyn : gesheng
noun: he  verb: attract  noun: song
cat : pro  cat : tv mark  cat : cn
sem : pl patient  sem :  sem : agent
fnc : attract  arg : song he  fnc : attract
mdr : mdd: mdr : mdr :
```

The SRG and the signature presentation:
Example 145. 一个人被他给杀了。 (A man was murdered by him.)

“给 (gei)” is a word with three different meanings. It is stored in the lexicon as three independent entries.

Here, it is used as a structure auxiliary, which is similar to the particle “所 (suo, SUO)”. The derivation process is also similar to that of the above example sentence.

Here are the two steps in the syntactic-semantic analysis, when the particle “给 (gei, GEI)” is involved:

(Step 0-4 are the same with the above examples.)

In step 5, only “#” is added to the “fnc” slot in the ss proplet.

In step 6, “#” is added to the “fnc” slot in the ss proplet.
In step 6, the preposition proplet is absorbed.

Derivation result:

\[
\begin{array}{c|c|c}
\text{sur : 人} & \text{sur : 杀} & \text{sur : 他} \\
\text{pyn : ren} & \text{pyn : sha} & \text{pyn : ta} \\
\text{noun: person} & \text{verb: kill} & \text{noun: he} \\
\text{cat : nr} & \text{cat : tv mark} & \text{cat : pro} \\
\text{sem : patient} & \text{sem : perf} & \text{sem : s3 agent} \\
\text{fnc : kill} & \text{arg : he person} & \text{fnc : kill} \\
\text{mdr : one} & \text{mdr :} & \text{mdr :} \\
\text{mdd :} & \text{mdd :} & \text{mdd :}
\end{array}
\]

The SRG and the signature presentation:

a) \[
\text{kill} \quad \text{he} \quad \text{person}
\]

b) \[
\text{V} \quad \text{N} \quad \text{N}
\]

### 13.3 Analysis of Conjunctives

According to Halliday and Hasan [1976], conjunctions are not the core elements of sentences, but used to transmit information as a reminder of the relation between conjuncts. Based on Halliday’s classification of complex sentences, the semantic meaning of various conjunctions may be similar, dissimilar, alternative, adversative, causal-purpose, conditional or temporal. English conjunctions are generally used alone while Chinese conjunctions are more often used in pairs. Here are some examples:

<table>
<thead>
<tr>
<th>Type</th>
<th>Chinese Counterparts</th>
<th>English Counterparts</th>
</tr>
</thead>
<tbody>
<tr>
<td>similar</td>
<td>不但 (bu-dan)... 而且 (ererqie)...</td>
<td>not only...but also...</td>
</tr>
<tr>
<td>dissimilar</td>
<td>而 (er)... 则 (ze)...</td>
<td>but</td>
</tr>
<tr>
<td>alternative</td>
<td>不是 (bu-shi)... 而是 (ershi)...</td>
<td>not...but...</td>
</tr>
<tr>
<td>adversative</td>
<td>虽然 (suiran)... 但是 (danshi)</td>
<td>though/but</td>
</tr>
<tr>
<td>cause/purpose</td>
<td>因为 (yinwei)... 所以 (suoyi)...</td>
<td>because/so</td>
</tr>
<tr>
<td>conditional</td>
<td>除非 (chufei)... 否则 (fouze)...</td>
<td>unless</td>
</tr>
<tr>
<td>temporal</td>
<td>首先 (shou-xian)... 然后 (ranhou)...</td>
<td>first...then</td>
</tr>
</tbody>
</table>

As stated in 800 Words in Modern Chinese (Lv [1980]), there are all together 97 conjunctions in Chinese. Lu [1983] increases the number to 120, among which 90 are more frequently used. Generally, all these conjunctions share some common features: they are bounded to the conjuncts; they are not modified; they are not used in combination if from the same category (e.g. both are conditional); and they can be put before or after the subject. Take “因为 (yinwei, because)... 所以 (suoyi, so)...” as an example.
Example 146. 因为他没来所以错过了机会。(Because he didn’t come, he missed the chance.)

| surface: | 因为 他 没 来 所以 错过 了 机会 |
| pinyin: | yinwei ta mei lai suoyi cuoguo le jihui |
| English: | because he not come so miss - chance |

In this example, the conjunction “因为 (yinwei, because)” starts the sentence, followed by the subject.

Lexical lookup:

Syntactic-semantic analysis:

In this step, the pronoun is read in and copied into output.

In step 2, the adverb “没 (mei, not)” is read in. The core value from the nw proplet is copied to the “mdr” slot in the conjunctive proplet. This prepares for the absorption of the conjunctive
proplet. Then two proplets are copied into output, becoming the sentence start for next step.

In step 3, the input of the verb “来 (lai, come)” activates a variation of the rule of S+V. The functor-argument relation between the pronoun and the verb is represented as the values of the “arg” and “fnc” attributed in related proplets. Moreover, the conjunctive proplet is absorbed. The “adj” value of the conjunctive is appended to the “mdr” attribute.

In step 4, the conjunctive “所以 (suoyi, so)” is read in and simply copied into output.

