

Qualia Relations in Metaphorical Noun-Noun Compounds

Zuoyan Song

School of Chinese Language and Literature,
Beijing Normal University, Beijing,
China, 100875
meszy@163.com

Qingqing Zhao

School of Chinese Language and Literature,
Beijing Normal University, Beijing,
China, 100875
874540721@qq.com

Abstract

This paper aims to find out the qualia roles involved in metaphorical noun-noun compounds in Mandarin Chinese. Metaphor concerns the resemblance between things. From the perspective of qualia structure proposed by Generative Lexicon, the resemblance in metaphorical compounds can be interpreted in the way that a compound and its metaphorical component share the same quale role. A preliminary investigation shows that no matter which constituent (the modifying noun or the head noun) takes on a metaphorical meaning, only three qualia roles are found in metaphorical compounds, which are FORMAL, CONSTITUTIVE and TELIC, ordered from the most to the least frequent. AGENTIVE role is excluded. Among the values of FORMAL role, shape is the most frequent. CONSTITUTIVE role mainly relates to body part terms. TELIC role is mainly concerned with artifactual type nouns. Also, this study reveals some fine-grained distinctions between nouns of different types.

1 Introduction

It is clear that there are many types of nominal compounds, but as it is well known that the majority are composed of two nouns, i.e. noun-noun compounds. Compounds of this type present the result of productive compounding processes (Packard 2002:85; Li and Thompson 1981). In noun-noun compounds, the most common construction is modifier-head with the head on the right. The relatedness between the meaning of a compound and those of its components is always a hot topic and there are numerous studies available, among which, the most innovative are

works within the Generative Lexicon (GL) perspective.

In GL, Qualia structure contains four basic qualia roles (Pustejovsky 1995:85-86):

- Constitutive role: The relation between an object and its constituents or proper parts.
e.g. material, weight, parts and component elements.
- Formal role: That which distinguishes the object within a large domain.
e.g. shape, color, orientation, magnitude, dimensionality and position.
- Telic role: purpose and function of the object.
i.e. purpose that an agent has in performing the object and built-in function or aim which specifies certain activities.
- Agentive role: factors involved in the origin or “bringing about” of an object.
e.g. creator, artifact, natural kind and causal chain.

The qualia are taken as representing an essential component of word meaning, capturing how language speakers understand objects and relations in the world and providing the minimal explanation for the linguistic behavior of lexical items.

Under the theoretical framework of qualia structure, Johnston and Busa (1999) analyze the nominal compounds in English and Italian and propose Qualia Modification observing the relational structure between modifiers and heads in compounds. They focus on three types of qualia modification: TELIC, AGENTIVE and CONSTITUTIVE. Bassac and Bouillon (2013) offer a detailed analysis of the telic relationship in nominal compounds both in French and in Turkish. Recently, the approach of qualia modi-

fication has been adopted in several research works to analyze Chinese compound nouns. Lee et al. (2010) demonstrate the qualia modification in noun-noun compounds found in Chinese as well as a couple of other languages like German, Spanish, Japanese and Italian. Wang and Huang (2011) specifically investigate the modifier-head type in compound event nouns. Song and Qiu (2013) examine the qualia relations in the nominal compounds containing verbal elements (NCCVs) and identify some productive compounding patterns. Unlike previous studies, which focus on the qualia relation between the two elements in a compound, this study also pays attention to the qualia relation between a compound and its components.

Following the generative perspective in works mentioned above, this paper aims to investigate the qualia roles involved in a special class of the noun-noun compounds in Mandarin Chinese, which contain metaphorical nouns. Huang (2008) first introduces qualia roles into the analysis of metaphorical noun-noun compounds and gives some examples. Based on more data, we will make a deeper analysis from both quantitative and qualitative perspective.

The rest of this paper is organized as follows. Section 2 introduces the data and method. Section 3 and section 4 demonstrate the qualia roles involved in noun-noun compounds containing metaphorical modifiers and heads respectively. Section 5 summarizes the paper.

2 Data and Method

Different from qualia modification which focus on the modifiers, this work expects to reveal what qualia information a metaphorical component can contribute to the compound no matter it is a modifying noun or a head noun. Metaphor is an imaginative way of describing something by referring to something else which is the same in a particular way. It emphasizes the resemblance between things. From the perspective of qualia structure proposed by Generative Lexicon, the resemblance in metaphorical compounds can be interpreted in the way that a compound and its metaphorical component share the same quale role. For example, compound *shisun* (石笋 stone-bamboo shoot) ‘stalagmite’ is not a bamboo shoot but a stone in the shape of bamboo shoot. *Sun* specifies the formal role of *shisun*. In other words, *shisun* and *sun* share the same formal role. More precisely, they share the same value of the formal role, namely shape.

