

# Supporting Online Material

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## **S1 The association matching method**

As association is a kind of subjective thinking, we take men's subjective feeling as the standard when choosing the possible association starting points. For example, the movement of soft palate cannot be chosen as a starting point because it is seldom felt. And the possible starting points of consonant  $\text{r}$  is “curling tongue backwards”, because when we pronounce it, we subjectively feel the tongue curling backwards though the tongue does not actually move in that way. Besides, the differentiation of place of articulation (such as different parts of the tongue) is no so accurate as in phonetics. For example, the front of the tongue generally refers to all the front part of the tongue, including the tip. All the oral cavity organ or position that function in pronouncing and the movements and shape 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 word, as the language material from three representative and comparative natural languages of eastern and western countries. These three languages are Chinese, Latin and English. Chinese is spoken by the largest number of people. It has a long history and has very great influence on languages of the surrounding areas like North, South Korea, Vietnam and Japan. It has no relations with western language. Latin is one of the old languages which has the greatest influence on European languages. English is the most widely used language. Though belonging to Indo-European language family like Latin, English has a lot of inherent words different from Latin. And the language materials from English and Latin are complementary. The pronunciations of the above three natural languages are relatively close, so they are comparable. What's more, the fact that Chinese has little loanwords proves that there is little interaction between Chinese and the other two languages.

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 vowels and consonants (see S6.1, table S4), the association items and examples (associated things, selected from language material). Every association item has at least 5 examples (in S3, S6)

We know from the matching result that one phoneme corresponds to several starting points, each starting point corresponds to various association items and each association item has a lot of examples. Besides, different phonemes may correspond to the same starting point and have the same or similar association items.

The association items must be similar but some different conforming with association thinking, if manner of articulation is the same but places of articulation are different. For example, three groups of plosive have similar pronouncing movements of blocking air stream. But the

obstruction of bilabial \p\, \b\ is near the lips and the association item is “close” or “shelter” (see S3.5.7.). The obstruction of \t\, \d\ (articulated with the tip of the tongue touching the upper teeth-ridge) is in the oral cavity and the association item is “obstruct” (see S3.5.22). And the obstruction of \k\, \g\ (articulated with the back of the tongue touching the soft palate) is between the oral cavity and the throat and the association item is “separate” (see S3.5.14).

If manners of articulation are different, but pronouncing movements are partly the same, then the corresponding association items must be similar too. For example, non-plosive \n\ and plosive \t\, \d\ both have the movements of tongue tip touching upper gums, and they have the similar association items of “touch” or “combine” though they may have other different association items (compare S3.5.22. with S3.6.1-3).

The above two inspection shows we have succeeded in matching.

## **S2 Explanation of language material and pronunciation**

S2.1. Words used for studying association items are chosen from morpheme / single-morpheme word (as compared with compound word) of Chinese, Latin and English.

S2.2. This paper focuses on the pronunciation of words in dictionaries though pronunciation of words have changed in history.

S2.3. Word pronunciation in different languages is not always exactly the same. Therefore, to study the association items of pronunciation, we choose the same consonant and vowel phonemes in at least two languages as “identified phoneme” and show in International Phonetic Symbols with “\ ”. We regard the phonemes with the articulation place and manner nearly the same as the identified phoneme as the same phoneme, see table S1. The corresponding relation between the identified phonemes and initial consonant of a Chinese syllable is shown in table S2, and simple or compound vowel of Chinese syllable is shown in table S3.

S2.4. The study is based on the actual pronunciation of word though the same letter may have different pronunciation in different words in English.

S2.5. In language material, words with the same spelling but unrelated in meaning are labelled with 1, 2, 3, and the various senses of a word are labelled with 1., 2., 3. in order of appearance.

## **S3 Association items of the initial consonant**

S3.1. Associating the shape of vocal organs caused by articulation with the intimated images.