In this step, the second verb is read in. The “nc” value in the first ss proplet is replaced by the core value from the nw proplet. The core value from the first ss proplet is copied as the “pc” value in the nw proplet. Thus the coordination relation is represented. The conjunctive proplet, i.e. the third ss proplet is absorbed by the nw proplet, with its core value becoming an “mdr” value. “#” is copied as the first “arg” value in the verb proplet, and the first “cat” value is accordingly
removal.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: lai</td>
<td>pyn: ta</td>
<td>pyn: cuoguo</td>
<td>pyn: le</td>
<td></td>
</tr>
<tr>
<td>verb: come</td>
<td>noun: he</td>
<td>verb: miss</td>
<td>adj: LE</td>
<td></td>
</tr>
<tr>
<td>cat: vq</td>
<td>cat: pro</td>
<td>cat: p' tv</td>
<td>cat: asp</td>
<td></td>
</tr>
<tr>
<td>sem: because spt</td>
<td>sem: s1 agent</td>
<td>sem: so</td>
<td>sem: perf</td>
<td></td>
</tr>
<tr>
<td>arg: he</td>
<td>func: come</td>
<td>arg: #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr: not</td>
<td>mdr: so</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nc : miss</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This step starts the rule of W+ASP.

<table>
<thead>
<tr>
<th>7</th>
<th>sur: 来</th>
<th>sur: 他</th>
<th>sur: 错过</th>
<th>sur: 机会</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: lai</td>
<td>pyn: ta</td>
<td>pyn: cuoguo</td>
<td>pyn: jihui</td>
<td></td>
</tr>
<tr>
<td>verb: come</td>
<td>noun: he</td>
<td>verb: miss</td>
<td>noun: chance</td>
<td></td>
</tr>
<tr>
<td>cat: vq</td>
<td>cat: pro</td>
<td>cat: p' tv</td>
<td>cat: cn</td>
<td></td>
</tr>
<tr>
<td>sem: because spt</td>
<td>sem: s1 agent</td>
<td>sem: so perf</td>
<td>sem: patient</td>
<td></td>
</tr>
<tr>
<td>arg: he</td>
<td>func: come</td>
<td>arg: #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr: not</td>
<td>mdr: so</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nc : miss</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In step 7, the rule of V+N is activated.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: lai</td>
<td>pyn: ta</td>
<td>pyn: cuoguo</td>
<td>pyn: jihui</td>
<td></td>
<td></td>
</tr>
<tr>
<td>verb: come</td>
<td>noun: he</td>
<td>verb: miss</td>
<td>noun: chance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cat: vq</td>
<td>cat: pro</td>
<td>cat: tv</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sem: because spt</td>
<td>sem: s1 agent</td>
<td>sem: so perf</td>
<td>sem: patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>arg: he</td>
<td>func: come</td>
<td>arg: #</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdr: not</td>
<td>mdr: so</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nc : miss</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the full stop is read in, the analysis comes to the end.

Derivation result:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: lai</td>
<td>pyn: ta</td>
<td>pyn: cuoguo</td>
<td>pyn: jihui</td>
</tr>
<tr>
<td>verb: come</td>
<td>noun: he</td>
<td>verb: miss</td>
<td>noun: chance</td>
</tr>
<tr>
<td>cat: vq</td>
<td>cat: pro</td>
<td>cat: tv</td>
<td></td>
</tr>
<tr>
<td>sem: because spt</td>
<td>sem: s1 agent</td>
<td>sem: so perf</td>
<td>sem: patient</td>
</tr>
<tr>
<td>arg: he</td>
<td>func: come</td>
<td>arg: #</td>
<td></td>
</tr>
<tr>
<td>mdr: not</td>
<td>mdr: so</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mdd:</td>
<td>mdd:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nc : miss</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SRG and the signature presentation:
This example sentence can also be reorganized as

Example 147. 他因为没来所以错过了机会。 (Because he didn’t come, he missed the chance.)

The semantic meaning doesn’t change with reorganization of the structure. The syntactic-semantic analysis is slightly different and the derivation result is composed of the same group of proplets.

The derivation result of “他因为没来所以错过了机会。”

The SRG and the signature presentation:

Conjunctives are not only used for complex sentences. Some conjunctives, including “和 (he, and)” , “与 (yu, and)” , “及 (ji, and)” , “以及 (yiji, and)” , “且 (qie, and)” , “或 (huo, or)” and “或者 (huozhe, or)” , are observed to connect words or phrases from the same category to form one element of a simple sentence. For example:

Example 148. 他们比身高及体重。 (They compare height and weight.)
Lexical lookup:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cat : pro</td>
<td>cat : pur</td>
<td>cat : s’ p’ tv</td>
<td>cat : cn</td>
<td>cat : conj</td>
<td>cat : cn</td>
<td>cat :</td>
</tr>
</tbody>
</table>

Syntactic-semantic analysis:

1. in this step, the input of “们 (men, MEN)” starts the rule of W+MR.

2. The rule of S+V is activated when the verb is read in. The “arg” slot and the “fnc” slot in the two proplets are respectively filled with the “noun” and “verb” values. The first “cat” value in the verb proplet is canceled and the value of “agent” is appended to the “sem” attribute in the ss proplet.

3. In step 3, the rule of V+N is activated by the input of the noun “身高 (shengao, height)”.

Another
“cat” value is canceled from the verb proplet with the addition of another “arg” value.

