A Comparative analysis of Chinese Simile and Metaphor based on a large scale Chinese Corpus

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Abstract. This paper puts forward the mapping inheritance hypothesis which states that the ultimate goal of mapping is to inherit the attributes of source domains by comparing structures 'as A as Y'(像 Y 一样 A)and 'n n/n+n'. Furthermore, we have built a knowledge base for simile and explored the distribution of source domain and its attribute hierarchy. The study shows that the number of S domain words in Chinese simile is different from metaphor, they only have in common 155 S domain words. Although simile and metaphor both tend to choose the semantic category B_object as their source domain, simile expressions are more likely to choose plants and animals, metaphorical expressions are more likely to choose inanimate objects.

Keywords: Metaphor mapping; Attribute inheritance; *TongYiCi CiLin*; Semantic distribution

1 Introduction

In Chinese structures 'as A as Y'(像 Y 一样 A) and 'n of n/n+n' contain two typical forms of simile and metaphor. For example.

(1) She is as naive as a child.
(2) The guy was as sly as a fox.
(3) Her flowers of life are more beautiful.
(4) The man was screened by the tide of era.

The difference between simile and metaphor is that the Topic, the Vehicle and the Ground are closely connected by the simile mark 'as…as'. There is neither an obvious mark, nor a Ground in the form of 'n+n', but it is directly connected between the Topic and Vehicle by 'of'. There are metaphor, such as flowers of life, tide of era, in which the 'of ' can be omitted as in the examples below.

(5) She smelled the fragrance of life flowers.
(6) He writes a group of little people who up and down in the era tide.

(7) The company has long suffered heavy losses in that financial storm.

In the traditional rhetoric, simile and metaphor are two parallel patterns. According to the modern theory of metaphor, the simile is considered as a kind of generalized metaphor, and its differences from the metaphor has been discussed by many scholars. (Aristotle,1954; Wangdao Chen, 1964; Dingfang Su,2003).

Besides the structural differences between simile and metaphor, it's also very important to study whether in the simile structure 'as A as Y'(像 Y 一样 A) the Vehicle Y has limited grouping and what is the mapping features between Topic and Vehicle. Veale Tony(2007) introduced a method of their collection of similes, Yuxiang Jia(2009) collected many Chinese similes and made detailed analysis with semantic classes. Bin Li(2012) collected Chinese similes and construct a large database of "noun-adjective" items in English and Chinese. The above collection of similes offers beneficial reference for similar project.

Therefore, this paper selects the construction 'as A as Y'(像 Y 一样 A) from comprehensive modern Chinese BCC online corpus , which is a language corpus with 1 billion tokens. We summarize the principle of mapping differences of 'as A as Y'(像 Y 一样 A) and 'n of n/n+n' based on Chinese TongYiCi CiLin（CiLin） classification system.

The remainder of the paper is organized as follows. We first describe the mapping inheritance nature of the simile and metaphor, then present a method of the simile mapping analysis of source domain. In section 4, we get a comparison of the results of the semantic distribution based on CiLin. Finally, we conclude with a discussion for the future work.

2 mapping inheritance nature of the simile and metaphor

The Aristotelian view of understanding metaphor is a process of finding the shared Ground between Topic and Vehicle through implicit comparison (Black, 1962). Theories of metaphor interpretation have used the idea of interaction or comparison of attributes of Topic and Vehicle (Richards ,1965; Lynne Cameron,2001). Later Lakoff and other scholars (Johnson,1987; Lakoff 1980) provided the Conceptual Metaphor theory, according to which metaphor can be understood as a cross domain mapping in the conceptual system. The mapping can be expressed as LOVE IS JOURNEY. According to the CM theory, both 'as A as Y'(像 Y 一样 A) and 'n of n /n+n' patterns can describe a mapping between the source domain and the target domain such as the above expressions child ->people(she), fox->guy, flower->life, tide ->era, storm -> finance. The mapping of the source domain and the target domain is based on a similarity relation.

Conceptual metaphor theory, compared with the traditional studies of rhetoric, consider the nature or mapping based more on similarity, it sets up a relationship between the conceptual and syntactic layer, also expands the study of

metaphor from the conceptual layer to the syntactic surface of mappings. In this sense, simile is a kind of metaphorical simile. Therefore, this paper uses terms of the Source and Target domain instead of the Topic and Vehicle.

