Discussion on Lexical Phonosemantic Types in Analytical Grammar

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Abstract—Analytical grammar adopts the axiomatic strategy similar to mathematical analytic geometry, and places the phonosemantic types of Chinese vocabulary into the phonosemantic system of cognate words, which is characterized by four elements: pivotal meaning, meaning-class, phonetic nucleus and Phonetic category. The phonosemantic nucleus composed by pivotal meaning and phonetic nucleus, which is the center of the homologous system of Chinese, is in the recessive position. It forms a three-dimensional structure of phonosemantic type with phonetic category and generalized meaning. All the phonosemantic types of vocabulary can be placed in this three-dimensional structure.

Keywords—analytical grammar; phonosemantic nucleus; phonosemantic type

I. INTRODUCTION

The basic reason for the formation of cognate lies in the iconicity of the subjective and objective world — the iconicity analogy of human thinking and the iconicity connection of the material world, which are the iconicity of semantics and the iconicity of sound manifested in cognate words. Cognate words are recursively generated on the basis of iconicity of sound and meaning, which is the generation mechanism of cognate words. The phonetic correspondence of cognate languages in historical linguistics is not the recursion of iconicity of phonosemantic, but the correspondence of diachronic evolution system. There is not necessarily a phonosemantic recursive relationship between different languages. It is the evolution mechanism of cognate words rather than the generation mechanism. This paper discusses the generation mechanism of cognates rather than the evolution mechanism.

II. PROPOSAL OF THE CONCEPT OF PHONETIC NUCLEUS

Traditional language philology has made great achievements in the study of the relationship between sound and meaning of cognate words, but they all belong to the same type of analysis, which can be collectively referred to as empirical phonosemantics. The empirical phonosemantics has encountered some problems difficult to overcome: how can it be called "sound close"? How to determine the standard of phonetics? Some scholars advocate strictness, some advocate leniency, and can't agree with each other. How to determine "same meaning" and "close meaning" and what is their constitutive relations? These are controversial (Sun Yongchang, 2009: 142-145). Yang Guangrong (2000: 173-174) believes that etymology in the past is a linear concept, and his solution is to construct a nonlinear etymology. "It believes that all cognate words in a language are not generated by linear pattern. On the contrary, all cognate words in a language are generated in a nonlinear way in general. Some cognates don't have a clear 'root' or 'primitive form', and the cognates that can find a 'root' or 'primitive form' are just a part of it." His concrete operation is to divide the sound and meaning into two dimensions, and then form iconicity network or cognate group by matching the sound and meaning.

It is believed that Yang's two-dimensional etymology is very successful in the division of semantic nucleus and meaning-class, and the concept of "iconicity element" (2000:173) is also instructive, but he is messy in the two-dimensional (2000: 159-160) of speech, and he turns the initial consonant and rhyme, the pronunciation method and the pronunciation position, the rhyme belly and the rhyme tail into two-dimensional respectively, which makes the two-dimensional structures of semantics and speech difficult to be generated organically. It seems that the two-dimensional structures of speech and semantics are carried out respectively, and then form a word. It is impossible to see which element of "pivotal meaning" is matched with the two-dimensional structure of speech. Is it the pronunciation method or position of initial, vowel or initial? If it is one of the elements, then other speech units do not need to be two-dimensional, and if "pivotal meaning" may match with any elements after the two-dimensional speech, then it is equivalent to the failure of the two-dimensional speech. In fact, this is the same as the confusion of empirical phonosemantics in phonetics. It means it is impossible to grasp the standard of phonetics. Whether it is loose or strict, it will lead to the mistakes of cognate word association. The reason why the speech is difficult to be two-dimensional is that it is bound by syllables or segments and cannot find the phonetic nucleus of cognates.