S3.1.1. **Rotate, circle, surround, curve** and other related or similar things (association starting point: “rounding”, consonant concerned: w)

e.g. Chinese: 洼(\wa\ concave), 瓦(\wa\ Chinese tile, semi-cylindrical in shape), 弯(\wan\ curl, curve), 湾(\wan\ bend of a river), 蜿(\wan\ serpentine, meander), 豌(\wan\ pea), 丸(\wan\ a small ball), 宛(\wan\ winding), 碗(\wan\ bowl, a deep round container), 腕(\wan\ wrist), 枉(\wan\ not straight, to bend), 辘(\wan\ rim of wheel), 隈(\we\ a river bend), 逦(\we\ winding, curved), 围(\we\ surround), 圩(\we\ surrounded with dykes), 委(\we\ roundabout), 纹(\wən\ veins, winding lines), 罅(\wən\ crack on earthenware), 瓮(\wəŋ\ an earthen jar), 涡(\wo\ whirlpool), 窝(\wo\ nest), 蜗(\wo\ snail), 握(\wo\ bend one's fingers into a fist); Latin: uber (breast), umbilicus (navel, log), uncus (crooked), unio (pearl); English: wall, wallow, waltz, wax, wheel, welter, whirl, whorl, wind, wrap, wreath, wrench, wrest, wring, wrist, writhe, wry.

W in wr was pronounced in ancient time.

The articulation movements of labial are clearly visible. The round shape of lips caused by articulation of \w\, the only rounded consonant, is quite obvious. Therefore, it is natural to associate it with “rotate”, “circle”, “surround”, “curve”. There are large numbers of examples in

the three languages.

S3.1.2. **Rotate, circle, surround, curve** and other related or similar things (association starting point: “labialization consonant”, consonant concerned: consonants followed by rounded vowels.

e.g. Chinese: 围(\duən\ surrounded with mat to store grain), 滚(\gun\ roll), 碾(\gun\ stone roller), 辘(\gun\ roller), 国(\guo\ in ancient times, its meaning is a capital surrounded by a high wall), 环(\huan\ ring,loop), 回(\hue\ surround, revolve, return -- turn to original place), 徊(\huai\ walk around), 还(\huan\ return -- turn to original place), 寰(\huan\ globe,earth), 缯(\huan\ noose), 环(\huan\ a annular thing), 鬟(\huan\ bun of hair), 围(\huan\ surround), 圉(\huən\ pen to raise pigs, there is a fence surrounding the pigs), 囿(\jou\ enclosure), 圜(\i<sup>w</sup>\ jail, the prisoners are surrounded with high walls), 框(\kuan\ a circle, circumscribe), 眶(\kuan\ eye socket), 困(\kuən\ keep somebody within a certain area, find oneself surrounded), 廓(\kuo\ 1. the circumference of the object, outline), 轮(\luən\ wheel), 涡(\luo\ whorl in a fingerprint), 螺(\luo\ spiral shell), 圃(\pu\ same as 园), 旋(\ji<sup>w</sup>en\ rotate), 漩(\ji<sup>w</sup>en\ whirlpool), 券(\ji<sup>w</sup>en\ arch), 穴(\ji<sup>w</sup>e\ cave, hole), 卷(\dji<sup>w</sup>en\ something rolled up or shaped like a roll), 球(\tjiu\ ball), 囚(\tjiu\ the prisoners are surrounded with high walls), 曲(\tji<sup>w</sup>\ curved), 屈(\tji<sup>w</sup>\ to bend), 圈(\tji<sup>w</sup>en\ circle), 拳(\tji<sup>w</sup>en\ fist), 蜷(\tji<sup>w</sup>en\ curl up), 髻(\tji<sup>w</sup>en\ curled hair), 圉(\tjuən\ a type of circular granary), 团(\tuan\ something circle-shaped or something ball-shaped), 转(\tuan\ to roll round with the hand), 月(\i<sup>w</sup>e\ moon), 圆(\i<sup>w</sup>en\ circle), 园(\i<sup>w</sup>en\ plot for growing vegetables, flowers, etc. , usually there is a fence surrounding it), 拥(\i<sup>w</sup>oŋ\ gather around), 钟(\dzon\ big bell, a round hollow metal object), 盅(\dzon\ small bowl, a small deep round container), 周(\dzou\ circumference), 轴(\dzou\ axle), 珠(\dzu\ pearl, bead), 转(\dzuan\ turn, rotate), 啭(\dzuan\ warble); Latin: monile (necklace, collar), mola (millstone), sol (sun), volvo (to roll); English: cobble, dome, foam, knob, pock, polo, hoop ( .ring, band), loop, whirl, whorl.

Some non-rounded consonants may be labialized because of anticipatory coarticulation. Therefore, they have the same intimation with rounded consonant. In Chinese, the words concerned with “rotate”, “circle”, “surround” or “curve” nearly all contain rounded or labialized consonants. It evinces that there truly exists this kind of articulation intimation.