Besides its mapping, metaphor has also an important pragmatic function. The reason why people use metaphor is that it is an instrument to describe the reality, from concrete to abstract, from simple to complex objects, it helps people understand deeply the world they live in. During the process of mapping, the abstract and complex things inherit partial attributes of other simple things. Therefore, in addition to the mapping of metaphor, there is also the inheritance of attributes. The ultimate goal of the mapping is to inherit the attributes of the source domains.

In addition, it can be noticed from the order of words in both simile and metaphor that the target domain is generally preceded by the source domain in the structure of 'as A as Y'(像 Y 一样 A)and 'n of n/n+n', where the target domain is first determined to realize the purpose of inheritance. For example.

(8) His practice is as lovely as a child.
(9) His heart is as hard as stone.
(10) Travel in the ocean of knowledge.

Speakers want to express ideas of 'practice - > lovely, heart- > hard, knowledge- > broad'. Here, 'practice, heart, knowledge' are targets that people first think about. 'lovely, hard and broad' are the attributes that speaker want to perform, by searching for people's collective unconscious to activate these attributes of the words in the S domain.

Therefore speakers choose a known S domains such as 'children, stone, the sea' for analogy and they make concepts 'practice, stone, knowledge' inherit some attributes of S domains, like 'lovely, hard, broad'. In this sense, the direction of metaphor should be the mapping of T -> S domains and the T domain inherits the similar attributes from the S domain words. So the generalized metaphor essentially can be seen as the inheritance of the target domain to the source domain, which is closely related to the function of a language.

3 The simile mapping analysis of source domain attribute

All the things in the world can be explained using metaphors when they are not easy to understand. Therefore, all familiar, unfamiliar things can act as X. Here X may be a specific or abstract while Y is often more specific than X. Y often is a familiar thing for speakers and listeners. Only in this way can the basis of communication be realized. What the speaker wants to express depends entirely on the attributes of Y. So Y plays a key role in 'as A as Y'(像 Y 一样 A) and what attributes X inherited is determined by Y. Therefore, this paper mainly explores the structure and semantic classification of Y, based on the comprehensive modern Chinese BCC online, covers all the works from modern writers. We retrieved

the pattern 'as A as Y'(像 Y 一样 A) to manual and excluded other expressions. For example:

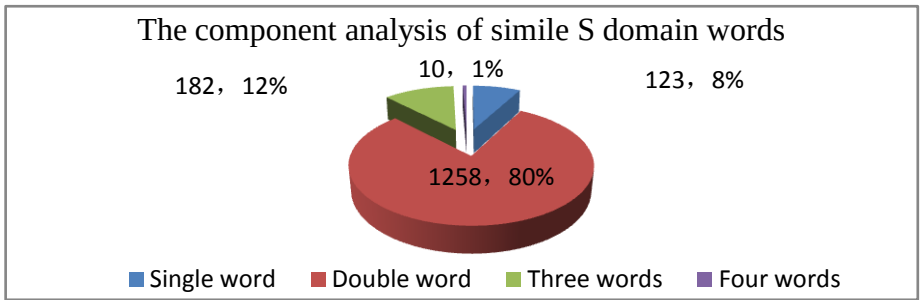
(11) All the wild sea birds are like a moth to the flame quickly.

(12) Looking at the problem is as sharp as your sword technology.

The expression of simile involves more complex source domain concepts which we do not examine in this study.

There are 1573 total S domain words, among which the words with two characters form the majority, with 1258 words that correspond to the 80% of the total. The words with a single character are 182, with the proportion of 12%. Words with three characters are a little bit less, only 123 of the total, and cover the proportion of 8%. In the end we have the words with 4 characters, which cover only the 1% percentage of the S domains.

Fig. 1. Fig. 1. The component analysis of S domain words for simile



We have discovered that there are many different properties from the same source domain.

When people make metaphorical mappings, according to the actual communication needs, the target domain generally only inherits one attribute of source domain. Therefore, S domain 'child' in 'as A as Y'(像 Y 一样 A) has mapping expressions of 43 times. Target domain inherited 43 attributes such as 'excited, poor, happy, naive, naughty, gay and innocent and simple, quiet, grievances, kind, cheerful, curious, happy, clean, low, high, sorry, smart, fragile, Triumph, and naughty, shy, lively, firm and vigilant, stubborn, stubborn, lovely, happy, enthusiastic, gentle, modest, honest, obedient, helpless, careful, slender, careful, impatient, happiness, attachment and anxious'. The mapping of N target domains to 1 source domain is created.