At present, the phonic dichotomy of cognate words cannot find a "nucleus" to maintain cognate words as well as the analysis of cognate words' meaning, which only stays on the surface phonetics of sound conversion. According to the principle of iconicity of phonosemantic of cognate words, not only the meaning of cognate words is in iconicity network, but
also the sound of cognate words is in iconicity network at recursive level. Theoretically, the sound of a group of cognate words also has a common "nucleus", which is called the phonetic nucleus. The phonetic nucleus is the nucleus element to maintain the phonetic iconicity of a group of homologous words. In phonetics, the phonetic nucleus does not represent initial consonant, rhyme or segment, but represents phonetic characteristics. In phonology, it represents the common distinctive characteristics of homologous words. Phonetic category is a kind that is differentiated according to the common distinctive features, also called phonetic collections. The so-called "phonetic conversion" in the phonology of cognate words is only a phenomenon in Phonetic category, and it is restricted by the phonetic nucleus mechanism. The phonetic nucleus is the common distinguishing feature of a group of cognate words. Any phonetic conversion relationship can be expressed by phonetic nucleus (common distinguishing feature) and phonetic category, so that a "nucleus" to maintain cognate words’ phonetic can be found smoothly, just like the thought of dichotomy of cognate words' meaning (pivotal meaning and meaning-class).

According to the generation mechanism of cognates, a group of cognates can be represented as a set of sounds and meanings \{pivotal meaning, meaning-class, phonic nucleus, phonetic category\}, which can formally express the sound and meaning types of cognates:

- (a) word meaning = pivotal meaning (meaning-class)
- (b) word sound = phonetic nucleus (phonetic category)
- (c) phonology \rightarrow \{common distinctive features\} / pivotal meaning (meaning-class)

(a) represents the specific meaning of a group of cognates, which is the result of the change of the meaning-class based on the pivotal meaning. (b) represents the specific phonetic of a group of cognates, which is the result of the phonetic nucleus selection based on the phonemic category. (c) represents the phonology of a given group of cognates, which is the phonetic nucleus with the same \{common distinguishing feature\}. A group of words with the same pivotal meaning and phonetic nucleus are cognate words. The specific phonetic is selected within the phonetic collections limited by \{common distinctive features\} (so-called phonetic nucleus). The specific meaning of words changes in the meaning-class.

### III. PHONOSEMANTIC NUCLEUS IN ANALYTICAL GRAMMAR

Yang Guangrong (2014) pointed out that "analytic grammar has the nature of analytic geometry, and the denotation and connotative space concept of natural language running through it", "the generation of word units of analytic grammar is in accordance with the two-dimensional etymological law", and pivotal meaning and meaning-class are the two keys of two-dimensional etymology, respectively corresponding to the connotation and denotation of natural language. In terms of phonetic, it can also be corresponding to the connotation and extension of natural language, namely, phonetic nucleus and phonetic category. Finally, the three-dimensional static types of vocabulary can be constructed by the four elements of pivotal meaning, meaning-class, phonetic nucleus and phonetic category.

"The combination of pivotal meaning and phonetic nucleus constitutes the genetic part of cognates, which is the recessive component" (Yang Guangrong, 2005). The basic mechanism of cognates generation is the dual iconicity of sound and meaning. The recursive inheritance of cognates includes not only pivotal meaning, but also phonetic nucleus. The phoneme system of a language is limited, so the speech expression is limited, which is also the reason why there are many homophones in Chinese. Therefore, there is no sense distinguishing function for the phonetic nucleus which is not combined with the pivotal meaning, and the existence of the phonetic nucleus alone is valueless. It must exist on the basis of the pivotal meaning. The group of "飞/fēi", "绯/fēi", "绯/fēi", "绯/pái", "采/fěi", "采/fēi", "采/yáng", "非/fēi" and "绯/fēi" gain sound from "非/fēi" (Jiang Shaoyu, 2015). They have same phonetic nucleus \{A | + consonant, + lip sound, - nasal sound; + excess, - nasal sound, - plosive sound, + middle\}, but they can be divided into three different word families, and their relationship can be represented by two-dimensional coordinate system as following "Fig. 1".

![Phonosemantic nucleus coordinate system](image)

**Fig. 1.** Phonosemantic nucleus coordinate system

Group a: the semantic meaning of "飞/fēi", "绯/fēi", "绯/fēi" and "排/pái" is "分别/fēi wéi". Group b: the semantic meaning of "采/fěi" and "采/fēi" is "飞杨/fěi yáng". Group c: the semantic meaning of "采/fěi", "非/fēi" and "绯/fēi" is "非/chāi". Their phonetic nucleus are completely the same. Without semantic nucleus of them it has no function of distinguishing semantic meaning. In coordinate system, pivotal meaning is set as x-axis, which means independent variable;
phonic nucleus as y-axis, which means dependent variable. In the integration of semantic nucleus and phonic nucleus of cognate words, semantic nucleus is the key. With different semantic nucleus, even if phonic nucleus of words are the same, it cannot be classified into a group of cognate words.

