A Generative Lexicon Perspective to Possessive Relation in Mandarin Chinese

Shan WANG  Chu-Ren HUANG
Department of Chinese and Bilingual Studies, The Hong Kong Polytechnic University
Hung Hom, Kowloon, Hong Kong

wangshanstar@gmail.com; churenhuang@gmail.com

Abstract: This paper investigates possessive relation of Possessor DE Possessee construction based on the generative lexicon theory. For possessive relation, it is found that either possessors or possessees can come from natural types, artifactual types and complex types; the semantic types of possessive relation are different when the possessor and possessee belong to different individual domains; the typicality of qualia roles in possessive relation is constitutive < formal < agentive < telic; qualia structure does not explain all possessive relation; artifactual types and complex types always lead to ambiguity or polysemy respectively; a possessee selects different qualia roles of the possessor. For the extension of the generative lexicon theory, first, some criteria to distinguish natural types from artifactual types are suggested; second, the scope of the constitutive role of qualia structure is enlarged by including a location and its constituents, a period of time and its constituents, and an institution and its members.

Keywords: natural, artifactul, complex, possessive relation

1. Introduction

Possessive relation is an important topic in linguistics. Zhu (1982) introduced some common relations between a modifier and its head, in which “NP1 (DE) NP2” mainly has the following relations: the modifier is a possessor (“wòmen de xuéxiào ‘our school’ | gōngshè de shēngkōu ‘the commune’s animals’”), material (“mùtou fángzi ‘wooden houses’ | sùliào kǒudài ‘plastic bags’”), time and location (“zuótiān de bāo ‘yesterday’s newspaper’ | běijīng de tiānqì ‘Beijing’s weather’”). Lu (2003) further summarizes 17 possessive relations: appellation, ownership, organ, component, material, property, feature, idea, member, deformation, achievement, product, condition, wound, career, landscape, location, and ability.

Based on these important studies, this paper examines one type of possessive relations ‘Possessor DE Possessee’ from a different perspective, namely on the basis of the generative lexicon theory (henceforth GLT), which was first proposed in Pustejovsky (1991) and further developed in Pustejovsky (1995), with the goal of capturing the generative nature of lexical creativity and sense extension phenomena. The aims of this paper are to find out the relation between a possessor and its possessee based on GTL, explore univocal, ambiguous and polysemous possessive relations, and improve GLT.
The data of this study are extracted from Sinica Corpus\(^1\) using Chinese word sketch engine\(^2\), collected online by google and baidu, or provided by informants.

The following sections are arranged as follows. Section 2 introduces GLT and our expansion of it. Section 3 explores the relation between a possessor and its possessee. Section 4 discusses univocal, ambiguous and polysemous possessive relations. Finally, the conclusion and suggestion for future work are summarized in Section 5.

2. Generative Lexicon Theory

2.1 Qualia Structure

Pustejovsky (1995) investigates how lexical items encode semantic information in the qualia structure. There are four roles in a qualia structure, and each is associated with some values: (i) 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; (ii) the formal role can distinguish the object within a larger domain. Orientation, magnitude, shape, dimensionality, color, and position are its role values; (iii) the telic role is about the purpose and function of the object; (iv) the agentive role describes factors involved in the origin of an object, such as creator, artifact, natural kind, causal chain.

This paper extends the scope of the constitutive role by including a location or a period of time and its constituents, an institution and its member.

2.2 Domain of Individuals

(Pustejovsky 2001, 2006; Pustejovsky & Jezek 2008) separate the domain of individuals into three distinct levels: (i) natural types that direct at the formal and constitutive qualia roles; (ii) artifactual types that refer to telic or agentive roles; (iii) complex types that make references to the relation between types.

Pustejovsky proposes that natural types refer to constitutive or formal role, while artifactual types refer to telic or agentive role. However, this is not an absolute delimitation. Natural types can also have telic and agentive roles. For example, the water we drink has the telic of maintaining our life and is purified through sedimentation, filtration and disinfection. Nevertheless, natural types need to presuppose an event in order to refer to telic or agentive role. For instance, the agentive role of water is not inherent; sedimentation, filtration and disinfection are contextualized event. Artifactual types can have constitutive role and formal role. For example, the constituents of a pen are the nib, the reservoir and the body. A pen has shape and color as well, which is its formal role. Nevertheless, these are just contextual information; only the telic role is inherent, that is, a pen is for writing.