In this study, we obtained 1573 concepts used in source domains that later we used to built a knowledge base for simile. the source domain words constitute the core of the simile knowledge base. We set the attribute fields such as [mark word], [T word], [S word], [Mapping] and [Mapping attribute] for simile 'as A as Y'(像 Y 一样 A). In order to describe the mapping more clearly, the layer investigation is made as shown in the table below:

Table 1. Distribution of the S domain words for Simile

SD Level	SD Word	Num.of SD Mapping	Toatal Num. of SD Mapping	Rate
>15	11	319	3317	9.62%
>10	31	572	3317	17.24%
>5	94	1036	3317	31.23%
between 2 and 5	453	1255	3317	37.84%
1	1026	1026	3317	30.93%

At present, there are 3317 mapping expressions in knowledge base, and we set up 5 levels of statistics for the source domain. In the mapping of the source and target domains, we find that there are three important boundary points, that is, the source domain frequency equal 1, between 2 and5, exceed 5, with each for about a third.

The top mapping is between 2 to 5, which is 453 with the proportion of 37.84%. That means that the mapping of target domain to source domain, will activated between 2 to 5 attributes of S domain words. There are many literature similes, created with author's idea in order to be different, based on the similarity between the T domain and S domain. So only the S domain words with 1 times reached 1026, accounted for 30.93%of all similes.

In order to better describe the corresponding relationship between the source domain and the attributes, the paper lists all the source domains, mapped more than 10 times.

Table 2. The S domain words with Top 31

SD_word	Mapping Num.	SD_word	Mapping Num.	SD_word	Mapping Num.
People	66	Bird	14	Rabbit	12
Children	43	The wind	14	Mouse	12
Water	36	Cattle	14	Father	12
Dog	32	Kid	14	Fire	11
Cat	24	The sky	14	Lion	11
Woman	24	Ice	14	fille	11
Wolf	21	Girl	14	Angel	11
Stone	20	Snake	14	Sea	11
Ant	19	Pig	13	Mother	11
Child	18	Mountain	13		
Baby	16	The sun	13		

The table above shows that the top 31 S domain words that above 10, among

them, the S domain for person contains 11 words such as 'people, children, women, and child, girl, father, fille, angel, mother, kid and baby'; the source domain for animal contains 11 words such as 'dog, cat, cow, wolf, ant, bird, snake, pig, rabbit, mice and lion' ;the S domain for natural contains 9 words such as ' water, stone, wind, sky, ice, fire, sea, mountain and sun '.

The use of the S domain words for simile reflects completely the Chinese people thought, which gets inspiration by observing first the human body to describe the universe. A person which uses his body as a point of observation, would generally use 'a person' as source domain, then would refer to the beginning of life using words as 'infant, 'child', and words as 'mother', 'father' to express something that generates life. In similes, people often choose to use 'children, child, baby, and angel' as S domain words and for similes that concern the aspects sex, they use concepts of 'women, maiden, mother' is more than concepts of men. In the top 31 S domain words, the S domain words for male have only one like 'father'.

A source domain we selected housed animals such as 'dog, cat, cow, pig, rabbit', are familiar with us. First, there are 66 different mapping patterns from source domain of person. The second includes 43 patterns from 'child' domain. The third includes 36 patterns from 'water' domain.

Compared with S domain words, the attribute A also has a one-to-many mapping that the target domain and the source domain achieves the multi relationship, but they only have one attribute of S domain. For example:

(13) Eye is as sharp as a blade.

(14) Two front paws of strange insect are as sharp as a steel hook.

(15) The situation is just as sharp as a knife, when it is sweeping the Quartet.

Here T domain words 'eyes, insect, situation' is mapping to the source domain 'blade, hook, knife', the selection of the inherited attribute A is 'sharp'. The statistics of A based on simile knowledge base are as follows:

Table 3. The mapping distribution of attribute A in Simile

A Level	A Word	Num.of SD Mapping	Toatal of Mapping	Rate
>15	28	674	3317	20.32%
>10	57	1044	3317	31.47%
>5	162	1790	3317	53.96%
between 2 and 5	395	1139	3317	34.34%
1	388	388	3317	11.70%

This paper also set the attribute A for 5 levels and finds that the selection of attributes A has shorter ranges than S domain words. That case is totally differ-

ent from the above source domain. Firstly, the top A level has 162, covering the simile patterns of 1790, accounted for all forms of simile 53.96%, in the highest proportion of all levels of the hierarchy. Secondly, the mapping frequency of A between 2 to 5，is covering 1139 simile expressions, accounted for the total of 34.34%. Finally, the mapping frequency of A with only 1 times contains the total of 388, accounted for the simile rate of 11.70%.Therefore, we conceive that original A is limited and people usually focus on the commonly used A.