S3.1.3. **Protrude** and other related or similar things (association starting point: “labialization”, consonant concerned: consonants followed by rounded vowels

e.g. Chinese: 嘟(\du\ thrust out the lips), 凸(\tu\ convex), 突(\tu\ bulge, protrude), 啜(\tsuo\ sip, sup), 撮(\dze\ purse one's lips), 噘(\dji<sup>w</sup>e\ pout), 呶(\nu\ bulge, protrude).

The shape of rounded lips has three characteristics: 1).to round the lips(seeS3.1.2.); 2). to bring the lips together in tiny folds(seeS3.5.1.); 3).to protrude the lips(seeS3.1.3.). In Chinese, the later two shapes also have their intimations. It proves that Chinese words are more extensive in sound symbolism.

S3.1.4. **Straight** and **even** and other related or similar things (association starting point: “spreading”, consonant concerned: p, b, m, f, v)

S3.1.4.1. **Flat, straight** and other related or similar things

e.g. Chinese: 板(\ban\ plank), 版(\ban\ [printing]a block or plate), 钣(\ban\ metal plate), 扁(\bien\ flat), 匾(\bien\ tablet), 饼(\bij\ round flat cake), 盘(\pan\ pan, disk), 盆(\pən\ basin), 片(\pien\ slice, flat piece), 平(\piŋ\ even), 铺(\pu\ 1.plank bed), 面(\mien\ plane); Latin: bractea (brattea)(gold leaf), pagina (page, leaf), planus (1.. level, flat, plain); English: board, mat, pan, panel, plain ( .area of level country), plane ( .flat or level surface), plank, plate, flat.

When pronouncing \p\, \b\, \m\, \f\, \v\, two lips are level to each other and are not protruded. It is to make man associate that with “level”, “straight”, “even”.

S3.1.4.2. **Make level or even, quell** and other related or similar things

e.g. Chinese: 刨(\bau\ to plane), 平(\piŋ\ make even), 铺(\pu\ 2.spread and make level); Latin: pavo (to even), paco (1.to pacify), pacatus (peaceful, tranquil), pax (peace); English: plane ( .make wood smooth by using a plane), peace.

Many verbs, nouns or adjectives can be converted into one another.

S3.1.5. **Tip** and other related or similar things

S3.1.5.1. Association starting point: “tip of tongue”, consonant concerned: t, d n l, r s, ts, dz

e.g. Chinese: 旦(\dan\ daybreak), 端(\duan\ extremity; beginning or end), 始(\s\ beginning, start), 矢(\s\ arrow, dart), 首(\sou\ head), 梢(\sau\ tip, the thin end of a twig), 艄(\sau\ the stern (of a boat)), 鞘(\sau\ the tip of a whip), 钉(\diŋ\ nail), 头(\tou\ head), 秃(\tu\ bald); Latin: digitus (digit), sagitta (arrow), speculum (dart), spica (an ear of wheat), spina (thorn, prickle), stilus/stylus (stake); English: nib, tack, tip ( .thin end of something), toe, tentacle, terminal.

The tip of the tongue plays an important role in articulating these consonants. It makes man associate the tip of the tongue with “tip”, “end”, etc. The movement of the tongue tip is visible.

S3.1.5.2. Association starting point: “front of tongue”, consonant concerned: j, ʃ, tʃ, dʒ

e.g. Chinese: 尖(\dʒien\ tiny end), 箭(\dʒien\ arrow), 极(\dʒi\ apex extremity), 扞(slender, pointed piece of bamboo), 钎(long steel stick in sharp end), 枪(ancient weapon with a sharp end).

The movement of the front of the tongue, though invisible, contains the movement of tongue tip. So, in Chinese, these consonants have the same intimation item as S3.1.5.1.

S3.1.6. **Open** and other related or similar things (association starting point: “mouth well open”, consonant concerned: k, g, h)

e.g. Chinese: 开(\kai\ open); Latin: hiatus(open mouth, hiatus), hio(to be open, gape, yawn), hiulus(gaping, open); English: gag, gape, grin.

When pronouncing \k\, \g\, \h\, the opening of the mouth is the largest and the most obvious.