   pyn: ta pyn: bi pyn: shengao pyn: ji
   noun: he verb: compare noun: height adj: and
cat: pro cat: tv cat: cn cat: conj
   sem: pl sem: non-action sem: sem:
   fnc: compare arg: he height fnc: compare arg:
   mdr: mdr: mdr: mdd:

When the conjunctive is read in, an additional attribute, i.e. “nc”, is created in the proplet of “身高 (shengao, height)”. The temporary value “#” is provided.

5. sur: 他 sur: 比 sur: 身高 sur: 体重
   pyn: ta pyn: bi pyn: shengao pyn: tizhong
   noun: he verb: compare noun: height noun: weight
   cat: pro cat: tv cat: cn cat: cn
   sem: pl sem: non-action sem: sem:
   fnc: compare arg: he height fnc: compare fnc: compare
   mdr: mdr: mdr: mdr:
   nc: weight pc: height

In step 6, another common noun is read in. The temporary value “#” is replaced by the core value from the nw proplet. An additional attribute, i.e. “pc”, is created in the nw proplet and provided with the core value from the proplet “身高 (shengao, height)”.

   pyn: ta pyn: bi pyn: shengao pyn: tizhong pyn: tizhong
   noun: he verb: compare noun: height noun: weight noun: weight
   cat: pro cat: tv cat: cn cat: cn
   sem: pl sem: non-action sem: sem:
   fnc: compare arg: he height fnc: compare fnc: compare fnc: compare
   mdr: mdr: mdr: mdr:
   nc: weight pc: height

When the full stop is read in, the analysis comes to the end.

Derivation result:

<table>
<thead>
<tr>
<th>sur: 他</th>
<th>sur: 比</th>
<th>sur: 身高</th>
<th>sur: 体重</th>
</tr>
</thead>
<tbody>
<tr>
<td>pyn: ta</td>
<td>pyn: bi</td>
<td>pyn: shengao</td>
<td>pyn: tizhong</td>
</tr>
<tr>
<td>noun: he</td>
<td>verb: compare</td>
<td>noun: height</td>
<td>noun: weight</td>
</tr>
</tbody>
</table>
cat: pro| cat: tv| cat: cn| cat: cn|
| sem: pl| sem: non-action| sem:| sem:|
fnc: compare| arg: he height| fnc: compare| fnc: compare|
| mdr: mdr: mdr: mdr:
| nc: weight| pc: height|

The SRG and the signature presentation:
13.3. ANALYSIS OF CONJUNCTIVES

CHAPTER 13. PREPOSITIONS

a) compare
   \   \  
  he  height—weight

b) V
   \   
  N  N
Summary of Part III

Adjectives are mainly used as attributives, adverbials and predicators. In whatever usage, adjectives maintain their basic forms. When used as predicators, they have similarities with verbs in that they are often followed by aspect markers, take objects and appear in repetition. The rules for adjective analysis are therefore similar to those for verbs. However, additional operations are necessary to provide adjectives the attribute of “arg” and the semantic value of “av”. Adverbs belong to a relatively closed class. They usually occur before the words they modify, such as adjectives or verbs. In this dissertation, the first nine most frequent patterns of adverb application are listed and analyzed with examples. Among all the adverbs, “很 (hen, very)” and “极 (ji, extremely)” are also found as complement, which makes them outstanding and deserves special attention. Prepositions never occur independently. They requires arguments to form prepositional phrases. Generally, the argument proplets are absorbed into the preceding preposition proplet. When prepositions are followed by aspect markers, the rules applied resemble those for verbs in combination with aspect markers. Ba and Bei constructions, as exceptions of the preposition application, require different treatments from other prepositional constructions. The analysis of object-fronting is introduced in the part of Ba construction. The formal passive voice in Chinese is introduced in the part of Bei construction. Conjunctives may occur either on the phrase level or the sentence level. They are analyzed as in coordination structures.
This page intentionally contains only this sentence.
Part IV

Conclusion and Prospects
Chapter 14

Discussion and Conclusion

This research tries to cover the most basic and frequent phrase and sentence patterns in Chinese. The syntactic-semantic analysis is counted as complete if the derivation goes on successfully till the last input of the sentence, i.e. the full stop that activates the rule of S+IP. Otherwise it is automatically rejected and the derivation stops where the error occurs. The sentences that are analyzed as complete are checked manually for accuracy and then further divided into two groups: accurately parsed and inaccurately parsed. The test result is evaluated by precision, recall and F-measure.