According to Packard (2002:220), Metaphorical Lexicalization refers to words whose components lose their original meaning and take on a related, figurative or metaphorical interpretation, while the grammatical relationships within the compound continue to obtain. There are two types of metaphorical Lexicalization can be distinguished: that which occurs at the component level (component metaphorical lexicalization) and that which occurs at the level of the gestalt word (word metaphorical lexicalization). In component metaphorical lexicalization, one or both of the individual word components take on a metaphorical meaning, while the overall meaning of the compound continues to be a compositional sum of the meanings of its metaphorical parts. Our study will focus on component metaphorical compounds which are composed of two nouns and have modifier-head structure. These metaphorical compounds can be further divided into two types. Conceptual metaphor acts upon the modifying noun in one type and the head noun in the other type.

Of course, metaphor and metonymy can act simultaneously upon the meaning of a noun-noun compound, as suggested by Goossens (1995), who created the term *metaphonymy* to refer to this phenomenon. He identified two types of metaphonymies: metaphor from metonymy and metonymy within metaphor. Exactly speaking, the compounds examined in this paper are all metaphonymic compounds. That is to say, metonymy is also at work in these compounds. Compounds Containing Metaphorical modifier involve CATEGORY FOR PROPERTY metonymy. “Metaphor from metonymy” is at work in these compounds. *Mojing* (墨镜 ink-glasses) ‘sunglasses’ is such an example, where *mo* (ink) refers metonymically to the color of ink, and the compound as a whole is a metaphor (it refers metaphorically to something black). On the other hand, Compounds Containing Metaphorical head involve SPECIFIC FOR GENERIC metonymy. “Metonymy within metaphor” is at work in these compounds. For example, in the compound (石狮 stone-lion) ‘stone lion’, *shi* (狮) refers metonymically to something lion-shaped (SPECIFIC FOR GENERIC metonymy), and there is also a metaphor at work, by which a lion is linked to an artifact.

The interaction of metaphor and metonymy are complicated, we will not go into details since this is not the focus of this paper. More discus-

sion can be seen in Warren (1992), Geeraerts (2002), Benczes (2006), among others.

Generally, the compounds for our analysis come from *Modern Chinese Dictionary (version 6)*, which are disyllabic, and each noun in a compound is either a natural type or an artifactual type and refers to a physical object¹. First, a total of 666 metaphorical compounds are selected, out of which, 480 (72%) contain metaphorical modifiers and 186 (28%) contain metaphorical heads. Then, the qualia role in every compound is annotated. Finally, statistical analysis was performed.

In the following two sections, these two types will be examined one by one.

3 Compounds Containing Metaphorical Modifiers

In the compounds of this type, the modifying noun is used metaphorically. It does not refer to an object but some properties of the object, i.e. a quale role of the modifier. More precisely, modifying noun specifies some characteristic of head noun.

Such compounds bear a metaphorical relationship between the modifying noun and the compound: the entity denoted by the compound (or N_2) is metaphorically understood through the entity denoted by N_1 . N_1 is a metaphorical description of N_2 . This metaphorical relationship can be based upon a number of features, relations or functions. In other words, the modifying noun and the compound share the same quale role or the same value(s) of a quale role. Our examination shows that there are three qualia roles can be seen in compounds of this type, among which FORMAL is the most common, followed by CONSTITUTIVE and TELIC. Their distribution information is summarized in Table 1.