S3.1.7. **Hole** and other related or similar things (association starting point: “mouth well open”, consonant concerned: k, g, h)

e.g. Chinese: 口(\kou\ mouth, entrance), 孔(\kor\ hole), 窟(\ku\ cave; hole), 框(\kuan\ a circle, circumscribe), 眶(\kuan\ eye socket); Latin: cavus (hollow, concave), cavum (cavity, hole), hiatus (open mouth, abyss); English: cave, hatch, hole, holt.

When pronouncing \k\, \g\, \h\, the opened mouth is like a hole and the lips are the edge of the hole.

S3.1.8. **Arch form** and other related or similar things (association starting point: “palate”)

S3.1.8.1 Consonant concerned: k, g, h

e.g. Chinese: 弓(\goŋ\ bow), 躬(\goŋ\ bent body), 拱(\goŋ\ arch), 钩(\gou\ hook), 锅(\guo\ wok, shaped like a galea), 窠(\kə\ nest), 盔(\kue\ helmet), 弧(\hu\ arc), 虹(\hoŋ\ rainbow); Latin: camara=camera(arched roof), campana (bell, shaped like a helmet), camur(crooked), cassis(helmet), convexus (vaulted), curvus (bent, curved), galea(helmet); English: cove, crookback, helmet, hump, hunch.

When pronouncing \k\, \g\, \h\, the mouth is widely opened to get others to see the hunched palate and the raised tongue back also points to the palate. The dictionary explanation of Latin

word “palatum” is: palate, mouth, arch, vault etc. It evinces that there is association between palate and vault.

S3.1.8.2 Consonant concerned: ʃ, tʃ, dʒ

e.g. Chinese: 桥(tʃiau\ stone arched bridge), 鞍(tʃiau\ arched part of a saddle), 穹(tʃion\ vault), 丘(tʃiou\ something shaped like a half-ball), 脊(dʒi\ ridge).

When pronouncing ʃ, tʃ, dʒ in Chinese, the front of the tongue points to the palate. This movement makes man associate the palate with arch form.

S3.1.9. **Rotate, circle, surround, curve** and other related or similar things (association starting point: “curl back tongue”, consonant concerned: r)

e.g.Chinese: 绕(\rau\ 1.wind(around), 2.go around), 日(\r\ sun), 揉(\rou\ 1.roll, 2.causesomething to bend), 燥(\rou\ bend a piece of wood on fire), 轱辘(\rou\ rim of wheel); Latin: rota (1.wheel;disk), roto (to turn, whirl, roll), rotundus (round, circular, spherical); English: reel, rim, ring ( .circular band, circle), rock ( .boulder), roll, rondo, rotate (1.move round a central point), round (1.shaped like a circle or a ball,a circular motion).

The movement of curling the tongue, though invisible, makes both the speaker and listeners have clear feeling of curling the tongue, thus associate it with “rotate”, “circle”, “surround”, “curve”. This is similar with the association of rounded consonants (see 3.1.1. 3.1.2.).

S3.1.10. **Right angle form** and other related or similar things (association starting point: “curl back tongue”, consonant concerned: r)

e.g.Latin: radius (stick; spur; ray; radius of a circle; spoke), radix (root); English: radial, ray, right (angle), rectangular, root.

The Latin word 'radius' has meanings: spur; radius of a circle; spoke. These meanings have something in common: spur is perpendicular (nearly) to the cock's leg, spoke is perpendicular to wheel axle and radius is perpendicular to cylinder axis. When we pronounce r, the tip of the tongue is 'perpendicular' to the blade. Therefore people may associate right angle form, spur, ray, radius, root, etc.with the movement of curling the tip of the tongue up. There is no such association item in Chinese.

S3.1.11. **Bulge or ball** and other related or similar things (association starting point: “mouth closed and air accumulated”, consonant concerned: p, b)

e.g. Chinese:胖(\paŋ\ obese), 苞(\bau\ flower bud), 胞(\bau\ afterbirth), 雹(\bau\ hail), 甑(\bu\ pot), 膀(\paŋ\ edema), 膀胱(\paŋguan\ bladder), 膨(\pəŋ\ inflate, swell), 泡(\pau\ bubble), 脬(\pau\ bladder), 疱(\pau\ pimple),便(\pien\ bulging, potbellied), 瓶(\piŋ\ bottle); Latin: bucca (1.cheek), bulbus (bulb), bulla (bubble), papula (pimple), pila (ball), pilula (pill, small ball); English: ball, bead, belly, bloat, bladder, bolus, bruise, bubble, bulb, bulge, bulk, bulla, pimple, paunch, pea, pearl, pebble, pellet, pill, polo, plump ( .make or become rounded), pock, podge, pudge, pot, potbelly, pox.