In the integrated coordinate system of "phonosemantic nucleus", any point on the x-axis and y-axis has only one intersection point, which is a phonosemantic nucleus which is unique. The phonosemantic nucleus is the smallest combination of phonetic and semantic iconicity of a group of cognate words. A phonosemantic nucleus can produce a word family theoretically, and a word family regards it as a set. Then the set has at least two members, namely \([A, \phi]\). The members that can appear in theory but not in practice can be set to zero (\(\phi\)), so that all words can be included in the investigation of the phonosemantic type. In other words, there is at least one word in each phonosemantic nucleus. The representation form of a word is: word = phonosemantic nucleus (meaning-class, phonetic category), which can be represented by \(f(x, y)\). x and y respectively represent meaning-class and phonetic category, which are independent variables. The phonosemantic types of words are as following "Fig. 2":

![Fig. 2. Three-dimensional coordinate system of lexical Phonosemantic type](image)

As shown in the "Fig. 2", any point C in the axis of phonosemantic nucleus is a word family. The corresponding Phonetic category is the natural sound set on the CD line, and the corresponding semantic-class is the event-class on the CB. Once a D point is determined on the CD line and a B point is determined on the CB line, then a member A of the C word family is determined. Therefore, all members of C word family are in plane ABCD.

**IV. LEXICAL PHONOSEMANTIC TYPES**

The phonosemantic types of vocabulary can be examined in the phonosemantic system of cognate words, and the phonosemantic types of vocabulary can be placed in this three-dimensional structure. According to the similarities and differences of the phonosemantic nucleus, they can be divided into two types: homogeneous type and heterogeneous type.

![Fig. 3. Homophonic motivation cognates.](image)

2) *Non-homophone motivation cognates — with same pivotal meaning, meaning-class but different phonetic category:* This kind of cognates has definite semantic nucleus and phonic nucleus, while meaning-class and phonetic category are not specific. As shown in "Fig. 2", the phonosemantic nucleus is determined to be C, the specific phonic value on the phonetic category line CD is uncertain, the specific value on the meaning-class line CB is also uncertain, and the cognates are scattered in the plane ABCD. For example, "霞, 菊, 荻, 菊, 菊" ("xiá, xiá, xiā, xiá, xiá") and "霞, 菊" ("jiā, jiā") are a group of cognates. But the last two words are of "霞" and "菊".
"(xíá mǔ yú") part, which are non-homophone motivation cognates, as following "Fig. 4":

3) Non-semantic involved sound-variant cognates — with same pivotal meaning, phonic nucleus and meaning-class but different sound value: This kind of cognates has definite pivotal meaning, phonic nucleus, and meaning-class value. It changes sound only on phonic category axis and these words have same phonic and semantic nucleus and same meaning-

class but different pronunciation. As shown in "Fig. 2", if phonosemantic nucleus is C, and then the specific meaning-class value B is determined on the meaning-class line CB, then the group of cognates is on the synonym line BA. For example, the second person "nǚ, ěr, ér, ruò, nǎi") is shown as following "Fig. 5":

4) Words of \{A, ð\} type — with same pivotal meaning, phonic nucleus, meaning-class value and phonic value, shown as variant Chinese characters sometimes in different shape: This kind of cognates has definite pivotal meaning and phonic nucleus, specific meaning-class value and phonic value. Therefore, a specific point can be obtained in the three-dimensional coordinate system of the lexical phonosemantic type. Theoretically, this point is also in the same source plane, but in the language practice, this point becomes the so-called “insulation without evidence” because of its absence of cognate in the place. Generally, it is not regarded as cognate words, but its phonosemantic nucleus is also unique in the three-dimensional coordinate system of lexical phonosemantic types, which does not prevent it from being classified as cognate words.