4 The comparative analysis of the source domain of 'as A as Y'(像 Y 一样 A) and ‘n of n/n+n’

Wang Zhimin (2010) investigated the metaphorical expression of ‘n of n/n+n’ in the Grammatical Knowledge-base (GKB) of Contemporary Chinese, examined that whether words can be entered into the above expressions. The reference materials are mainly from the modern Chinese online corpus of the center for Chinese linguistics research, Peking University.

We investigated the 35198 words of GKB, and finally got Chinese metaphorical list of more than 700 S domain words. It indicates that when people use nouns as metaphorical mapping, the metaphorical domains selected are conditional, and are also limited, which accords with the universal law of human recognition. It is the limited source domain that constitutes the system of Chinese noun metaphor.

In order to know whether S domain words between 'as A as Y'(像 Y 一样 A) and ‘n of n/n+n’ have same semantic features, we make a further inspection and put above S domain words into the classification of Cilin. The S words of two kinds of knowledge base are analyzed and compared as the following table.

Table 4. Semantic categories of SD words for simile and metaphor

Simile：as A as Y			Meta: N+N		
CiLin	Mapping	Rate	CiLin	Mapping	Rate
B_object	929	52.99%	B_ object	373	49.67%
A_person	316	18.03%	D_ abstract things	208	27.70%
D_abstract things	170	9.70%	A_ person	85	11.32%
OOV_unknown words	117	6.67%	C_ time and space	48	6.39%
C_time and space	29	1.65%	OOV_unknown words	18	2.40%
H_ activity	8	0.46%	E_ features	9	1.20%
E_ features	4	0.23%	I_phenomenon and	6	0.80%

			state		
			H_ activity	4	0.53%

There are 21 semantic categories for CiLin, labeled by A,B …L. S domain words have obvious preference for the semantic category, which only projected onto 7 kinds of semantic categories such as B_object, A_person, D_abstract things, C_time and space, E_ features, H_ activity and I_phenomenon. That shows that no matter simile or metaphor, their S domain words produce regular projection as follows:

The top three highest projection categories are B_object, A_person, D_abstract things, among which category B_object, contains 929 S domain words in simile, accounted for 52.99% of all source domains. The highest metaphorical projection is also category B_object, D_ abstract things and A_ person, where category B_object, contains 373 S domain words, covering nearly half of the total source domain. The ranking of the two or three place has changed, the number of A_ person drops sharply and it is reduced to the third, while the second is D_abstract thing.

It is worth notice that two structures of unknown words shows great differences, in similes there are 117 words that doesn't appear into Cilin dictionary, and among metaphors there are only 18 unregistered words. What kind of semantic category do the unknown words belong to? It will help to understand the case of S words comprehensively. We process all the unknown words and classified them into the corresponding semantic classification. After that, we made a new statistic of all the similes. The results are shown in the following table.

Table 5. Semantic categories of SD words with unknown words for simile and metaphor

Simile：as A as Y			Meta: N+N		
CiLin	Mapping Pat	Rate	CiLin	Mapping Pat	Rate
B_object	1007	57.44%	B_ object	384	51.13%
A_person	340	19.40%	D_abstract things	212	28.23%
D_abstract things	185	10.55%	A_ person	86	11.45%
C_time and space	29	1.65%	C_ time and space	48	6.39%
H_ activity	8	0.46%	E_ features	11	1.46%
E_ features	4	0.23%	I_phenomenon and state	6	0.80%
			H_ features	4	0.53%

From the above table, we can see that the order of the semantic category has not changed. The top three categories B_object, A_person, D_abstract things

in simile, have increased in different numbers due to the unknown words' tagging, among which the majority of unknown S domain words are classified as B_ semantic categories, second as the A_ people. There is more proof that the majority of the S domain words are concrete objects that are familiar with us.