Human activity penetrates almost every corner of life and therefore it is sometimes hard to distinguish natural types from artifactual types. If we trace back a table that is

\(^1\) http://db1x.sinica.edu.tw/kiwi/mkiwi/
\(^2\) http://158.132.124.36/
made of wood, we will find that wood is a part of a tree, which is natural. But as the table is man-made and even if its material is natural, we consider it artifactual. Even human beings can be artifactual, such as test-tube babies.

Confronted with the above difficulty of distinguishing natural types and artifactual types, this paper sets the following criteria to differentiate the two types, as complements to Pustejovsky (1995).

(i) Whether an object can originate without human labor

If an object can never come into being without human involvement, then it is not natural. For instance, a table can never exist if no one bothers to make it.

(ii) Whether an object can originate in nature

Examples like niúnǎi ‘milk’, xiāngjiāo ‘bananas’, qíncài ‘celery’ are objects of nature, even if the bananas we eat are picked from a farm, which are grown by a farmer.

(iii) Time and Location

Time and location are natural, even though the name we use to address certain time or place is artifactual. For example, though tāngcháo ‘Tang Dynasty’ is established by liúān ‘Yuan LI’, it is natural as a period of time in history.

3. Relation between Possessor and Possessee

This section instigates the relation between a possessor and its possessee.

3.1 Generative Lexicon Perspective

This section describes possessive relation from a generative lexicon perspective. Firstly, the qualia role that is in use between a possessor and its possessee is examined. Then we figure out the possible semantic types of combination between them according to the domain of individuals, namely natural types, artifactual types and complex types.

3.1.1 Possessee as a Constitutive Role of Possessor

In a possessive relation, a possessee typically acts as a constitutive role of their possessor. The following part examines the subtypes of the constitutive role in possessive relations and the semantic types of the possessor and possessee combination.

3.1.1.1 Possessive Relations with Possessors from Natural Types

When a possessor belongs to natural types, its possessee can be from natural types, artifactual types or complex types. Therefore there are three types of collocations: Natural DE Natural, Natural DE Artifactual, and Natural DE Complex.

(i) Natural DE Natural

When a possessor and its possessee both belong to natural types, the possessee is usually an integral part or pieces of it. For instance, when a possessor is non-sentient, e.g.
a natural, object, location, time, some possessive relations are as follows: Natural DE Constituents: shāmò de fēngshā ‘a desert’s sand’, shèngxià de yángguāng ‘midsummer’s sunshine’; Location DE Natural: qīngzhōu de mìtáo ‘Qingzhou’s nectarines’, shāndōng de tàishān ‘Shandong’s Tai Mountain’; Time DE Natural: 2002 nián de xuě ‘snow of the year 2002’, qīngcháo de huángdì ‘the Qing Dynasty’s emperors’. When a possessor is sentient, the possessee is usually a part of it, e.g. Sentient Possessor DE Constituents: rén de xìbāo ‘human cells’, huángfēng de chībāng ‘a hornet’s wings’.

(ii) Natural DE Artifactual

This construction can have the following subtypes: Sentient Possessor DE Artifact: xiǎogǒu de wō ‘a puppy’s nest’; Location DE Artifact: zhōucūn de shāobīng ‘Zhoucun’s biscuits’; Time DE Event: qīmò de kǎoshi ‘final exams’.

(iii) Natural DE Complex

These subtypes are possible for this construction: Human DE Complex: lǐúchúánzhī de liànxì ‘LIU Chuanzhi’s Lenovo’, Location DE Complex: gǔlángyu de yǐnyuèhuì ‘Gulangyu’s concerts’ and Time DE Complex: qùnián de xìn ‘last year’s letters’.

