Articulation Intimation: the Surviving Trace of Language Origin

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After matching possible association starting points to the meanings of single-morpheme words of Latin, English and Chinese, we find there is certain relation caused by association between the meaning of words and the pronouncing movements. We name that articulation intimation. Articulation intimation has dual character. Most pronouncing movements for intimation are visible and man originally used them to intimate something. On the other hand, pronouncing movements produce sound and various phonemes may originated in that. Later people found that they could visualize the pronouncing movements according to the sound they heard and then they began to receive the intimation by hearing.

As everyone knows, association is one of the basic ability of human intelligence. It permeates every aspect in human thinking activities, and languages can not make an exception either.

We can generally show the course of the associative thinking in Fig. 1:

"A" stands for certain starting point of associating. "→" represents a certain association course. B1…Bn are the first level associated things and we call them direct association items. C1…Cn are second level associated things and we name them indirect association items.

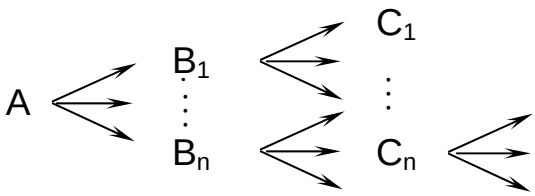

Fig.1　The course of the associative thinking

We can learn how people associate from various instances. For example, the dictionary explanation of English word "gape" is: 1) open the mouth wide; 2) yawn; 3) stare open–mouthed and in surprise; 4) come apart or become open wide. And the dictionary explanation of Latin word "palatum" is: 1) palate, 2) lips, mouth (e.g. obserare ～ (close mouth)), 3) <transfer> taste, 4) judgment, 5) arch, vault (e.g. ～ caeli (the vault of heaven)). They can be expressed as Fig. 2.

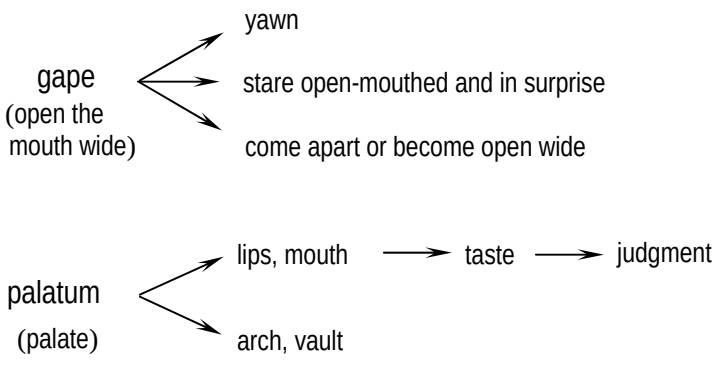

Fig. 2　associate in various instances

The above two examples tell us a certain buccal movement (such as opening the mouth) or position (like palate) can become a starting point. So we can get reasonable conjecture that all the oral cavity organs or positions that function in pronouncing and the movements and shapes of these organs may become the starting point of association. So we tentatively select a set of possible (that need verifying with the language material) starting points.

Second, we choose single-morpheme words, which can be regarded as the foundation of derivative and compound words, as the language material from three representative and comparative natural languages of eastern and western countries. These three languages are Chinese, Latin and English.

We divide the language material into different groups according to the meanings. And then we tentatively match the possible starting points to the groups and finally make their relation conform to association by similarity, by contiguity and by contrast. As a result, we get various kinds of association starting points of consonants and vowels *(1)* (S6.1, table S4), the association items and examples (associated things, selected from language material). (S3～S6)

The matching result shows that the three languages have large numbers of same association items:

Of 109 association items of initial consonants, 75% can be found in all the three languages and 7% can be found in both Chinese and English or both Chinese and Latin. These two parts accounts for 82% altogether. Then 17% can be found only in Chinese, 1% can be found in both English and Latin and none can be found only in English.

Among the 28 association items of vowels (a, e, i, u, o), 100% are found in all the three languages.

Association items with large amount of examples are listed below. **Rotate, circle, surround, curve** (association starting point: “labialization consonant”), 66 examples; **Speak** (“tip of tongue” / “front of tongue”), 67; **Close or shelter** (“mouth closed”), 66; **Bulge or ball** (“mouth closed and air accumulated”), 46; **Rotate, circle, surround, curve** (“rounding”), 45; **Hold together** (“contact of articulators (tip/front of tongue to upper teeth-ridge)”), 44; **Lick to taste, flavor** (“tip of tongue” / “front of tongue”), 32; **Place in between** (“approach of articulators (front of tongue to palate)”), 31 etc.