The formula for calculating precision is:

\[
\text{precision} = \frac{\text{Number of Accurately Parsed}}{\text{Number of Completely Analyzed}} \cdot 100\%
\]

The formula for calculating recall is:

\[
\text{recall} = \frac{\text{Number Of Accurately Parsed}}{\text{Total of Test Sentences}} \cdot 100\%
\]

The formula for calculating F-measure is:

\[
F = 2 \cdot \frac{\text{precision} \cdot \text{recall}}{\text{precision} + \text{recall}} \cdot 100\%
\]

After several rounds of evaluation and improvement, the best test result is as follows:

<table>
<thead>
<tr>
<th>result</th>
<th>precision</th>
<th>recall</th>
<th>F-measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.5%</td>
<td>90.6%</td>
<td>91.1%</td>
<td></td>
</tr>
</tbody>
</table>

Now, let us compare LAG with other Grammars in a systematic way:
CHAPTER 14. DISCUSSION AND CONCLUSION

<table>
<thead>
<tr>
<th></th>
<th>PSG</th>
<th>CG</th>
<th>DG</th>
<th>LAG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>top-down</td>
<td>bottom-up</td>
<td>Tomita</td>
<td>left-corner</td>
</tr>
<tr>
<td>1.</td>
<td>time-linearity</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2.</td>
<td>low lexical ambiguity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3.</td>
<td>syntactic structure</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>semantic structure</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>ambiguity reduction</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>6.</td>
<td>computation efficiency</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7.</td>
<td>Chinese application</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Though the number of ambiguous results is a little bit high in the first several tests, it is finally reduced by improving the algorithm with more information from the lexicon and more detailed definition of the rule patterns. The evaluation of all the eight properties of LAG prove positive, as shown in the above table, which makes the conclusion direct: LAG, supported by the language theory of SLIM, is unique, efficient and competitive in the syntactic-semantic analysis of Chinese.

Generally speaking, two main syntactic structures, namely the functor-argument structure and the coordination structure, are represented in this Chinese parsing process. In addition, the modifier-modified relation is illustrated. Since semantic relation speaks even louder than syntactic relation in Chinese, semantic information, such as the semantic meaning of the word and its semantic role in the sentence, is provided as well. The technology of absorption is applied to function words, such as determiners, aspect markers or other structural markers, adverbs, special prepositions, conjunctives, etc. It is also applied when a nominal structure is used as an adnominal modifier, such as a cardinal-quantifier (cdn-q) construction. If there is any gapping, since omission is not rare in Chinese, a gap is left and indicated by “#” in the derivation result.

Valence, as an important term in LAG, refers to the number of arguments a verb can have. But in Chinese, a noun or an adjective may also be a predicator. It is not possible to provide every noun or adjective with valence, because it either increases lexical ambiguity or contradict with other applications of the word.

In addition, because of the flexible correspondence between a word class and a syntactic role, there are more varieties of intrapropositional and extrapropositional relations in Chinese than in English.

According to Hauser [2011a], two connected nodes in a signature are called an elementary signature. Among the 36 possible intrapropositional elementary signatures, only 11 are found in English.
As demonstrated in the above table, only 11 are marked with “+” in the column for English. But, 18 elementary signatures are marked with “++” and 10 are marked with “+” in the column for Chinese. “+” means the marked signature is found in the corpus. “++” means the marked signature, found in the corpus, are also shown up in this dissertation.
If “/” represents the subject/verb relation in English, it means more in Chinese. Probably it is safe to say that it indicates the subject argument-functor relation in Chinese, since the role of a functor may be played by a verb, a noun or an adjective. It is similar to “\”. In this analysis of Chinese, it indicates the object argument-functor relation.

Compared with English, Chinese is much more flexible in syntax. Semantic relations are significant in the process and result of Chinese parsing. LAG, as a time-linear algorithm, is well applied to the modern Chinese analysis for the DBS content representation.
Chapter 15

Future Prospects

The improved Left-Associative Grammar, as in the SLIM theory of language and Database Semantics, can be put into large-scale parsing of Chinese. The following work can help to go further on the basis of this research:

- to build up a larger tailored lexicon and introduce machine learning for its scalability
- to improve the rules with more syntactic and semantic information extracted through statistic methods from well-developed corpus
- to apply in a larger system, e.g. as a module in a machine translation system

In addition, language production can be experimented on the basis of this research. Left-Associative Grammar, with the three variations of LA-hear, LA-think and LA-speak, can be transformed into a complete machine translation system. The numbered arcs graph (NAG) shows the activation order of the content, which will lead directly to the surface realization. With proper post processing, the Chinese sentences or texts, i.e. the input of LAG-parsing, can be automatically translated into English.
This page intentionally contains only this sentence.
Chapter 16

Summary

In this dissertation, Left-Associative Grammar is applied and tailored for the syntactic-semantic analysis of modern Chinese. The analysis follows the principle of time-linearity and description. Left-Associative Grammar is one of the two bases of Database Semantics. The DBS graphs of semantic relations, which can be automatically generated from the LAG derivation result, provide a more explicit view of the content of a sentence. The part of speech signature, as a more abstract presentation, helps to generalize the sentence patterns in Chinese with a clearer view of the deep semantic relations.

To meet the requirements of automatic LAG syntactic-semantic analysis and ensure its efficiency, a bilingual dictionary is built up. Lexical items in this dictionary are stored as non-recursive feature structures called proplets. It is also supposed to help on the lexical level to reduce ambiguity caused by polysemy and temporary shift of part of speech. NOUN, VERB and ADJECTIVE are the three word classes in the LAG-Chinese dictionary. This word classification is different from that in the traditional Chinese grammar. The class of NOUN includes noun in a narrow sense as in traditional grammar, and pronoun, numeral, quantifier as well. The class of VERB includes common verbs with one, two or three valences, causative verbs, modal verbs, directional verbs, etc. The Class of ADJECTIVE includes adjective in a narrow sense, adverb, preposition, conjunctive, auxiliary, etc. Each word has its attribute-value pairs with its grammatical and semantic information.