FORM	CONS	TELIC
165(89%)	11(6%)	10(5%)

Table 1: Distribution of qualia roles in compounds containing metaphorical modifiers

3.1 FORMAL Qualia Modification

In these compounds, metaphorical nouns modify the formal role of the head noun by exploiting their own formal role. As shown in table 2, the

¹ Compounds containing deverbal nouns (e.g. *meipi*) and trisyllabic compounds (e.g. *jiqiren*) are not in the scope of statistics. To illustrate our point, some of these compounds are analyzed in this paper.

values of the formal role vary wildly from noun to noun, including shape, color, size and so on. The most common formal values are shape (63%) and color (15%). For example, *luanshi* (卵石), which literally means ‘egg stone’, refers to egg-shaped stone. *Luanshi* ‘boulder’ is similar to *luan* ‘egg’ in shape. *xuecheng* (血橙) ‘blood orange’ denotes a kind of orange which is as red as blood. Some metaphorical modifying nouns can activate more than one values of the FORMAL role as seen in compound *yican* (蚁蚕) ‘cockscorb’, in which *yi* indicates the size, color as well as the shape of silkworms.

luan-shi	egg-stone	‘boulder’	shape
ta-lou	tower-building	‘tower building’	shape
qiu-guo	ball-fruit	‘cone’	shape
xing-yan	almond-eyes	‘almond-eyes’	shape
lang-gou	wolf-dog	‘wolf-dog’	shape
chuan-xie	boat-shoe	‘boat-shaped shoes’	shape
yi-can	ant-silkworm	‘newly-hatched silkworm’	size, shape, color
mo-jing	ink-glasses	‘sunglasses’	color
xue-cheng	blood-orange	‘blood orange’	color
hua-xian	flower-thread	‘colored thread’	color
niu-wa	bull-frog	‘bullfrog’	sound
feng-niao	bee-bird	‘hummingbird’	sound and feeding method
mi-zao	honey-jujube	‘jujube’	taste

Table 2: The formal values in metaphorical modifier

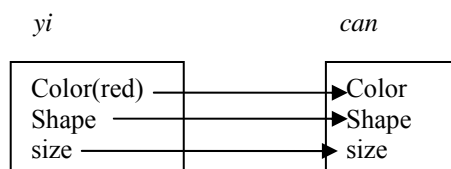


Figure 1: Mapping between the formal roles of *yi* and *can*

The metaphor-base modifiers such as *luan* and *xue* are used as adjectives. But they are quite different in qualia modification. Adjectives such as *elliptical* and *red* directly modify some aspects of the head noun. Metaphor-base modifiers, on the other hand, make reference to the FORMAL role of the head noun through their

own FORMAL role. In other words, to get the qualia role of the head noun, we have to get the qualia role of the modifying noun. For instance, the formal role of the modifier *yi* is mapped onto the head *can* as illustrated in Figure 1.

3.2 CONSTITUTIVE Qualia Modification

The CONSTITUTIVE quale explains the relation between an object and its constituents, or proper parts. In the compound *erfang* (耳房, ear-room) ‘side room’, *er* specify the relation between *erfang* and *zhengfang* (正房, principle-room) ‘principal room’. Side rooms are on the sides of the principle room, just as the ears are on the sides of the head. This information is encoded in the CONSTITUTIVE role of *er*. Different from FORMAL qualia modification in 2.1, which indicates the similarity between objects in attributes, CONSTITUTIVE modification shows the parallelism between two pairs of objects in relationship as shown in (1)

- (1) on_the_sides_of<*er* ‘ear’, *tou* ‘head’>
 on_the_sides_of<*erfang* ‘side room’,
zhengfang ‘principle room’>

Therefore, there is a location-located relationship between the two constituents of the compound: the modifier specifies the location of the head noun. Object metaphorically stands for its position in a relation. More examples include *jiaozhu* (脚注) ‘footnote’, *jiaodeng* (脚灯) ‘footlight’, *weizhu* (尾注 tail-note) ‘endnote’ and *meipi* (眉批 eyebrow-comment) ‘head note’. The modifying nouns in these compounds are all body-part terms. It is not hard to understand since the relation *Is_a_part_of* is proposed as a defining element for this type of nouns (Lenci et al. 2000).

3.3 TELIC Qualia Modification

In these compounds, the modifying noun and compound noun share similar TELIC role. For instance, compound *fangche* (房车, house-car) ‘recreational Vehicle’ refers to a car which is similar to a house in function. *fang* modifies the purpose of *che*, which is to live in. While in non-metaphorical compounds, TELIC qualia modification exhibits a *used_for* relation, in metaphorical compounds it presents a *used_as* relation. For example, *caidao* (菜刀 vegetable-knife) ‘cleaver’ is used for cutting vegetables, whereas *fangche* is used as a house. In fact, *fangche* is a house as well as a car, which is used both for living and

transportation, although it essentially belongs to Vehicles.

Pustejovsky(1995:142-148) proposes that a lexical item is able to inherit information according to the qualia structure it carries from multiple parents. For example, *dictionary* can inherit different roles from different types as shown in (2).