The movements of closing mouth and accumulating the air makes the cheeks bulged like bulges.

S3.2. Associating articulator or the articulation place of consonant with the intimated organ and their function.

S3.2.1. **Mouth** and other related or similar things (association starting point: “lips”, consonant concerned: p, b, m, w)

e.g. Chinese: 哺(\bu\ chew before swallowing), 抿(\min\ touch the glass with one's lips and drink a little), 吻(\wən\ 1. lips, 2 kiss), 喂(\we\ send food into the mouth of a person); Latin:

basio (to kiss), bucca (2.mouth), palatum (palate; taste), porta (entrance, outlet), portus (port), manduco (chew, eat), mordeo (to bite, to bite into), morsiuncula (little kiss), pappo (to eat, to drink); English: pout, bill, beak, mouth, mug, munch, muzzle, bite, meal, meat, peck.

It is quite common to intimate “kiss” and “eat” with the movements of lips. This shows articulation intimation is based on daily life.

S3.2.2. **Tongue** and its function and other related or similar things (association starting point: “tip of tongue” / “front of tongue”)

S3.2.2.1. **Tongue** and other related or similar things (consonant concerned: t, d, n, l, s, ts, dz)

e.g. Chinese: 舌(\sə\ tongue), 苔(\te\ fur, tongue-coating); Latin: lingua (1. tongue), ligula (tongue of land); English: tongue, lisp (speak unclearly (protrusile tongue) pronouncing s-sounds as / ʃ/).

The tip of the tongue is the most nimble and conspicuous part of the tongue. Therefore, the movement of tongue may also be associated with the tongue.

S3.2.2.2 **Speak** and other related or similar things (consonant concerned: t, d, n, l, s, ts, dz j, ʃ, tʃ, dʒ)

e.g. Chinese: 唱(\tsaŋ\ sing), 吵(\tsau\ quarre), 称(\tsəŋ\ say, call), 叱(\ts\ rebuke loudly), 答(\da\ answer), 叨唠(\daulau\ grumble), 嘀(\di\ whisper), 嘟囔(\dunun\ mutter), 读(\du\ read), 诏(\dzau\ instruct), 念(\nien\ read aloud), 呐(\na\ shout), 喃(\nan\ murmur), 囁(\naŋ\ speak in a low voice), 呶(\nau\ talk noisily), 啾(\noŋ\ murmur), 诺(\nuo\ promise), 唠(\lau\ talk), 骂(\li\ scold), 聊(\liau\ chat), 述(\su\ narrate), 说(\suo\ speak, say), 诵(\soŋ\ recite), 诉(\su\ tell), 谈(\tan\ talk), 叹(\tan\ sigh), 叮(\diŋ\ admonish) 哑(\ja\ dumb), 言(\jen\ speech), 谣(\jau\ ballad, rumour), 音(\jin\ sound, syllable, read), 噤(\jin\ dumb, do not talk), 咏(\joŋ\ chant), 语(\i<sup>w</sup>\ language), 吁(\i<sup>w</sup>\ appeal), 讲(\dʒiaŋ\ speak), 叫(\dʒiau\ call), 哮(\ʃiau\ roar), 嚣(\ʃiau\ clamor), 宣(\ʃi<sup>w</sup>en\ proclaim), 喧(\ʃi<sup>w</sup>en\ uproarious talk), 叙(\ʃi<sup>w</sup>\ talk), 笑(\ʃau\ smile); Latin: dico (say, tell), dicto (dictate), lingua (2.language), locutus (speech), logos (word; idle talk), loquor (speak), sermo (conversation, talk), sono (utter) jactito (mention); English: din, dumb, lore, nag, narrate, read, say, speak, sing, talk, tattle, teach, tell, row ( .scold; reprimand; argument).

From the above examples, it is clear that, in a word which mean “speak” or “song”, most articulation places of the initial consonants are the tip of tongue, some of that are the front of the tongue and the least of that are the back of tongue (see S3.2.4.3.). That conforms to the rate of utilization of the articulators during speaking or singing. And, in a word which mean “howl”, pharynx is the articulation place of all the initial consonants (see S3.2.4.4.). That is conforms to the fact that pharynx is the main articulator during howl. All these evince that there is relevance between articulation place of the initial consonants and words meanings.