The association starting points can be divided into movement type and sound type. Starting points of movement type of vowels include the position of lips (rounded or unrounded), the aperture of mouth (large, mid or small). Starting points of movement type of consonants include the position of lips (rounded or unrounded), place of articulation (lips, Upper teeth to lower lip, etc.), separated movements (lifting and dropping tip of tongue, curl back tongue, etc.). Starting points of sound type of vowels include the auditory articulation location, sonority, tone-color. Starting points of sound type of consonants include plosive, continuant, nasal, friction, approximant, strident, etc.

Fig. 3 shows several starting points of movement type and their corresponding association items.

For example, starting point “rounding” (or “labialization”) leads to three association items:1. **rotate, circle, surround, curve**, corresponding to rounding the lips (S3.1.1. S3.1.2.)；2. **protrude**, corresponding to protruding the lips (S3.1.3.)；3.**gather together**, corresponding to bringing the lips together in tiny folds (S3.5.1.).

And for another example, starting point “curl back tongue” leads to four association items:

1. **rotate, circle, surround, curve**, corresponding to curling the tongue (S3.1.9.); 2.**rearward, reverse**, corresponding to tongue tip pointing backwards (S3.4.1.); 3.**circulate,repeat**, the indirect association of the association item "round" (S 3.5.2.); 4.**soft**, corresponding to the soft characteristic of the tongue (S3.5.3.)

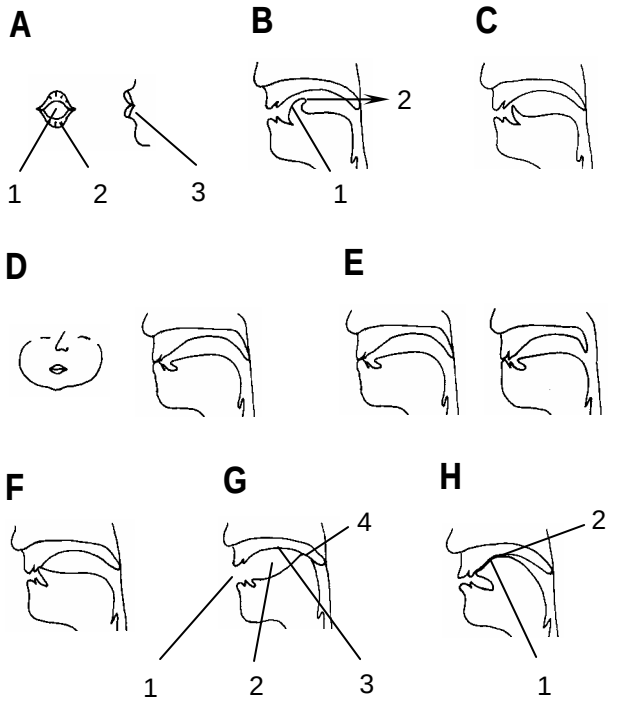

Fig 3 illustration of articulation intimation. (A)Association starting point: rounding or labialization. Association iterms: 1.round, curve, surround, rotate; 2.gather together; 3.protrude. (B) Association starting point: curl back tongue. Association iterms: 1. round, surround, curve rotate; 2.rearward, reverse; 3.circulate, repeat; 4.soft. (C) Association starting point: lifting tip of tongue. Association iterms: 1.lift; 2.erect; 3.sole; 4.height. (D) Association starting point: mouth closed and air accumulation. Association iterms: bulge or ball. (E) Association starting point: mouth closed. Association iterms: close or shelter; Association starting point: lips(bilabial). Association iterms: paired or juxtaposed. (F). Association starting point: tongue tip touching upper teeth-ridge. Association iterms: 1.touch; 2.hold together; 3.stay; 4.obstruct. (G) Association starting point: mouth well open. Association iterms: 1.open, hole; 2.unoccupied; 3.container. Association starting point: palate. Association iterms: 1.arch form; 2.height; 3.cover, lid. (H) Association starting point: front of tongue approaching hard palate. Association iterms: 1.approach; 2.narrow chink; 3.place in between; 4.resemble; 5.come to an agreement.

We know from Fig.3 that there is certain relation caused by association between the meaning of words and pronouncing movements. That is to say, the association caused by pronouncing movements has certain function of intimation and we call this 'articulation intimation' to distinguish it from the name "oral gestures"*(2)*.

Most pronouncing movements for intimation are visible and others can accept the intimation by seeing. Outwardly, "articulation intimation" seems to have nothing to do with the sound. But in fact, all kinds of pronouncing movements have relations with the sound they produce. We can visualize the speaker's pronouncing movements from the sound we hear and then accept the intimation of the speaker. We define this "dual character of articulation intimation".

