

# Adjectival Modification to Nouns in Mandarin Chinese: Case Studies on “cháng+noun” and “adjective+tú shì guān” \*

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**Abstract.** This paper studies the adjectival modification to nouns in Mandarin Chinese based on selective binding. The main findings include: An adjective can select different types of head nouns as arguments and an adjective may modify an individual or an event. The qualia structure of a noun helps us better understand an adjective’s selectional preference. Meanwhile, an adjective can modify multi-facet or one facet of the qualia role of a noun. The adjacent adjective of a noun is not necessarily modifying the noun.

**Keywords:** qualia structure, selective binding, adjectival modification to nouns

## 1 Introduction

In a sense enumerative lexicon, every fine-grained difference will be listed. However, the meaning of an adjective is dependent on the head it modifies. Considering this, (Pustejovsky, 1995) proposed selective binding, which takes place where a lexical item or phrase operates specifically on the substructure of a phrase, without changing the overall type in the composition. (Pustejovsky, 2000) further revealed that adjectives bind into the qualia structure of nouns to select a narrow facet of the noun’s meaning. For example, a large (Formal) carved (Agentive) wooden (Constitutive) useful (Telic) arrow ([Formal; Constitutive; Agentive; Telic]) illustrates the richness of the qualia structure and each adjective selects individual qualia.

Moreover, (Lapata, 2001) explored polysemous adjectives whose sense changes due to the nouns they modify. The probabilistic model he proposed can provide a ranking on the possible interpretation of the adjectives. (Saint-Dizier, 1998) proposed several extensions to the telic role through analyzing the French adjective “bon”. (Lenci, et al., 2000) extended the possible qualia role values to express fine-grained distinctions between semantic types. These studies give us a general idea of the behavior of adjectival modification to nouns and the way of extending qualia structure. However, no previous research on adjectival modification based on selective binding has been conducted regarding Mandarin Chinese.

The goal of our research is to find out the interaction between adjectives and their head nouns, including: finding out the argument types an adjective can combine with; showing an adjective may modify individuals or events; looking into what qualia role of the head noun that an adjective selects.

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\* The authors would like to thank the anonymous reviewer for his/her important comments.

The following sections are organized as follows. The theoretical basis is introduced in Section 2. Then we analyze “長(cháng, long)+noun” and “adjective+圖書館(tú shū guǎn, library)” respectively in Section 3. Finally, we summarize the paper and suggest future work in Section 4.

## 2 Theoretical Basis

(Pustejovsky, 1995) gave an interpretation of qualia structure as follows:

- (1) The constitutive role is about the relation between an object and its constituents or parts. Its role values include material, weight, parts and component elements.
- (2) The formal role can distinguish the object within a larger domain. Orientation, magnitude, shape, dimensionality, color, and position are its role values.
- (3) The telic role is about the purpose and function of the object.
- (4) The agentive role describes factors involved in the origin of an object, such as creator, artifact, natural kind, causal chain.

Based on the qualia structure, (Pustejovsky, 2001, 2006; Pustejovsky & Jezek, 2008) separated the domain of individuals into three distinct levels:

- (1) Natural Types: which direct at formal and constitutive qualia roles;
- (2) Artifactual Types: which refer to telic or agentive role;
- (3) Complex Types: which make references to the relation between types.

Furthermore, (Pustejovsky, 1995) represented selective binding in the following way:

If  $x$  is of type  $\langle a, a \rangle$ ,  $y$  is of type  $b$ , and the qualia structure of  $x$ ,  $QS_x$ , has quale,  $q$  of type  $a$ , then  $x$  is of type  $b$ , where  $[[x]] = \langle x, q \rangle$ .

In the following section, we put the above theoretical foundation into use to analyze adjectival modification to nouns by studying “長(long)+noun” and “adjective+圖書館(library)”.

## 3 Data Analysis

This study makes use of *Chinese word sketch engine*<sup>1</sup> and *Sinica Corpus*<sup>2</sup> to get data. Also, a few data are collected by informants' intuition.

In this section, we look at adjectival modification from two directions. One is how one particular adjective modifies different nouns, and the other is how different adjectives modify one particular noun. The two cases we choose for the above directions are “長(long)+noun” and “adjective+圖書館(library)” respectively.

### 3.1 One particular adjective modifies different nouns

In this part, we focus on “長(long)+noun” construction to see the argument selection and polysemous behavior of 長(long).

#### 3.1.1 Argument Selection of 長(long)

<sup>1</sup> <http://wordsketch.ling.sinica.edu.tw/>

<sup>2</sup> <http://dbo.sinica.edu.tw/SinicaCorpus/>

長(long) can modify a wide range of nouns. For example, 長(long)+natural type nouns, such as 長夜(long night), 長路(long road), 長髮(long hair); 長(long)+artifactual type nouns, such as 長電影(long movie), 長題目(long title), 長廣告(long advertisement); 長(long)+complex type nouns, such as 很長的演講(long speech), 很長的午餐(long lunch).