B. Heterogeneous Phonosemantic Nucleus Type

In the integrated coordinate system of "pivotal meaning – phonic nucleus", any point on the x and y axis has only one intersection point, and the nucleus of phonosemantic is unique. This means that no matter whether the pivotal meaning changes or the nucleus of sound changes, the phonosemantic nucleus is not the same, which is reflected in the three-dimensional coordinate system of lexical phonosemantic types. In other words, the different values on the axis of the phonosemantic nucleus determine the different homology of different phonosemantic nucleus. Take two different points A and A’ as plane ABCD and plane A’B’C’D’ perpendicular to Z axis, which are homologous planes of word family A and word family A’ respectively. It can be seen from the figure that homologous plane ABCD and homologous plane A’B’C’D’ are not on the same level. Therefore, this kind of lexical phonosemantic types do not belong to homologous words, and are heterogeneous phonosemantic nucleus type. To put it another way, in this type of heterogeneous phonosemantic nucleus, phonic nucleus and pivotal meaning cannot be the same at same time. The lexical phonosemantic types of heterogeneous nucleus are as following "Fig. 6":

Fig. 4. Non-homophone motivation cognates.

Fig. 5. Non-semantic involved sound-variant cognates.

Fig. 6. Three-dimensional coordinate system of Phonosemantic types of heterogeneous vocabulary
1) Words — with same pivotal meaning, same meaning-class and phonetic values but different phonetic nucleus, inexistent (this vocabulary type does not exist): Phonic category is the natural sound set divided by phonetic nuclei (common distinctive feature). Phonic nuclei and phonetic category determine each other's relationship, which is different from the relationship between pivotal meaning and meaning-class. A given phonetic nucleus will generate a corresponding phonetic category, and there will be different values in the phonetic category. Two or more words with the same Phonic value. In other words, the actual phonemes are the same, their phonetic nuclei must be the same, and the proposition is contradictory to this, so there is no such phonosemantic type. As shown in "Fig. 3", CD and CD’ are not in the same homologous plane, and the phonosemantic nuclei are different, but the phonetic category are the same, the phonetic nuclei are also the same, the difference is the pivotal meaning, which is not consistent with the proposition.

2) Non-homophonic synonyms— with same pivotal meaning, same meaning-class value, but different phonetic nucleus and phonetic values: "Pivotal meaning is a vertical semantic component and a genetic component of etymological meaning" [7][8]. Two points need to be noted here: first, pivotal meaning is a vertical component, not a central morpheme summarized horizontally, but a derived relationship; second, pivotal meaning is a genetic component of meaning, which is a necessary condition rather than a sufficient condition for the derivation of cognate words, and it must also have recursive heritage. It is the recursive inheritance of the phonosemantic nucleus that is the necessary and sufficient condition for the derivation of cognates. "Same pivotal meaning" defined in 3.2.1-3.2.4 proposition doesn't mean that two groups of words have derived relationship, but that two or more groups of cognate words have iconicity in their respective pivotal meaning, which is a horizontal comparison of two or more pivotal meanings. Words with the same pivotal meaning but different sounds can be collectively called non-homonymic pivotal meaning words. For example, the following four groups of cognates:

"gāo":1: "qiao", "qiáo", "jiao", "qiao", "qiao", "jiao", "jiao", "jiao", "jiao", "jiao"

"高") 2: "桥", "桥", "桥", "桥", "桥", "桥", "桥", "桥", "桥", "桥"
"gāo":2: "jiao", "jiao", "jiao", "jiao", "jiao", "jiao", "jiao", "jiao", "jiao", "jiao"

"高") 3: "乔", "乔", "乔", "乔", "乔", "乔", "乔", "乔", "乔", "乔"
"gāo":3: "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao"

"高") 4: "乔", "乔", "乔", "乔", "乔", "乔", "乔", "乔", "乔", "乔"
"gāo":4: "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao", "qiao"