But for n+n metaphorical expressions, there is only 1 source domain word that is classified to A_person. We see category A_people for metaphor still ranks third, but the total number of category A_person only have 86, which is less than a quarter of the total of simile of A_person.

Table 6. Semantic sub-categories of SD words for Cat_B

像 Y 一样 A				‘N 的 N /N+N’		
B_ object	Num of S words	Rate		B_ object	Num of S words	Rate
Bi animal	159	15.79%		Bp supplies	52	13.54%
Bp supplies	115	11.42%		Bg natural objects	50	13.02%
Bh plant	112	11.12%		Bo implement	45	11.72%
Bo implement	107	10.63%		Be landform	43	11.20%
Bm material	72	7.15%		Bn buildings	38	9.90%
Bg natural objects	67	6.65%		Bj microorganism	29	7.55%
Bk whole body	62	6.16%		Bf Meteorology	29	7.55%
Bf Meteorology	55	5.46%		Ba generic terms	18	4.69%
Br food and drug	54	5.36%		Bh plant	17	4.43%
Bn buildings	47	4.67%		Bi animal	14	3.65%
Be landform	39	3.87%		Br food and drug	12	3.13%
Ba generic terms	30	2.98%		Bm material	10	2.60%
Bq clothing	25	2.48%		Bd celestial bodies	8	2.08%
Bc part of an object	21	2.09%		Bc part of an object	7	1.82%
Bd celestial bodies	19	1.89%		Bb pseudo object	6	1.56%
Bb pseudo ob-	12	1.19%		Bq clothing	5	1.30%

ject						
Bl secretion	10	0.99%		Bk whole body	1	0.26%
Bj microorganism	1	0.10%				
Total	1007	100.00 %		Total	384	100.00%

Besides the semantic classes, this paper also investigated the distribution of two kinds of S domain words in the sub-category of Cilin. There are 18 semantic sub-categories of B in Cilin, where simile is covering all the type of categories of Cilin and it projects the most widely distributed sub-categories like Bi_ animals, Bp_ supplies, Bh_ plant, Bo_ equipment and Bm_ materials, accounted for approximately 60%.

Here the source domains of Bi_animals and Bh_plant have 159 and 112 respectively, ranked first and third, While the metaphor Bi_ animal, Bh_ plant only have 17 and 14 cases, ranking the ninth and tenth.

The distribution of the most source domains is five sub-categories such as Bp_supplies，Bg_natural objects, Bo_implement, Be_landform and Bn_buildings for metaphor constructions 'as A as Y'(像 Y 一样 A) and 'n of n/n+n'.

Here S domain words for metaphor that covering Bg_natural; objects，Be_landform and Bn_buildings, ranked in the forefront, but S domain words for simile are ranked at 6, 11, 10, the gap is very obvious.

From the top 5 category of metaphorical ranking, the metaphor is more inclined to choose inanimate objects, and similes tend to choose plants and animals.

Table 7. Semantic sub-categories of SD words for Cat_A

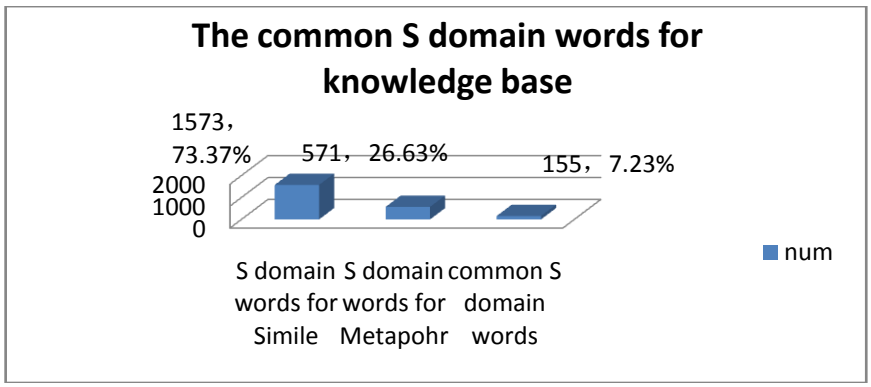
Simile：As...AS Y				Meta: N+N		
A_person	Num of S words	Rate		A_person	Num of S words	Rate
Ab People of all ages and both sexes	64	18.82 %		Al ability and insight	17	19.77 %
Ah family dependents	61	17.94 %		Ak character	14	16.28 %
Ae occupation	53	15.59 %		Ae occupation	10	11.63 %
Af identity	28	8.24%		Ag status	9	10.47 %
Aj relationship	25	7.35%		An evil person	8	9.30%