### 3.1.2 Polysemous Behavior of 長(long)

The interpretations of 長(long) can be quite diverse when it modifies different nouns, as shown in the following two examples:

就好像 在 很 長 很 長 的 隧道 裡 行走 似的。

just like in very long very long DE tunnel in walk like

“It is just like walking in a very long tunnel.”

他 吃 了 一頓 很 長 的 午餐。

he eat ASP a very long DE lunch

“He had a very long lunch.”

In , 長(long) is referring to the shape of 隧道(tunnel), which is a formal role value. In such a case, 長(long) modifies the individual object. In , the interpretation needs the duration of an event. 長(long) coerces the bare NP to an event reading.

## 3.2 Different adjectives modify one particular noun

In this part, we discuss “adjective+圖書館(library)” construction to see how adjectives modify facets of the head noun 圖書館(library). The qualia structure of 圖書館(library) is shown below:

$$\text{QUALIA} = \left( \begin{array}{l} \text{CONSTITUTIVE} = \text{collections} \\ \text{FORMAL} = \text{shape, color....} \\ \text{TELIC} = \text{provide knowledge} \\ \text{AGENTIVE} = \text{build} \end{array} \right)$$

In the following table, the top ten modifiers of 圖書館(library) ranked by F-score were extracted from *Chinese Word Sketch Engine*. The qualia roles that these adjectives select when it modifies 圖書館(library) were annotated.

**Table 1:** Adjective Modifiers of 圖書館(library)

Number	Adjective Modifier	Frequency	F-score	Qualia role
1	登樣(decent)	1	12.53	formal+constitutive+telic+agentive
2	靜寂(silent)	1	10.45	formal

3	大(large)	3	8.88	formal
4	豪華(luxury)	1	8.27	formal+constitutive+telic
5	聞名(famous)	1	7.44	formal+constitutive+telic+agentive
6	典型(typical)	1	7.14	formal+constitutive+telic
7	古老(old)	1	7.11	agentive
8	熟悉(familiar)	1	6.2	(refer to the agent)
9	完整(integral)	1	6.1	formal+constitutive+telic
10	好(good)	1	3.75	formal+constitutive+telic+agentive

Through examining 圖書館(library)'s qualia roles that different adjectives modify, we can find the following facts:

- (1) Some adjectives are able to modify multi-facet of a noun. Here we take the evaluative adjective 好(good) as an example:

我們 真的 需要 一個 好的 圖書館 和 醫藥室。

We really need a good library and medical room.

“We really need a good library and medical room.”

一個好的 圖書館(a good library) could be a library which is large and multifunctional with lots of collections and is well-built. These properties are the possible values of 圖書館(library)'s qualia roles, as shown below below:

$$\text{QUALIA} = \left( \begin{array}{l} \text{FORMAL} = \text{large} \\ \text{CONSTITUTIVE} = \text{collections} \\ \text{TELIC} = \text{multifunctional} \\ \text{AGENTIVE} = \text{build} \end{array} \right)$$

好(good) itself does not specify any facet of the head. It generally describes something with desirable and positive qualities. Similar examples are 登樣(decent), 豪華(luxury), 聞名(famous), 典型(typical), 完整(integral).

- (2) Some adjectives only modify one facet of a noun.

For example, 大圖書館(large library) usually means that a library that is spacious. Here 大(large) is a value of 圖書館(library)'s formal role. 古老的圖書館(old library) is a library which have been in existence for a long time. Here 古老(old) indicates the origin of a library, which is the agentive role of 圖書館(library).

- (3) The semantic orientation of some adjectives is not pointing to the head noun, as shown in the following example.

穿過 校園，走到 了 最 常 去 最 熟悉的 圖書館。

across campus, go to ASP most usually go most familiar library

“Across the campus, I went to the library that I most usually went and was most familiar with.”

Though 熟悉 (familiar) is modifying 圖書館(library), it does not point to the property of 圖書館(library). It refers to the agent who is familiar with the library.

#### 4 Conclusion and Future Work

In summary, this study has the following findings. An adjective can select different types of head nouns as arguments and an adjective may modify an individual or an event. The qualia structure of a noun helps us better understand an adjective’s selectional preference. Meanwhile, an adjective can modify multi-facet or one facet of the qualia role of a noun. The adjacent adjective of a noun is not necessarily modifying the noun. For future work, we need to study more cases to further reveal the interaction between adjectives and the qualia structure of their head nouns.

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