- (2) Dictionary **is_formal** book
 Dictionary **is_telic** reference
 Dictionary **is_agent** compiled-material

In terms of multiple inheritance, the inheritance relations in *fangche* can be illustrated by figure 2. *fangche* inherits telic role from both *fang* and *che*.

- (3) *fangche* **is_formal** *che*
fangche **is_telic** *che*
fangche **is_telic** *fang*

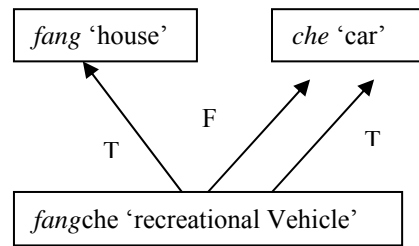


Figure 2: Multiple inheritance in *fangche*

Note that both *fang* and *che* are typical artifactual types which relate with concepts making reference to TELIC (purpose or function), or AGENTIVE (origin) (Pustejovsky 2001, 2006).

Another typical example is *zhahe* (闸盒 floodgate-box) ‘fuse box’, which can cut the lights off just as a floodgate can dam up water.

4 Compounds Containing Metaphorical head

FORM	CONS	TELIC
336(70%)	87(18%)	54(12%)

Table 3: Distribution of qualia roles in compounds containing metaphorical head

This section will focus on compounds where it is the second, headed noun that is understood metaphorically. There are also three qualia roles involving in compounds of this type, which are FORMAL, CONSTITUTIVE and TELIC, ordered from the most to the least frequent. Table 3 shows the frequencies of the qualia roles.

Unlike other noun-noun compounds, which usually involve only one qualia relation, compounds of this type can present two qualia roles, because the head nouns also indicate qualia information. In addition to referring to an object, the metaphorical head noun stands for some property, relation or function of an object as the metaphorical modifier does. In the case of *shishi*, *shi* ‘stone’ and *shi* ‘lion’ show CONSTITUTIVE role and FORMAL role of the compound respectively (see 4.1).

4.1 FORMAL Roles

Different from the metaphorical modifying nouns, which can indicate various values of formal role, the majority of the metaphorical head nouns (81%) are extended towards the reading ‘shape or image of an object’. The object that is denoted by the head noun is understood to be an image of that object, i.e. not an instance of the object itself. For instance, *shishi* (石狮 stone-lion) ‘stone lion’ is not a real lion but a thing resembling a lion in appearance and made of stone. The head noun *Shi* is interpreted as the shape of an object.

Generally speaking, this pattern of metaphorical compounds seems to be morphologically productive. Nouns like *hua* (花) ‘flower’, *qiu* (球) ‘ball’, *yan* (眼) ‘eye’, *si* (丝) ‘silk’, *ta* (塔) ‘tower’, *zhu* (柱) ‘post’ and *xing* (星) ‘star’ often occur at the head position and form a group of compounds. What is common in these nouns is that shape is one of the prominent features of the objects denoted by them regardless of natural type or artifactual type nouns. Some compounds containing *hua* and *qiu* are shown in (4) and (5).

(4)-花 *hua* ‘flower’:

雪花 *xue-hua* (snow-flower) ‘snowflake’
 水花 *shui-hua* (water-flower) ‘water spray’
 火花 *huo-hua* (fire-flower) ‘spark’
 浪花 *lang-hua* (wave-flower) ‘spindrift
 /spray/waves’
 纸花 *zhi-hua* (paper-flower) ‘paper flower’
 绢花 *juan-hua*³ (silk-flower) ‘silk flower’

(5)-球 *qiu* ‘ball’:

火球 *huo-qiu* (fire-ball) ‘fire ball’
 雪球 *xue-qiu* (snow-ball) ‘snowball’
 血球 *xue-qiu* (blood-ball) ‘blood cell’
 棉球 *mian-qiu* (cotton-ball) ‘cotton ball’
 煤球 *mei-qiu* (coal-ball) ‘eggette’.

Note that *hua* (花) ‘flower’ tends to be metaphorically extended towards color reading when it serve as modifying noun as compound *huaxian* ‘coloured thread’ shows (see table 1). When serving as head noun, however, it is much more likely to be interpreted as the shape of a flower.

Of course, besides shape, metaphorical head nouns can reveal other values of the formal role. For instance, *songtao* (松涛 pine-billow) ‘the souging of the wind in the pines’ is resembling billows in sound.