3.1.1.2 Possessive Relations with Possessors from Artifactual Types

When a possessor comes from natural types, the possessees can be natural types, artifactual types or complex types, so there are three kinds of construction: Artifactual DE Natural, Artifactual DE Artifactual, and Artifactual DE Complex.

(i) Artifactual DE Natural

The subtypes of this construction include: Artifact DE Constituent: xiāngyān de níngōu ‘cigarettes’ nicotine’; Organization DE Member: gōngchǎn de gōngrén ‘a factory’s workers’, yánjiūsuǒ de yánjiūyuán ‘an institute’s researchers’.

(ii) Artifactual DE Artifactual

This kind of possessive relation is very large and has several subtypes. When the possessee is an integral part of the possessor, examples are shuíjiāo de xiànrè ‘dumpling’s stuffing’, chéngbǎo de chéngqiang ‘a castle’s walls’, bōli de suīpiàn ‘pieces of the glass’, shèyǐngjī de yīngmù ‘a video camera’s screen’. When the possesses is things of a place, an example is zhōucūn de shāobīng ‘Zhoucun’s biscuits’.

(iii) Artifactual DE Complex

An instance of this construction is dàlóu de chuānghu ‘a building’s windows’.

3.1.1.3 Possessive Relations with Possessors from Complex Types

If a possessor falls into a complex type, the possessees can be from natural, artifactual or complex types. Thus their combinations include: Complex DE Natural, Complex DE Artifactual, and Complex DE Complex.

(i) Complex DE Natural
An example of this construction is zào cān de niú nǎi ‘breakfast’s milk’.

(ii) *Complex DE Artifactual*

Some examples are yán chǎng huì de yīnyuè ‘a concert’s music’, bào zhī de wén zǐ ‘a newspaper’s characters’, mà diāng lào de shè běi ‘McDonald’s devices’.

(iii) *Complex DE Complex*

In this construction, both the possessor and possessee are complex types. For instance, yàn jiăng is event·info, bì jì is physo·info, and yàn jiăng de bì jì ‘a speech’s notes’ is a case in point.

### 3.1.2 Possessee is a Formal Role of Possessor

A possessee can function as a formal role of its possessor, and the possible combinations and examples are *Natural DE Natural*: niú pí de tǎnxìng ‘cowhide’s elasticity’; *Artifactual DE Natural*: bō lǐ de yān sè ‘the color of the glass’, dà lóu de wài guān ‘the appearance of a building’; *Complex DE Natural*: bào zhī de chī cūn ‘a newspaper’s size’, chà de wèi diào ‘tea’s taste’, bái gōng de wēi zhǐ ‘the White House’s position’.

### 3.1.3 Possessor or Possessee is an Agentive Role

Possessee can be an agentive role of possessors, indicating the origin or coming about. For example, *Natural DE Natural*: tā de mā ma ‘his mother’, hǎi de shēng yīn ‘sea’s sound’; *Artifactual DE Natural*: gōng chāng de zào yīn ‘a factory’s noise’.

### 3.2 Other Relations between Possessor and Possessee

Besides the relations that can be accounted for using GLT, there are some other relations between a possessor and its possessee. For instance, three types of such relations are: (i) the possessor is a human, and the possessee is his/her property. For instance, *Natural DE Artifactual*: nǚ shēng de liú hǎi ‘girls’ bangs’, xiǎo lǐ de běn tiān ‘Xiao Li’s Honda’; (ii) the possessor is human, and the possessee is his/her idea. For example, *Natural DE Artifactual*: tā de yǐ jiàn ‘his views’; (iii) the possessee is time or location, and the possessor is part of it. For instance, *Natural DE Natural*: gōng zhū de shēng rì ‘a princess’ birthday’, fù qīn de jiā xiāng ‘father’s hometown’.

The above analysis is summarized in Table 1.