Based on the study of modern Chinese grammar, various basic usages of NOUNs, VERBs and ADJECTIVEs are analyzed. Rules, operations and graphical representation of the analysis result are provided. According to the demand of semantic analysis, adding values for the semantic attribute is proposed to note semantic roles and pragmatic functions, such as agent, patient, experiencer, and so on. The derivation result is meant to represent the content and deep semantic relations of the sentence. From the perspective of the fundamental usage of nouns, verbs and adjectives, the structures of subject-predicate, coordination, predicate-object, etc, are studied and analyzed, as well as the variants of these basic structures, including object-fronting, semantic passive, formal passive, element omission and so on.
With respect to the analysis of a function word, the algorithm of conditional absorption is proposed as an improvement of Left-Associative Grammar. In the absorption of a function word by a content word, the core value and/or the semantic value of the function word is maintained under certain conditions, which helps to avoid possible back-tracing to a large extent in later language production and machine translation. In all the 36 possible fundamental intra-propositional part of speech signatures, 29 are found in modern Chinese. It demonstrates the flexibility of Chinese sentence patterns. That all the 29 relations are correctly analyzed shows the adaptability of the algorithm adopted and proposed in this research. In the future, the approach of automatic syntactic and semantic analysis based on improved Left-Associative Grammar can be applied to other large-scale Chinese corpus. Language production and machine translation based on this research may also be a focus of the following-up study.
Zusammenfassung


In Hinblick auf die Analyse eines Funktionsworts, wird der Algorithmus der bedingten Absorption als Verbesserung der linksassoziativen Grammatik empfohlen. Bei der Absorption eines Funktionsworts durch ein Inhaltswort wird der Grundwert und/oder der semantische Wert des Funktionsworts unter bestimmten Bedingungen aufrecht erhalten, was das mögliche Back-Tracking in einem großen Teil der späteren Sprachproduktion und MAschinenübersetzung zu vermeiden hilft. Von den 36 möglichen grundlegenden intra-propositionalen Wortklassen Signaturen treten im modernen Chinesisch 29 auf. Dies zeigt die Flexibilität chinesischer Satzmuster. Das all diese 29 Relationen korrekt analysiert werden, zeigt die Anpassbarkeit des Algorithmus, der in...
dieser Arbeit verwendet und vorgeschlagen wird. Auf Grund der Vielfalt chinesischer Texte
sollte der Ansatz automatischer syntaktischer und semantischer Analyse basierend auf linksas-
soziativer Grammatik auch auf andere umfassendere chinesische Korpus angewendet werden, um
seine Effizienz zu überprüfen. Zusätzlich stellt die Sprachproduktion und maschinelle Übersetzung
basierend auf dieser Forschung eine Möglichkeit für Folgestudien dar.
Part V

Appendix
## Proplet Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Full Name</th>
<th>Value(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>adj</td>
<td>adjective</td>
<td>English translation of the adjective represented by the surface</td>
</tr>
<tr>
<td>arg</td>
<td>argument</td>
<td>noun, verb or adjective belonging to the main predicator</td>
</tr>
<tr>
<td>cat</td>
<td>category</td>
<td>category segments specifying combinatorial properties</td>
</tr>
<tr>
<td>fnc</td>
<td>functor</td>
<td>noun, verb or adjective belonging to another word</td>
</tr>
<tr>
<td>mdd</td>
<td>modified</td>
<td>noun, verb or adjective modified by another word</td>
</tr>
<tr>
<td>mdr</td>
<td>modifier</td>
<td>noun, verb or adjective modifying another word</td>
</tr>
<tr>
<td>nc</td>
<td>next conjunct</td>
<td>another word in coordination which comes later</td>
</tr>
<tr>
<td>noun</td>
<td>noun</td>
<td>English translation of the noun represented by the surface</td>
</tr>
<tr>
<td>pc</td>
<td>previous conjunct</td>
<td>another word in coordination which comes earlier</td>
</tr>
<tr>
<td>prn</td>
<td>proposition number</td>
<td>an integer holding the proplets of a proposition together</td>
</tr>
<tr>
<td>pyn</td>
<td>pinyin</td>
<td>Chinese pronunciation of the word</td>
</tr>
<tr>
<td>sem</td>
<td>semantics</td>
<td>semantic segments specifying non-combinatorial properties</td>
</tr>
<tr>
<td>sur</td>
<td>surface</td>
<td>surface of a word form</td>
</tr>
<tr>
<td>verb</td>
<td>verb</td>
<td>English translation of the verb represented by the surface</td>
</tr>
<tr>
<td>wrn</td>
<td>word number</td>
<td>an integer for numbering word proplets</td>
</tr>
</tbody>
</table>
## Proplet Values

<table>
<thead>
<tr>
<th>Value</th>
<th>Explanation</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>adj</td>
<td>adjective</td>
<td>cat of an adjective</td>