Articulation intimation items of consonants are much more than those of vowels. This is because the pronouncing movements of consonants are more complicated than those of vowels and that makes association starting points of consonants more than those of vowels.

Pronouncing movements of consonants need the coarticulation of vowels. That means only a syllable can accomplish completed articulation intimation. For example, vowel \i\ following bilabial can make lips keep closed to indicate "small", vowel \a\ following bilabial makes lips wide apart to indicate "large" and rounded vowels behind the consonants can labialize the consonants before it to indicate "round", "rotate", "curved" or "enclose". It is thus clear that at

least a rounded vowel and two non-rounded vowels of different size in opening are needed in order to accomplish the intimation. We can intimate “big, middle, small” if one more non-rounded vowels is added. We can intimate “big circle”and “small circle” if one more rounded vowel is added. Most vowel systems are “triangular” in shape, especially based on a 3-or 5-vowel pattern.*(3)*. Its cause may just be this need of intimation.

We also find that the association caused by starting points of sound type is generally similar to the examples of synaesthesia (secondary onomatopoeia). For example, the sound \sl\ may lead to the association of “slick” as in “slimy” and “slither” (S4.1.1. e.g. English) This corresponds to the examples in reference *(4) (5)*.

Articulation intimation, synaesthesia and onomatopoeia are all caused by association and mutually complementary in associated things. Articulation intimation mostly indicates concrete things. The associated things of synaesthesia is usually something abstract and those of onomatopoeia are something that can make sounds.

Most single-morpheme words in Chinese are monosyllabic words. Coarticulation of consonants and vowels makes single-morpheme words more possible to have symbolic meanings and intimate more accurately.

Take Chinese words expressing taste for example. The place of articulation of the consonant in 甜 \tien\ (sweet) is tip of the tongue which is sensitive to sweet taste. The place of articulation of the consonant in 苦 \ku\ (bitter) is back of the tongue which is sensitive to bitter taste. And the place of articulation of the consonant in 咸 \ʃien\ (salty) and 鲜 \ʃien\ (tasty flavor) is the front part of the tongue which is sensitive to salty taste. And the main vowel of 甜 \tien\ (sweet), 咸 \ʃien\ (salty flavor) and 鲜\ʃien\ (tasty flavor) is \e\ and its association item is “moderate, pleased” (S6.5.2.2.), indicating the three taste is joyous. Vowel in 苦 \ku\ (bitter) is \u\ and its association item is “doom, rotten, mournful” (S6.5.5.2.), indicating this taste may cause bad feeling. And vowel in 辣 \la\ (hot) is \a\, and its association item is 'fiery color, hotly' (S6.5.3.), corresponding to the hot feeling of peppery taste.

Associated things of Chinese words cover a wide range and conform to association with few exceptions. For example, the pronouncing movements of rounded/labialized consonant have three aspects: 1. rounding the lips, 2. gathering together the lips. 3. protruding the lips. English and Latin only have intimation items corresponding with “rounding the lips”, while Chinese has intimation items corresponding with all the three aspects. According to the statistics of the matching result, 20% of the association items are only found in Chinese while just 5% are possessed by English or Latin only.

Nearly all the single-morpheme words, which mean rotate, circle, surround, curve and so on, contain rounded vowels and rounded/labialized consonants(intimate with rounded lips) and consonant \r\ (intimate by curling back tongue). (S3.1.1., S3.1.2., S3.1.9.) And over 30 Chinese words related to place in between all begin with consonants containing the movements of “approaching the upper palate to the tongue”. (S3.5.25.)

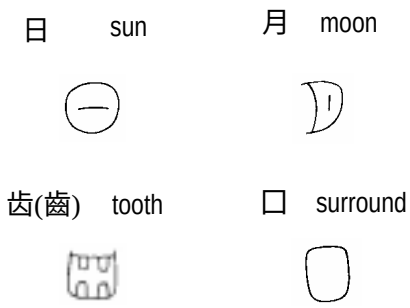

Fig. 4 Chinese characters representing things in pictorial form

As we know, Chinese characters are the only existing ideographic writing. With few exceptions,