The interpretation of such compounds as *shishi* and *xuehua* typically involves a shift from object to image, and seems to be triggered by the combination of lexical entries. Consider, for example, the compound *shishi* ‘stone lion’. Some property that is normally understood in the interpretation of lion is excluded when it is modified by stone, i.e. a stone lion cannot be a natural kind. This interpretation effect is called Metonymic Type Coercion (MTC) in Kluck (2007). According to our preliminary investigation, TELIC and CONSTITUTIVE qualia modification nouns are most likely to lead to MTC.

4.1.1 TELIC qualia Modification

The compound *jiqiren*² (机器人 machine-man) ‘robot’ denotes a kind of machine in the shape of a man. *ren* is a natural type which has no specific TELIC role. When combining with *jiqi*, it gets a TELIC role and AGENTIVE role since *jiqi* is a typical artifactual type. The noun *ren* has to be interpreted as a type that does not conflict with the TELIC role, i.e. an image. Therefore, the compound is an artifactual type, too. This is also an example of multiple inheritance (see figure 2). Similarly, *wanjuche* (玩具车 playing-utensil-car) ‘toy car’ is not a car but a toy in the shape of a car. In compound *jiqiren*, a TELIC role is imposed on the natural type noun *ren*. In the case of *wanjuche*, however, the normal TELIC role of *che* (‘transportation’) is, at least in part, replaced by the TELIC role of *wanju* (‘playing’).

It is worth noting that *wanjuche* and *fangche* are quite different in that a toy car is a toy in the shape of a car but a recreational Vehicle is a car that has some functions of a house. It is easy to tell the difference from figure 2 and figure 4.

² We found no similar examples in bisyllabic compounds.

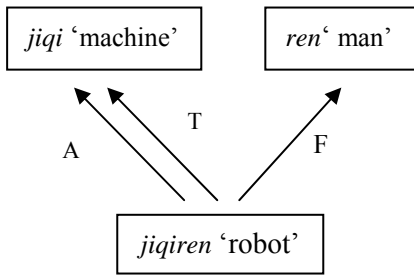


Figure 3: Multiple inheritance in *jiqiren*

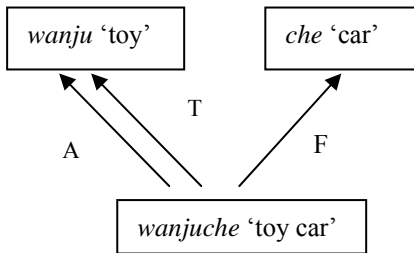


Figure 4: Multiple inheritance in *wanju che*

4.1.2 CONSTITUTIVE Qualia Modification

In the compound *shishi* ‘stone lion’, the modifying noun *shi* ‘stone’ is used to specify a subpart of or the material of the denotation of the head noun, which is usually not contained in a lion. So, the head noun *shi* ‘lion’ is reanalyzed to an image of a lion. More similar examples are given in (6) and (7).

- (6) 石羊 *shiyang* (stone-sheep) ‘stone sheep’
 泥人 *niren* (clay-man) ‘clay figurine’
 纸花 *zhihua* (paper-flower) ‘paper-flower’
 纸鹤 *zhihe* (paper-crane) ‘paper-crane’
- (7) 石笋 *shisun* (stone-bamboo shoot) ‘stalagmite’
 雪花 *xue-hua* (snow-flower) ‘snowflake’

While stone and clay are natural substances which can be used as material, paper is artifactual material. All the compounds in (6) are artifactual types, which are interpreted structurally as ‘objects that are shaped like N_2 and made of N_1 ’. For example, *niren* is shaped like a man and made of clay. On the other hand, the compounds in (7) are all natural types, which are interpreted structurally as ‘objects that are shaped like N_2 and composed of N_1 ’. For example, *xuehua* is shaped like a flower and composed of *shui*.

4.2 CONSTITUTIVE Role

Some body part nouns like *jiao* (脚) ‘foot’, *tou* (头) ‘head’ and *ding* (顶) ‘the peak of a head’ can occur in the head position and metaphorically extended towards the reading ‘the position of the body part’. For Instance, *yejiao* (页脚 page-foot) ‘footer’ is at the bottom of a page, just as a foot is at the bottom of a man. The relation between *mei* (眉 ‘eyebrow’) and *ren* (人 ‘person’) is also similar to the relation between *yemei* (页眉 ‘header’) and *ye* (页 ‘page’) as shown in (8) and (9).