**Table 1**: Relation between Possessor and Possessee

<table>
<thead>
<tr>
<th>Possessor</th>
<th>Possessee</th>
<th>Nature</th>
<th>Artifactual</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>constitutive, formal, time, location</td>
<td>time, location, property, idea, social relation</td>
<td>constitutive</td>
<td></td>
</tr>
<tr>
<td>Artifactual</td>
<td>constitutive, formal</td>
<td>constitutive</td>
<td>constitutive</td>
<td>constitutive</td>
</tr>
<tr>
<td>Complex</td>
<td>constitutive, formal</td>
<td>constitutive</td>
<td>constitutive</td>
<td>constitutive</td>
</tr>
</tbody>
</table>
Table 1 illustrates the following facts for the Possessor DE Possessee construction.

First, either possessors or possessees can belong to natural types, artifactual types and complex types.

Second, when a possessor belongs to the natural type, its natural type possessee can be a constitutive role, a formal role, time or a location of it; its artifactual type possessee can be time, a location, a property, an idea, or social relation of it; its complex type possessees usually serves as a constitutive role.

Third, when a possessor is from artifactual types or complex types, its natural type possessee can be a constitutive role or formal role of it; its artifactual type and complex type possessees are usually the constitutive role of it.

Fourth, a possessee most typically takes a constitutive role, followed by a formal role. The agentive role is sometimes used and telic role is rarely used. Therefore the qualia structure hierarchy for possessees in possessive relation is depicted below:

constitutive < formal < agentive < telic

Fifth, qualia structure cannot explain all possessive relations. For example, when time, location, property, or social relation serves as possessees, they are not qualia roles.

4. Univocal, Ambiguous and Polysemous Possessive Relations

4.1 Univocal Possessive Relations

The Possessor DE Possessee construction can be univocal. For instance, when the possessee is an integral part or pieces of the possessor, e.g. jīnyú de wēiba ‘the tail of a goldfish’ and bōlǐ de suǐpiàn ‘pieces of the glass’, a formal role of the possessor, e.g. xuěxiào de wèizhi ‘the location of the school’, or possessive relation is about social relation, e.g. xiǎomíng de jiēfù ‘Xiaoming’s brother-in-law’, the Possessor DE Possessee construction has only one meaning.

4.2 Ambiguous and Polysemous Possessive Relations

If an arifactual type has two or more senses, it can be ambiguous. A complex type has more than one meaning facet, and it is polysemous. A word with two or more meaning facets is a dot object.

When an ambiguous artifactual type or a polysemous complex type acts as a possessor or possessee, possessive relation collocation can have two or more explanations. Sometimes all the explanations are acceptable and sometimes only one is acceptable. The following section shows what explanation is reached when the possessor, possessee, or both of them, are ambiguous or polysemous.

4.2.1 Possessive Relation with an Ambiguous or Polysemous Possessor

This part explores the meaning when the possessor is ambiguous and polysemous.
4.2.1.1 Possessive Relation with an Ambiguous Possessor

When the possessor has more than one sense, and the possessee has only one sense, usually only one sense of the possessor will be activated. For example, xiàngqí ‘chesses’ has two senses: physical objects or an event.

(1) a. yībān  gāodàng  xiàngqí  yòu  guìzhòng  mùcái  huò  yùshí  zhíchéng.  (physical object)
   generally high-grade chess from valuable wood or jade make
   ‘Generally high-grade chesses are made of valuable wood or jade.’

b. jìnniánlái, méiguó wán  xiàngqí  de  rén  yuéláiyuèduō.  (event)
   recent years America play chess DE people more and more
   ‘Recent years in America, more and more people play chess.’

In Artifactual DE Natural construction, such as xiàngqí de xíngzhuàng ‘’, only the ‘physical objects’ sense of xiàngqí ‘chesses’ is activated, as illustrated below.

<table>
<thead>
<tr>
<th>xiàngqí ‘chesses’</th>
<th>xíngzhuàng ‘shape’</th>
</tr>
</thead>
<tbody>
<tr>
<td>a physical object</td>
<td>formal</td>
</tr>
<tr>
<td>an event</td>
<td></td>
</tr>
</tbody>
</table>

4.2.1.2 Possessive Relation with a Polysemous Possessor

When the possessor has more than one meaning facet while the possessee is univocal, the possessee will activate one meaning facet of the possessor. The following shows examples in Complex DE Natural and Complex DE Artifactual constructions.