The above four groups of cognates are different in phonetic nucleus and phonetic category, and have no derivative relationship, but their respective pivotal meanings are all "high", which provides conditions for the generation of synonyms. When the pivotal meanings and meaning-classes of one group of cognates and one group of cognates are the same, the two words can be regarded as non-homonymous synonyms. For example, the three words "乔/縣", "侨/縣" and "侨/縣" all have the meaning of "outstanding talents". Shuowen Renbu: "乔/縣" means high". In "Guxun Huizuan", the second note "乔/縣" is quoted from Liu Baonan's "Interpretation of Analagous of Confucius", "乔/縣" refers to the tall height of one person"; the seventh note "乔/縣" "乔/縣"" means outstanding person. "Yupian Renbu" says: "侨", "侨", "侨", "侨", "侨") "Shuowen Renbu" records: "侨", "侨", "侨", "侨", "侨", "侨", "侨", "侨", "侨", "侨", "侨", "侨", "侨"

3) Words — with same pivotal meaning, same phonetic value, but different nucleus sound and meaning-class values: This vocabulary type does not exist. The proposition contradicts with the theory that the same phonetic value must have same phonetic nucleus.

4) Non-homophonic pivotal meaning words — with same pivotal meaning but different phonetic nucleus, sound class and meaning-class values: The two words have different value of nucleus and category, so there is no condition of homophone proximity. The two words have the same pivotal meaning and different meaning-class, so the two words have the same pivotal meaning accidentally. In other words, they are actually multiple groups of words expressing the same pivotal meaning. For example, in 3.2.2, the four groups of words with the pivotal meaning of "high" have the same pivotal meaning, and the pivotal meaning of "red" has the same voice meaning, such as "高/縣" ("高/縣" and "高/縣"), "高/縣" ("高/縣" and "高/縣"), "高/縣" ("高/縣" and "高/縣"), "高/縣" ("高/縣" and "高/縣"), "高/縣" ("高/縣" and "高/縣"), "高/縣" ("高/縣" and "高/縣"). For another example, the pivotal meaning of three groups of words "高/縣", "高/縣", "高/縣" and "高/縣", "高/縣", "高/縣" are all "高/縣". The three groups of words are non-homophonic pivotal meaning words from each other.

5) Homophonic and same meaning-class word— with same phonetic nucleus, same meaning-class value, same phonetic value but different pivotal meaning: The phonetic nucleus and phonetic category are the same, that is, homophone. Different pivotal meaning leads to different phonosemantic nucleus, so it is not on the same homologous plane. The words of this kind of phonosemantic type are homophones at first, and they are related in meaning and easy to be confused with cognates. The line where the intersection line CC' of homophone face CC'D'D and the
same face BB'C'C is located belongs to homophone synonymous type words.

6) Homonym — with same phonic nucleus and phonic value, different pivotal meaning and meaning-class value: Homonym: is of same phonic value. They are on the homonym plane CC'D'D in the three-dimensional coordinate system of lexical phonetic type, but not in the same class plane. Homonym belong to this kind. Chinese homonym is a common phonetic phenomenon, most of which are not related in the sense, such as "书/shū", "侍/shì", "转/shuǐ", and "转/shuǐ" in Modern Mandarin Chinese.

7) Near-sound same meaning-class word — with same phonic nucleus, same meaning-class value, different pivotal meaning and phonic value. Such as "祯/zhēn" (幸卒/zhāng zhēn) and "祯/zhēn" (幸卒/duān gēng), "端/duān" and "幸 /zhāng" are of similar sound in quasi dual tone, and the phonic nucleus as are following "Fig. 7":

![Fig. 7. Near-sound heterogeneous vocabulary.](image)

Shuowen(《说文》) says: "以真受赋也．"(yi zhēn shòu fū yé) Duan Yucai (段玉裁) was interpreted: "this is also said '从示从真, 真亦声'(còng shì cóng zhēn, zhēn yì shēng). Cut out the silent part. Sound and meaning are of same source". "Shibu" also records: "祯, 祥也."(zhēn, xiáng yé). Xu Kai stated: "祯/zhēn" has the character of "祯/zhēn", which refers to upright person. If a man is upright, he will be blessed by the heaven. It can be seen "祯/zhēn" gets meaning form "祯/zhēn", and "祯/zhēn" from "祯/zhēn" (正/zhèng), but with different pivotal meaning. Both of them belong to Shuowen(《说文》), and are related to "祯/shēn", which are synonyms of near sound.