Ad membership	22	6.47%		Ah family dependents	8	9.30%
Ak character	19	5.59%		Af identity	8	9.30%
An evil person	12	3.53%		Aj relationship	6	6.98%
Am belief	11	3.24%		Ab People of all ages and both sexes	3	3.49%
Aa general term	11	3.24%		Ac posture	2	2.33%
Al ability and insight	10	2.94%		Am belief	1	1.16%
Ai generation	9	2.65%				
Ag status	9	2.65%				
Ac posture	6	1.76%				
Total	340	100.00%		Total	86	100.00%

There are 14 semantic sub-categories of people in Cilin, which S domain words for similes is covering all types of A semantic, but S domain words for metaphor are covering some categories, among them, Ad_membership, Ak_character, Ai_generation are excluded. The S domain words for similes is covering Al_ability and insight，Ak_character, Ae_occupations , Ag_status and An_evil person widely, which reflects the tendency of selecting the source domain of similes and metaphors.

Of course, in addition to the differences of the semantic classification of the source domain, this paper also found some common S words between them. As shown in the table below:

Fig. 2. The common S domain words for knowledge base



The common S domain words of two knowledge bases are only 155, accounted for 7.23% of the total number of similes and metaphor source domains. According to the previous thinking, this paper also projected the 155 common S domain words to the classification system of Cilin, as shown in the following ta-

ble:

Table 8. Semantic sub-categories of common SD words

CiLin	Mapping Pat	Commen SD words	Rate
B_ object	113	155	72.90%
D_ abstract things	25	155	16.13%
A_person	14	155	9.03%
H_ activity	2	155	1.29%
C_time and space	1	155	0.65%

The distribution of common S domain is changed from 6 classes to 5 classes. Meanwhile, the ranking of the 5 categories has also changed, the source domain of the second place A_ people sharply declined, containing only 14 words and ranked third, while the number of D_ abstract things arranged in second place.

The category C_ time and space, H_ activity also occurred to change, ranked in the last two. Whether there is a same Ground mapping for common S domain words in the constructions simile and metaphor deserves deep study. So we select category B_ species of public domain sources the word 'ocean' for example, In BCC online corpus ocean simile used for example:

(16) A person's mind as deep as the ocean

(17) Wisdom is as deep as the sea. Dong Daren

(18) Jis sky is as deep as the ocean

Target domains are often expressed abstractly. For example: 'mind, wisdom, and sky', through the mapping from target to source domain to activate the attribute 'deep and profound'. That is totally different from the metaphor 'n ocean'. For example:

(19) Three seemed caught up in a sea of flowers.

(20) Let the car into a sea of laughter.

(21) The city has become a sea of buildings.

The target domain such as 'flowers, laughter, building' is mapping into the ocean of the source domain, and activate the ground of ocean like 'much and large' and there is no sense 'deep'. In simile and metaphor, the source domain 'ocean' highlights the different attribute tendency, simile tendency to choose the attribute of 'deep', metaphor to choose the attribute of 'wide'. Meanwhile, distinction between simile and metaphor is that T domain words for simile select abstract words such as 'mind, wisdom, and heaven', while T domain words for metaphor choose specific things such as 'flowers, laughter, building'. T domain words are also the important key for the difference between two structural mappings. In the future, we will further study the semantic distribution of T domain words and their tendency to inherit the source domain.

5 Conclusion

This paper presents a mapping inheritance hypothesis which states that the ultimate goal of mapping is to transfer the attributes of source domains by comparative structures 'As... As'(像 Y 一样 A)and 'n n/n+n'.We analyzed the distribution of the source domain in Chinese simile and the hierarchy of its attributes, processing the attributes in the source domain through a Chinese simile knowledge base. The study shows that S domain words for simile are distinguished from the change quantity of metaphors just because there are only 155 common words between them. The study shows that the number of S domain words for Chinese simile is different from the number of S domain words used in Chinese metaphors, similes and metaphors share only 155 common words. There is also a great difference between the semantic categories chosen from Chinese similes and metaphors. Simile generally expresses its comparison using concepts of plants and animals, but metaphor more commonly uses inanimate objects as words domain.

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