</tr>
<tr>
<td>adv</td>
<td>adverb</td>
<td>cat of an adverb</td>
</tr>
<tr>
<td>cdn</td>
<td>cardinal</td>
<td>cat of a numeral</td>
</tr>
<tr>
<td>cn</td>
<td>common noun</td>
<td>cat of a noun</td>
</tr>
<tr>
<td>conj</td>
<td>conjunctive</td>
<td>cat of an adjective</td>
</tr>
<tr>
<td>nr</td>
<td>noun referring to human being</td>
<td>cat of a noun</td>
</tr>
<tr>
<td>prep</td>
<td>preposition</td>
<td>cat of a preposition</td>
</tr>
<tr>
<td>pro</td>
<td>personal pronoun</td>
<td>cat of a pronoun</td>
</tr>
<tr>
<td>dpro</td>
<td>demonstrative pronoun</td>
<td>cat of a pronoun</td>
</tr>
<tr>
<td>det</td>
<td>determiner</td>
<td>cat of a determiner</td>
</tr>
<tr>
<td>nquan</td>
<td>adnominal quantifier</td>
<td>cat of a quantifier</td>
</tr>
<tr>
<td>vquan</td>
<td>adverbial quantifier</td>
<td>cat of a quantifier</td>
</tr>
<tr>
<td>nmr</td>
<td>noun marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>omr</td>
<td>ordinal marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>cmr</td>
<td>complement marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>pmr</td>
<td>plural marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>smr</td>
<td>structure auxiliary</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>tmr</td>
<td>temporal noun marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>vmr</td>
<td>adverbial marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>amr</td>
<td>adjective marker</td>
<td>cat of an auxiliary</td>
</tr>
<tr>
<td>nm</td>
<td>personal name</td>
<td>cat of a noun</td>
</tr>
<tr>
<td>nd</td>
<td>country name</td>
<td>cat of a noun</td>
</tr>
<tr>
<td>nl</td>
<td>location noun</td>
<td>cat of a noun</td>
</tr>
<tr>
<td>nt</td>
<td>temporal noun</td>
<td>cat of a noun</td>
</tr>
<tr>
<td>+N</td>
<td>to modify a noun</td>
<td>sem of a quantifier or an adverb</td>
</tr>
<tr>
<td>+man</td>
<td>to modify a noun referring to human being</td>
<td>sem of a quantifier</td>
</tr>
<tr>
<td>+V</td>
<td>to modify a verb</td>
<td>sem of a quantifier or an auxiliary</td>
</tr>
<tr>
<td>object</td>
<td>object</td>
<td>sem of a noun</td>
</tr>
<tr>
<td>abstract</td>
<td>abstract</td>
<td>sem of a noun</td>
</tr>
<tr>
<td>tense</td>
<td>tense</td>
<td>sem of an adverb</td>
</tr>
<tr>
<td>pl</td>
<td>plural</td>
<td>sem of an auxiliary</td>
</tr>
<tr>
<td>neg</td>
<td>negative</td>
<td>sem of an auxiliary</td>
</tr>
<tr>
<td>odn</td>
<td>ordinal</td>
<td>sem of an adjective</td>
</tr>
<tr>
<td>individual</td>
<td>individual</td>
<td>sem of an auxiliary</td>
</tr>
<tr>
<td>clausal</td>
<td>clausal</td>
<td>sem of a conjunctive</td>
</tr>
</tbody>
</table>
### Rules

<table>
<thead>
<tr>
<th>Rule Name</th>
<th>Paraphrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADJ+ADJ</td>
<td>combination of two ADJECTIVES in an arbitrary order</td>
</tr>
<tr>
<td>ADJ+N</td>
<td>an ADJECTIVE plus a NOUN</td>
</tr>
<tr>
<td>AN+N</td>
<td>a nominal modifier plus a NOUN</td>
</tr>
<tr>
<td>AN+NV</td>
<td>a nominal modifier plus a nominal predicate</td>
</tr>
<tr>
<td>DET+N</td>
<td>a determiner plus a NOUN</td>
</tr>
<tr>
<td>DQ+N</td>
<td>a determiner-quantifier phrase plus a NOUN</td>
</tr>
<tr>
<td>MR+ROOT</td>
<td>a marker plus a root word</td>
</tr>
<tr>
<td>N+ADJ</td>
<td>a NOUN plus an ADJECTIVE</td>
</tr>
<tr>
<td>N+N</td>
<td>a NOUN plus a NOUN</td>
</tr>
<tr>
<td>NQ+NOUN</td>
<td>a cardinal-quantifier phrase plus a NOUN</td>
</tr>
<tr>
<td>NUM+QUAN</td>
<td>a numeral plus a quantifier</td>
</tr>
<tr>
<td>PREP+O</td>
<td>a preposition plus an object</td>
</tr>
<tr>
<td>S+AV</td>
<td>a subject plus an adjective predicate</td>
</tr>
<tr>
<td>S+IP</td>
<td>a sentence plus a punctuation mark</td>
</tr>
<tr>
<td>S+NV</td>
<td>a subject plus a nominal predicate</td>
</tr>
<tr>
<td>S+V</td>
<td>a subject plus a verb</td>
</tr>
<tr>
<td>S+VX</td>
<td>a subject plus a link verb</td>
</tr>
<tr>
<td>V+COMP</td>
<td>a VERB plus a complement</td>
</tr>
<tr>
<td>V+N</td>
<td>a VERB plus a NOUN</td>
</tr>
<tr>
<td>V+V</td>
<td>a VERB plus a VERB</td>
</tr>
<tr>
<td>V+VO</td>
<td>a VERB plus a verbal object</td>
</tr>
<tr>
<td>VS+ADJ</td>
<td>a verbal subject plus an adverb</td>
</tr>
<tr>
<td>VX+P</td>
<td>a link verb plus a predicative</td>
</tr>
<tr>
<td>W+ASP</td>
<td>a word plus an aspect marker</td>
</tr>
<tr>
<td>W+CONJ</td>
<td>a word plus a conjunctive</td>
</tr>
<tr>
<td>W+MR</td>
<td>a NOUN/VERB/ADJECTIVE plus a marker</td>
</tr>
<tr>
<td>X+X</td>
<td>a combination of two words from the same category</td>
</tr>
</tbody>
</table>
Rule Operations

acopy(a b) to copy the value of “a” and append it to “b”
cancel(a) to cancel a value or an attribute
concat(a b) to attach the value of “a” to the value of “b”
copy(a) to copy a proplet into output
ecopy(a b) to replace the value of “b” by the value of “a”
    If the attribute “b” does not exist, then create the attribute first.