8) Similar-sound and different meaning-class word — with same phonic nucleus, but different pivotal meaning and similar meaning and sound class values: This kind of words has some phonetic relations due to the function of phonetic nucleus. Some of them are close to each other in pronunciation and have different semantics such as "Ӧ/qiān" (Qing Yuan) and "肩/jiān" (Jian Yuan). The former is derived from the pivotal meaning of "点/jiān" (small), the latter is homologous with "肩/jiān", and "点/qiān" and "Axes/jiān" are vowel rhyme which are Non-synonymous words with near sound.

9) Words — with different pivotal meaning and phonic nucleus, same meaning-class value and sound class value, which is inexistent: The same sound class shall have same phonic nucleus, so it is inexistent

10) Non-homophonic and same meaning-class word — with different pivotal meaning and phonic nucleus, same meaning-class value, different phonic value: There are two kinds of non-homophonic synonyms: one is the synonym of the same thing but different name which is not related in phonetics; the other is the synonym of same meaning-class or same thing class. Due to the influence of time and space, some of the same things have phonetic changes, which belong to the phonic-change cognate words or homogeneous phonic and semantic words. For example, "布谷/bù gǔ - Bộ/gú - huô gú - gǔ gô - guô gông" belongs to the same phonosemantic nucleus. Another situation is that people name the same thing from different angles. The reason for naming is different in meaning and pronunciation, such as "棚/ mián", "棚/méi", "棚 /lû", "棚/yán" and "棚/bì". These five words are actually the same thing, but the reason for word formation is different, and the phonetic form is also different: "棚是近音, so it's called '棚/yán'; its function is 'to connect the head and make the head level', so it's called '棚/ mián'. It is also called '棚/lû' because it focuses on the rafters of the house, and '棚/bì' because it focuses on the comparison of the rafters. The eaves board is the eaves near the house, so it is called '棚/méi'" These five words belong to five different word families, but they refer to the same thing. They are Homonym. They refer to the same thing, and are words of same meaning-class. The second category is more common. The traditional way of arranging meaning categories is to collect words with the same meaning, many of which are non-homophonic and same meaning-class word. It should be noted that there are different levels in the classification of semantic classes, so the same meaning-class word are different in levels.

11) Words — with different pivotal meaning and phonic nucleus, same sound class value but different meaning-class value, which is inexistent: Same sound class value shall have same phonic nucleus, so it is inexistent.

12) Unlinked words of sound and meaning— with different pivotal meaning and phonic nucleus, different sound class value and meaning-class value: Distant phonosemantic are distant refers to words that have no relationship between sound (phonic nucleus, phonic category) and meaning (pivotal meaning, meaning-class). Select one member from each group of homologous words with distant phonosemantic, and then these members are also disrelated phonosemantic. In the three-dimensional coordinate system of lexical phonosemantic types, words with distant phonosemantic are not on the same source plane, nor on the homophone plane CC'D'D and the same type plane BB'C'C.

V. CONCLUSION

The phonosemantic types of Chinese vocabulary are as follows "Fig. 8":

![Fig. 8. The phonosemantic types of Chinese vocabulary](image)
The phonosemantic types of Chinese vocabulary study the phonosemantic relations of words from the internal and external combination of sound and meaning. From the internal combination of sound and meaning, the phonosemantic types of Chinese vocabulary involve various types of cognates. From the external combination of sound and meaning, they involve various types such as same-meaning words, synonyms, homophones, and approximant consonant words. Both the internal and external relations of phonosemantic are a continuum, not an absolute discrete quantity. From the internal relationship between sound and meaning, cognate words involve the factor of big and small levels, which is essentially the factor of big and small levels of phonosemantic nuclei. The big and small level of phonosemantic nuclei are determined by the pivotal meaning, and the pivotal meaning itself have the division of big and small levels, which is related to the unclear boundary of iconicity thinking itself. From the perspective of the external relations of sound and meaning, synonyms and Near-synonyms can be subdivided into different types of phonosemantic because they are related to word sound, but they are not absolute. For example, the boundary between non-homonymic synonyms and non-homonymic near-synonyms lies in the difference of meaning-class, but the division of meaning-class itself can be large or small. The same thing (things, behavior, state, nature, degree, etc.) in different semantic fields has different status, which affects the meaning level of words, thus affecting the types of phonosemantic. The phonosemantic types of Chinese vocabulary need further study.

REFERENCES