(i) Complex DE Natural

zàocān ‘breakfast’ is a dot object (event · physical object). In zàocān de niúnāi ‘breakfast’s milk’, the ‘physical object’ aspect is exploited.

<table>
<thead>
<tr>
<th>zàocān ‘breakfast’</th>
<th>niúnāi ‘milk’</th>
</tr>
</thead>
<tbody>
<tr>
<td>a physical object</td>
<td>a physical object</td>
</tr>
<tr>
<td>an event</td>
<td></td>
</tr>
</tbody>
</table>

(ii) Complex DE Artifactual

yàncānghuì ‘a concert’, as a dot object, can refer to an event or music. For instance:
4.2.2 Possessive Relation with an Ambiguous or Polysemous Possessee

When the possessee is ambiguous or polysemous, the possessor usually activates one sense or one meaning facet of it in a possessive relation.

4.2.2.1 Possessive Relation with an Ambiguous Possessee

If the possessee is ambiguous, while the possessor has univocal, the Possessor DE Possessee construction can have more than one explanation. Here we give an example in the Natural DE Artifactual construction.

(i) Natural DE Artifactual
lánqiú is from the artifactual type and is ambiguous with two senses: a physical object; an event. When the possessee lánqiú is a physical object, yáoming de lánqiú means the basketball that Ming YAO owns. When lánqiú is an event, yáoming de lánqiú means the ability of Ming YAO playing basketball.

```
yáoming ‘Ming YAO’  lánqiú ‘basketballs, basketball games’
human                           a physical object
                                           an event
```

4.2.2.2 Possessive Relation with a Polysemous Possessee

When the possessee is a dot object with more than one meaning facet, the he Possessor DE Possessee construction can also have more than one explanation. Here we look at two constructions: Natural DE Complex and Artifactual DE Complex.

(i) Natural DE Complex

liánxiäng has two meaning facets: producer · product. In Lìù chuánzhī de liánxiäng “”，liánxiäng ” can refer to any facet; thus this collocation has two explanations.

(3) a. cón 1984 nián liánxiäng chéngli zhi 1997 nián Lìù chuánzhī de liánxiäng chéngxíng, 1997 nián juéduì shì liánxiäng fāzhǎn lǐshǐ

‘From the establishment of Lenovo in 1984 to the coming into shape of Chuanzhi LIU’s Lenovo, the year 1997 is definitely a major turning point in Lenovo’s development history.’

b. Lìù chuánzhī de liánxiäng fāngzài zhuō shàng (product)

‘Chuanzhi LIU’s Lenovo is on the table.’

```
Lìù chuánzhī ‘LIU Chuanzhi’  liánxiäng ‘lenovo computers or the Lenovo company’
human                           a producer
                                           a product
```
(ii) Artifactual DE Complex

*chuāng*hu ‘a window’ is a complementary polysemous word, making reference to a physical object or an aperture. *dàlóu de chuāng*hu ‘a building’s window’ has two meanings as shown below.

(4) a. sān rén lìjí chuānguò dàlóu de chuāng*hu*, zhī fēixiàng
three people immediately go through building DE window, directly fly to
le tiānkōng* (aperture)*
ASP sky

‘The three people immediately went through the building’s window, and directly flew to the sky.’

b. dàlóu de chuāng*hu* bùhuì cā yī cì jiù gānjìng* (physical object)*
built DE window cannot wipe once at once clean

‘The windows of the building can not be clean just by wiping once.’

\[
\begin{array}{c|c|c}
\text{dàlóu ‘a building’} & \text{chuāng*hu* ‘a windows or aperture’} \\
\hline
\text{a buliding} & \text{a physical object} & \text{an aperture}
\end{array}
\]

4.2.3 Possessive Relation with a Polysemous Possessor and Polysemous Possessee

If the possessor and the possessee are both polysemous, that is, they are both from complex types, the meaning of possessive relation Complex DE Complex has four possibilities. For example, in bái*gōng* de mén ‘the White House’s doors’, both bái*gōng* ‘the White House’ and mén ‘doors’ are dot objects: the former is a building or government, while the latter can be or physical objects or apertures.