(8) At_the_bottom_of <*jiao* ‘foot’, *ren* ‘person’>
 At_the_bottom_of <*yejiao* ‘footer’, *ye* ‘page’>

(9) At_the_top_of <*mei* ‘eyebrow’, *ren* ‘person’>
 At_the_top_of <*yemei* ‘head’, *ye* ‘page’>

Generally speaking, body parts terms can serve as both modifier and head nouns with a location meaning as seen in *meipi* (眉批) and *yemei* (页眉). However, there are some exceptions. As a head noun, *er* assumes a metaphorical meaning ‘something shaped like an ear’ as seen in *yin'er* (银耳 silver-ear) ‘tremella’ and *mu'er* (木耳 wood-ear) ‘agaric’. The CONSTITUTIVE role that is activated in modifier position while the FORMAL role (shape) is activated in the head position. In other words, both CONSTITUTIVE and FORMAL roles of *er* are salient. On the other hand, *xin* ‘heart’ can stand for a central location only in the head position as *jiaoxin* (脚心 foot-heart) ‘the underside of the arch of the foot’ and *dixin* (地心 earth-heart) ‘the earth’s core’ shows.

4.3 TELIC Role

In some compounds, the head nouns can show the TELIC role of the compound. For example, *naoqiao* (脑桥 brain-bridge) ‘pons’ denotes a part of the brain acting as a bridge, which is used for connecting different sides. Similar compounds include *chiqiao* (齿桥 tooth-bridge) ‘retainer’, *shangu* (扇骨 fan-bone) ‘the ribs of a fan’, *zhijin* (纸巾 paper-towel) ‘facial tissue’, *zhiqian* (纸钱 ‘paper money’) and *bimao* (笔帽 pen-cap) ‘cap of a pen’

It is noted that the metaphorical head nouns in these compounds are either artifactual types or body part nouns. Moreover, their FORMAL roles are often activated as well. That is, the compari-

son is based on function and possibly shape. Consider the compound *zhijin*. It is not only used as a towel, but also looks like a towel. Likewise, *shangu* looks like a rib and *bimao* looks like a cap.

5 Conclusion and Discussion

In previous sections, we examine the qualia roles involved in metaphorical noun-noun compounds. Compared to non-metaphorical noun-noun compounds, these compounds demonstrate two major characteristics.

First, no matter which constituent (the modifying noun or the head noun) takes on a metaphorical meaning, only three qualia roles are found in these compounds, which are FORMAL, CONSTITUTIVE and TELIC, ordered from the most to the least frequent. AGENTIVE role is excluded.

(10) FORMAL > CONSTITUTIVE > TELIC

From these observations, we can infer that metaphor emphasizes the resemblance between things in physical properties (e.g. shape, color, sound), location relation and function rather than origin. Among the values of FORMAL role, shape is the most frequent. It is reasonable since it is an attribute that can be perceived most directly through the senses. Shape is the primary way we recognize what an object is. CONSTITUTIVE role mainly relates to body part terms. TELIC role is mainly concerned with artifactual type nouns and body part terms.

Second, in compounds containing metaphorical head, the qualia roles of the compound not only can be activated by the modifier but also by the head noun, because the head noun as well as the modifying noun can indicate qualia information.

Also, this study reveals some fine-grained distinctions between nouns of different types. First of all, different nouns highlight different qualia roles or different values of a qualia role. On this view, TELIC role are salient for artifactual nouns such as *house*, *car* and *bridge*. CONSTITUTIVE role (especially part/whole relation and location relationship) is prominent in body part terms like *head*, *foot* and *heart*. Shape and color are typical features of a flower in that we often create a comparison between an object and a flower based on shape or color, as the examples of *huaxian* and *zhihua* show.

Secondly, artifactual type nouns are quite different from natural type ones. Metaphorical artifactual type nouns, especially those in head position, often exhibit both FORMAL role and TELIC role as seen in compounds *zhijin* and *shangu*.

It is particularly interesting that although both *zhuancha* (砖茶 brick-tea) ‘brick tea’ and *chazhuan* (茶砖) refer to the same object and *zhuancha* takes on a metaphorical meaning in both compounds, they have different meaning. While *zhuancha* means ‘tea that is shaped like a brick’, *chazhuan* means ‘a brick-like object made of tea’. *zhuancha* plays different role in these two nouns. In modifier position, it only describes an object, but in head position, it also refers to an object.