one Chinese character corresponds to a monosyllabic single-morpheme word. We found the symbolic meanings which pronouncing movements indicate and the characters represent are usually supplement and complement each other. For example, 日(\r\ sun): its pronouncing movements intimate round (S3.1.9.), and its written character represents a circle(Fig. 4) *(6)*;月(\iʷe\ moon): its consonant \iʷ\ symbolizes curl, the vowel \e\ symbolizes brighter and azure (S3.1.2., S6.5.2.1.) and its written character represents crescent (fig. 4) *(6)* ;齿(齒) (\ts\ tooth): its pronouncing movements intimate revealing closed teeth (S3.2.3.) and its character represents the revealed closed teeth(Fig. 4) *(6)*; "口" is a meaning element of Chinese characters, it symbolizes "rounded" or "surrounded"*(6)*, There are 26 characters have this element and mean "rounded" or "surrounded" *(7)*: 囚\tʃiu\, 团\tuan\, 回\hue\,园\iʷen\, 围\we\, 困\kuən\, 囤\duən\, 囵\luən\, 囫\hu\, 国\guo\, 困\tʃuən\, 囵\liŋ\, 囿\jou\, 圃\pu\, 圄\iʷ\, 圂\huən\, 圆\iʷen\, 圊\tʃiŋ\, 圉\iʷ\, 圈\tʃiʷen\, 圌\tsue\, 圐\ku\, 圞\luan\, 圙\liʷe\, 圜\huan\, 口+淵\wan\ Among them, only two words '囵, 圊 'don't contain rounded vowels or rounded/labialized consonants.

Because Chinese characters don't denote phonemes, they have a strong function of distinguishing homophones. For example 卓 (\dzuo\ tall and erect)and 桌 (\dzuo\ table) are the same word \dzuo\ in antiquity. Its designation changed with the scene and context. (S3.4.2.)

In Chinese, most words are compound words. They are composed of a few single-morpheme words (2000 single-morpheme words most in use and the compound words they compose constitute 98% of Chinese words*(8)*). The inner form of compound words makes them have sound symbolic meaning as well as single-morpheme words.

In the past few years, there has been an explosion of papers on origin of language in reputable journals, as well as several books(e.g.*(9)*). Based on the dual character of articulation intimation we can give an explanation of how words come to be in the very beginning in detail.

Many animals can communicate with movements of limbs. Before mankind had languages, walking upright and working with tools made the ancestor of man able to communicate with gestures and their intelligence developed to have primary association thinking. When both hands were needed to work (like hunting and cultivating), they naturally used the movements of lips and tongue to indicate concrete things, such as expressing "large" or "small" by opening the mouth widely or doing the opposite, expressing "round", "surround", etc.(decided by scene) by rounding lips, expressing "teeth" or "bite with teeth", etc., by touching teeth with the tip of the tongue and so on. In order to draw others' attention, they made some sounds at the same time while doing these movements for intimation. Thus primitive vowels and primitive consonants with some naturally formed vowels appeared. The appearance of primitive phonemes, especially primitive consonants, has very important meaning because only human languages have numerous consonants. It indicated that mankind made the first step of speaking. To express more things with articulation intimation, people found more phonemes in practical use and more primitive monosyllable words appeared. This was a rather long process and accelerated the evolution of man's intellect and flexibility of vocal organs, especially the tongue.

In this course, man gradually found a corresponding relation existing between the pronouncing movements and the sound they produced and that they could know what others' meant by listening to their sound and visualizing their pronouncing movements. Then more consonants came into being, which containing some invisible pronouncing movements. Man began to receive speech sound information by hearing instead of receiving intimation by seeing.

This made it possible to raise speech speed. And besides articulation intimation words, the appearance of synaesthesia words and onomatopoeic words (Different from “vocal imitation”, onomatopoeic words are combinations of phonemes in a word that imitates the sounds associated with the thing concerned. There is no doubt that onomatopoeic words appeared after phonemes) broadened the scope of the expression of primitive words.

Being passed on from generation to generation, primitive words gradually formed certain collective habit. New words can be explained by existing words but no more need to be defined what they indicate by means of articulation intimation, synaesthesia and onomatopoeia. So naturally non-association single-morpheme words began to appear and former motivation of primitive words was gradually forgotten.

With the development of the society, things needed to be expressed with languages increased rapidly. However, words which could be defined with sound symbolism were rather limited. So the appearance of non-association single-morpheme words made word-creating free from the fetters of sound symbolism. At the same time, to avoid the increasing of words from bringing about large numbers of homophones, people had to increase the average number of syllables. Chinese made it by composing compound words with monosyllabic single-morpheme words. And after writing characters appeared, monosyllabic homophones were distinguished by the ideographic writing. That made Chinese keep a lot of articulation intimation words and sound symbolic words of language beginning stage. Languages of Indo-European family increased the average number of syllables by adding prefixes, suffixes and other syllables used for distinguishing homophones. Therefore, the traces of language origin in Indo-European languages are few and hard to be perceived. And “the linguistic sign is arbitrary” “…the signal is unmotivated” *(10)* are correct.

References and notes

1.Supporting online material is available on the site: www.friendlywords.org/

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