(5) a. dāngjīn shìjiè shàng, bǐ bái*gōng* piào-liàng de duō de
nowadays world on, compare the White House beautiful DE more DE
zhùzhái, bùzhī yǒu duōshāo* (building)*
house, do not know have how many

‘On today’s world, no one knows how many houses are more beautiful than the White House.’

210
White House announce Canada Prime Minister will the end of this month visit USA

‘The White House announced that Canadian Prime Minister will visit the United States at the end of this month.’

(6) a. wǒ hū tīngjiàn yóurén zài mén shàng qiāo le liǎng shēng. (physical object)

I suddenly hear someone in door on knock ASP two sound

‘I suddenly heard someone knock at the door twice.’

b. wǒmen chū le nà gè mén, wǎng yòubian yī zhuǎn, jiù kànzdào we go out ASP that CL door, towards right one turn, at once see

chēzhàn le. (aperture)

station ASP

‘We went out of that door, turned right, and saw the station.’

bái gōng de mén ‘’ can have four combinations: building DE phyo, building DE aperture, government DE phypo, government DE aperture. To be a correct construction, bái gōng ‘’ in bái gōng de mén ‘’ can only be a building; mén ‘’ can mean a physical object or an aperture. Therefore only the former two collocations are right.

(7) a. bái gōng de mén xiàng nán kāi. (building DE phyo)

the White House DE door towards south open

‘The White House’s doors are open to the south.’

b. tā cóng bái gōng de hòu mén chūlái. (building DE aperture)

he from the White House DE back door come out

‘He came out from the back door of the White House.’

<table>
<thead>
<tr>
<th>bái gōng ‘the White House’</th>
<th>mén ‘a door or an aperture’</th>
</tr>
</thead>
<tbody>
<tr>
<td>a buliding</td>
<td>a physical object</td>
</tr>
<tr>
<td>a government</td>
<td>an aperture</td>
</tr>
</tbody>
</table>

In sum, when a possessor is ambiguous or polysemous, while its possessee is univocal, the *Possessor DE Possessee* construction usually has only one possible
explanation. This is because the possessee selects a qualia role from the qualia structure of the possessor. When a possessee is ambiguous or polysemous, while its possessor is univocal, the Possessor DE Possessee construction will have more than one explanation. This is because the possessee selects different qualia roles of the possessor. When both the possessor and the possessee are polysemous, possessive relation has four possible explanations depending on which qualia role of the possessor is selected by the possessee.

5. Conclusion and Future Work

Through the above analysis, we have the following findings.

For possessive relation, it is found that either possessors or possessees can come from natural types, artifactual types and complex types; the semantic types of possessive relation is different when the possessor and possessee belong to different individual domains; the typicality of qualia roles in possessive relation is constitutive < formal < agentive < telic; qualia structure does not explain all possessive relation; artifactual types and complex types always lead to ambiguity or polysemy respectively; a possessee is selecting different qualia roles of the possessor.

For the extension of the generative lexicon theory, first, some criteria to distinguish natural types from artifactual types are suggest; second, the scope of the constitutive role of qualia structure is enlarged by including a location and its constituents, a period of time and its constituents, and an institution and its member.

Besides possessive relation Possessor DE Possessee discussed in this paper, in Mandarin Chinese, Possessor + Possessee, yǒu ‘have’, shǔyú ‘belong to’ et al can also demonstrate possessive relation. For future research, these constructions need to be investigated in order to gain an overall view of possessive relation.

Acknowledgements

We would like to thank the constructive comments from Prof. Wei-Tien TSAI on China Linguistics Summer Institute 2010 in Nankai University, and Prof. Fu-Zhen SI and Dr. Zuo-Yan SONG on The Symposium Commemorating the 90th Anniversary of the Birth of Prof. Zhu Dexi and the 50th Anniversary of Prof. Lu Jianming’s Teaching in Peking University. We would also thank Dr. Mable Chan for the advice on language use. The remaining errors are of course ours.

References