In this paper, we only discuss metaphorical noun-noun compounds. For further study, we will extend the generative lexicon perspective to metaphorical noun-noun phrases.

Acknowledgments

This work is partially supported by the National Social Science Foundation of China (No. 10CYY032), the Open Project Program of Shandong Key Laboratory of Language Resource Development and Application and Major Project of National Social Science Foundation (No. 12&ZD227). We are grateful to the two anonymous reviewers for highly constructive input.

References

- Bassac, Christian and Pierrette Bouillon. 2013. The Telic Relationship in compounds. In: Pustejovsky et al.(eds), *Advances in Generative Lexicon Theory Text*, Speech and Language Technology Volume 46:109-126.
- Benczes, Réka. 2006. *Creative Compounding in English*. Amsterdam/Philadelphia: John benjamins.
- Geeraerts, Dirk. 2002. The Interaction of Metaphor and Metonymy in Composite Expressions. In: René Dirven and Ralf Pörings (eds.), *Metaphor and Metonymy in Contrast*, pp435-65. Berlin: Mouton de Gruyter.
- Goossens, Louis. 1990. Metaphonymy: The Interaction of Metaphor and Metonymy in Expressions for Linguistic Action. *Cognitive Linguistics*, 1.3: 323–340.
- Huang, Jie. 2008. A Cognitive Perspective to Semantic Interpretation of Metaphonymic Noun-Noun Compounds in Chinese and English. *Foreign Language Education*, 29.4:25-29.
- Johnston, Michael and Federica Busa. 1999. Qualia Structure and the Compositional Interpretation of

- Compounds. In: E. Viegas (ed). *Breadth and Depth of Semantics Lexicons*, pp. 67-187. Dordrecht, Kluwer.
- Kluck, Marlies. 2007. Optimizing interpretation from a Generative Lexicon: a case study of Metonymic Type Coercion in modified nouns. 4th International Workshop on Generative Approaches to the Lexicon (GL 2007), Paris : France (2007)
- Lee, Chih-yao, Chia-hao Chang, Wei-chieh Hsu and Shu-kai Hsieh. 2010. Qualia Modification in Noun-Noun Compounds: A Cross-Language Survey. In: *Proceedings of the 22nd Conference on Computational Linguistics and Speech Processing (ROCLING-2010)*, pp.379-390.
- Lenci, Alessandro, Busa F., Ruimy N, et al. 2000. *SIMPLE Work Package 2 – Linguistic Specifications*, Deliverable D2.1. ILC-CNR, Pisa, Italy.
- Li, Charles N. and Thompson, S. A. 1981. *Mandarin Chinese: A Functional Reference Grammar*. Berkeley: University of California Press. 1981.
- Packard, J.L. 2000. *The Morphology of Chinese*. New York: Cambridge University Press.
- Pustejovsky, James. 1995. *Generative Lexicon*. MIT Press, Cambridge.
- Pustejovsky, James. 2001. Type Construction and the Logic of Concepts, In: Bouillon, P., Busa, F. (eds.) *The Syntax of Word Meanings*, pp.91-123. Cambridge University Press, Cambridge.
- Pustejovsky, James. 2006. Type Theory and Lexical Decomposition. *Journal of Cognitive Science* 6:39–76.
- Song, Zuoyan and Likun Qiu. 2013. Qualia Relations in Chinese Nominal Compounds Containing Verbal Elements. *International Journal of Knowledge and Language Processing*. 4(1):1-15.
- Wang, Shan and Chu-Ren Huang. 2010. Adjectival Modification to Nouns in Mandarin Chinese: Case Studies on “cháng+ noun” and “adjective+ túshūguān”. In: *Proceedings of Pacific Asia Conference on Language, Information and Computation*. Tohoku University, Sendai, Japan.
- Wang, Shan and Chu-Ren Huang. 2011. Compound Event Nouns of the ‘Modifier-head’ Type in Mandarin Chinese. In: *Proceedings of the 54th Pacific Asia Conference on Language, Information, and Computation*. Nanyang Technological University, Taiwan.
- Warren, Beatrice. 1992. *Sense Developments. A contrastive study of the development of slang senses and novel standard senses in English* [Stockholm Studies in English 80]. Stockholm: Almqvist and Wiksell International.