nattr(a b) to create a new attribute in proplet “b”
sappend(a1, a2, a3... b) to combine a number of values as the new value of “b”
    If the attribute “b” does not exist, then create the attribute first.
List of Examples

1. They have been here for three months.
2. He has come twice.
3. He swallowed the chocolate at once.
4. I will come on the third day.
5. He washes every one.
6. He counts one by one.
7. I laugh.
8. Mother loves me.
9. The book is mine.
10. This is a car.
11. This makes me sad.
12. I come here.
13. I work here.
14. Here is the office.
15. I like here.
16. The buildings here are high.
17. These can run.
18. He works this way.
19. He is so young.
20. There are only books in the room.
21. He is more Ah-Q.
22. Tomorrow is Saturday.
23. Ming Li is from Shanghai.
24. It is again Saturday tomorrow.
25. Ming Li is probably from Shanghai.
26. I have oil.
27. He is too oily.
28. I like art.
29. This coat is very artistic.
30. He has the ability.
他真本事。(He is really capable.) ................................................. 90
她思想特传统。(Her thinking is very traditional.) .............................. 93
她特淑女。(She is a lady.) .............................................................. 93
这个人特青春。(She is very vigorous.) ............................................. 93
他特绅士地打开了门。(He opened the door like a gentleman.) .......... 94
她长得非常中国。(He looks very Chinese.) ........................................ 96
她的穿戴很时髦。(Her clothes are fashionable.) .............................. 98
她的穿戴特香港。(Her clothes are fashionable.) .............................. 98
他是一个很吝啬的人。(He is very mean.) ......................................... 98
他是一个特葛朗台的人。(He is very mean, like Grandet.) ............... 98
人们欢迎李明。(People welcome Ming Li.) ....................................... 101
我不同意你的意见。(I don't agree to your opinion.) .......................... 102
他从北京来。(He comes from Peking.) ............................................ 102
我和老师讨论问题。(I discussed with the teacher.) ............................ 103
她有一辆车。(She has a car.) ......................................................... 104
两个人成了朋友。(The two persons became friends.) ........................... 105
我喜欢星期天。(I like Sundays.) ..................................................... 106
这件事发生在星期天。(It happened on Sunday.) ............................... 107
我喜欢星期天的早晨。(I like Sunday morning.) ............................... 107
星期天是明天。(Sunday is tomorrow.) ........................................... 108
星期天异常寒冷。(It was unusually cold on Sunday.) ......................... 109
星期天去上海了。(X went to Shanghai on Sunday.) ............................ 110
李明住在前面。(Ming Li lives in front.) ........................................... 113
李明在学校前面。(Ming Li lives in front of the school.) ....................... 114
李明在学校以东。(Ming Li lives to the east of the school.) ............... 115
李明出现在我之前。(Ming Li appears in front of me.) ........................ 115
李明住附近。(Ming Li lives in the neighborhood.) ............................. 116
附近住着李明。(Ming Li lives in the neighborhood.) ........................... 118
后面落下了几个人。(Several persons lagged behind.) ......................... 119
前边建了一座楼房。(A building has been built up in front.) ............... 120
外面相当冷。(It is rather cold outside.) ........................................... 121
李明有一把椅子。(Ming Li has a chair.) ........................................... 122
旁边有一把椅子。(There is a chair nearby.) ...................................... 122
他总躺着。(He is always lying.) ..................................................... 132
他学了德语。(He has learnt German.) .............................................. 132
他学过吉他。(He has learnt playing Guitar.) ..................................... 133
我走走。(I walk a bit.) ................................................................. 134
他们说说笑笑。(They talk and laugh.) ............................................. 134
我们讨论讨论这个方案。(Let's discuss a bit about this program.) .... 134
我走走。(I walk a bit.) ................................................................. 136
我走了走。(I walked a bit.) ........................................................... 136
75. 我看一看书。(I read a bit.)
76. 我看了书。(I read a bit.)
77. 我听故事。(I listen to stories.)
78. 说更难。(It is more difficult to speak.)
79. 她能忍受孩子的闹。(She can stand the noise from the child.)
80. 她读小说解闷。(She read novels to kill time.)
81. 流动资产包括现金。(Current assets include cash.)
82. 上午来找我的是我的父亲。(The person who came for me in the morning is my father.)
83. 他会跑。(He will/can run.)
84. 他很会弹吉他。(He can play guitar very well.)
85. 他应该而且会来。(He should and will come.)
86. 他应该会来。(He is probably coming.)
87. 他应该会愿意来。(He is probably willing to come.)
88. 他来了。(He has come.)
89. 眼泪要掉下来了。(Tears are going to drop down.)
90. 他笑了起来。(He has started laughing.)
91. 眼泪掉下来过。(Tears dropped down once.)
92. 两个主要政党已经联合起来组成政府。(Two main parties have united to organize a government.)
93. 她的脸红起来。(Her face is becoming red.)
94. 我会吩咐她准备咖啡。(I will order her to prepare coffee.)
95. 他给了我一本书。(He gave me a book.)
96. 他抢了我一本书。(He robbed me of a book.)
97. 我听了他两堂课。(I attended to two of his lessons.)
98. 他是一个聪明孩子。(He is a clever boy.)
99. 他是一个聪明的孩子。(He is a clever boy.)
100. 他是一个很聪明的孩子。(He is a very clever boy.)
101. 他平安地回来了。(He came back safe.)
102. 他平安回来了。(He came back safe.)
103. 他聪明。(He is clever.)
104. 他很聪明。(He is very clever.)
105. 这台电脑坏了。(This computer has broken down.)
106. 这台电脑坏了。(This computer was broken before.)
107. 这台电脑还坏着。(This computer is still broken.)
108. 这项工程方便了生活。(This project made life convenient.)
109. 我们应该稳定情绪。(We should make our mood stable.)
110. 他热心公益。(He is keen on public benefits.)
111. 我可怜他。(I have pity on him.)
112. 她的脸红红的。(Her face is red.)
113. 他有一双冰冷冰冷的手。(He has a pair of ice-cold hands.)
114. 他慢慢走着。(He is walking slowly.)
<table>
<thead>
<tr>
<th>Example</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 他慢慢地走着。</td>
<td>(He is walking slowly.)</td>
</tr>
<tr>
<td>116 他只惦记钱。</td>
<td>(He is only concerned about money.)</td>
</tr>
<tr>
<td>117 方法很重要。</td>
<td>(The method is important.)</td>
</tr>
<tr>
<td>118 我们真应该学习英语。</td>
<td>(We should learn English.)</td>
</tr>
<tr>
<td>119 她不十分了解他。</td>
<td>(She does not know him very well.)</td>
</tr>
<tr>
<td>120 头发几乎全白了。</td>
<td>(The hair is almost all white.)</td>
</tr>
<tr>
<td>121 她很快振作起来。</td>
<td>(She recovered soon.)</td>
</tr>
<tr>
<td>122 他肯定会格外生气。</td>
<td>(He will certainly be extremely angry.)</td>
</tr>
<tr>
<td>123 医生又来探视。</td>
<td>(The doctor pays a visit again.)</td>
</tr>
<tr>
<td>124 他正经由丝绸之路去巴基斯坦。</td>
<td>(He is going to Pakistan through the Silk Road.)</td>
</tr>
<tr>
<td>125 他就没按照要求去做。</td>
<td>(He didn't follow the requirement.)</td>
</tr>
<tr>
<td>126 他永远也不会理解。</td>
<td>(He will never understand.)</td>
</tr>
<tr>
<td>127 我开心得很。</td>
<td>(I am very happy.)</td>
</tr>
<tr>
<td>128 我开心极了。</td>
<td>(I am very happy.)</td>
</tr>
<tr>
<td>129 我感动极了。</td>
<td>(I am deeply moved.)</td>
</tr>
<tr>
<td>130 他出差到北京。</td>
<td>(He goes on a business trip to Beijing.)</td>
</tr>
<tr>
<td>131 他朝着汽车跑。</td>
<td>(He runs towards the car.)</td>
</tr>
<tr>
<td>132 他出差到过北京。</td>
<td>(He has been in Beijing for a business trip.)</td>
</tr>
<tr>
<td>133 他已经睡在床上。</td>
<td>(He is already sleeping in the bed.)</td>
</tr>
<tr>
<td>134 我把书借他了。</td>
<td>(I lent the book to him.)</td>
</tr>
<tr>
<td>135 我想把门打开。</td>
<td>(I want to open the door.)</td>
</tr>
<tr>
<td>136 你别把我当孩子。</td>
<td>(Don’t take me as a child.)</td>
</tr>
<tr>
<td>137 我把衣服洗干净了。</td>
<td>(I have washed the clothes clean.)</td>
</tr>
<tr>
<td>138 一个男人被他谋杀了。</td>
<td>(A man was murdered by him.)</td>
</tr>
<tr>
<td>139 一个男人被谋杀了。</td>
<td>(A man was murdered.)</td>
</tr>
<tr>
<td>140 一个男人被他所杀。</td>
<td>(A man was murdered by him.)</td>
</tr>
<tr>
<td>141 他们为歌声所吸引。</td>
<td>(They are all attracted by the song.)</td>
</tr>
<tr>
<td>142 一个男人被他给杀了。</td>
<td>(A man was murdered by him.)</td>
</tr>
<tr>
<td>143 因为他没来所以错过了机会。</td>
<td>(Because he didn’t come, he missed the chance.)</td>
</tr>
<tr>
<td>144 他们比身高及体重。</td>
<td>(They compare height and weight.)</td>
</tr>
</tbody>
</table>
Bibliography


BIBLIOGRAPHY