S3.2.2.3. **Lick to taste, flavor** and other related or similar things (consonant concerned: t, d, n, l, s, ts, dz j, ʃ, tʃ, dʒ)

e.g. Chinese: 尝(\tsaŋ\ taste), 食(\s\ eat), 舐(\s\ lick), 舔(\tien\ lick), 甜(\tien\ sweet), 酸(\suan\ sour), 辣(\la\ hot), 茹(\ru\ eat,taste), 啣(\suo\ suck) 盐(\jen\ salt), 咸(\ʃien\ salty), 辛(\ʃin\ pungent), 鲜(\ʃien\ 1. tasty flavor, monosodium glutamate flavor); Latin: delambo (lick), delingo (to have a lick of), dulcis (sweet), lacteo (suck), lambo (lick), lingo (lick), linctus (lick), sal (1.salt), sapio (to have a flavour or taste), tango (1.to taste); English: lap (drink by taking up with the tongue,as a cat does), lick, savo(u)r, season (flavour), salt, sour, sweet, taste, treacle.

The tongue is often used to taste food. In most words concerned with “taste” of all the three

languages, the initial consonants are articulated with the tip or front of the tongue. It evinces that there is relevance between articulation place of the initial consonants and words meanings. Especially, in Chinese, the articulation place of initial consonants in words concerned with “taste” conforms to the tongue's sensitive part of taste. The articulation place of the consonant in 甜(\tiē\ sweet) is tongue tip, which is sensitive to sweet taste. The articulation place of the consonant in 苦(\kǔ\ 1.bitter, 见 S3.2.4.2.) is the back of the tongue, which is sensitive to bitter taste. The articulation place of the consonant in 咸(\xián\ salty) and 鲜(\xiān\ 1. tasty flavor, monosodium glutamate flavor) is the front of the tongue, which is sensitive to salty taste and monosodium glutamate flavor.

S3.2.3. **Tooth** and other related or similar things (association starting point: “tip of tongue to upper teeth-ridge”, consonant concerned: t, d, n, l, or association starting point: “revealing closed teeth” and “tip of tongue to upper teeth-ridge”, consonant concerned: s, ts, dz)

e.g. Chinese: 啮(\niè\ gnaw), 噬(\shì\ gnaw), 齿(\chǐ\ tooth), 吃(\chī\ eat), 餐(\cān\ meal), 啜(\chuò\ eat, drink); Latin: dens (tooth), cibor (eat), cenare (to dine), coenare (to dine); English: gnash, gnaw, tooth.

Besides the above, other Chinese words which means “tooth”, “bite” etc. see S3.5.25.

S3.2.4. **Throat** and other related or similar things (association starting point: “inner” / “glottis”, consonant concerned: k, g, h)

S3.2.4.1. **Throat** and other related or similar things

e.g. Chinese: 哽(\gěng\ choke due to food blockage), 鲠(\gěng\ get stuck in one's throat), 咯(\kǎ\ cough something up from the throat or trachea), 咳(\kē\ cough up), 吭(\hāng\ throat), 喉(\hóu\ larynx), 喝(\hè\ 1.drink); Latin: glottis (throat), gula (1.gullet), guttur (1.throat), haurire (drink, swallow), halo (exhale); English: gulp, cough.

S3.2.4.2. **Taste** and other related or similar things

e.g. Chinese: 甘(\gān\ sweet; pleasant, as opposed to “bitter”), 苦(\kǔ\ 1.bitter), 感(\gǎn\ sense, e.g. sense of taste), Latin: gusto (taste), gustare (tasting); English: hot (producing a burning(hot) sensation on the tongue).

The back of the tongue is also sensitive to taste, especially bitter and hot taste.

S3.2.4.3. **Sing** and other related or similar things

e.g. Chinese: 告(\gào\ tell), 歌(\gē\ song, sing), 话(\huà\ speeches), 呵(\hē\ 1.scold in a loud voice); Latin: canere (sing), canto (sing; sound), Carmen (song); English: call, cry, croon, hawk.

In Chinese or Latin, majority of words related with “sing” begin with velar (\k, \g, \h), because velar or pharyngeal is easy to be associated with pharynx or larynx and singing is closely related to pharynx and larynx.

S3.2.4.4. **Shout, howl** and other related or similar things

e.g. Chinese: 喊(\hǎn\ shout), 号(\hào\ shout), 嚎(\háo\ howl), 喝(\hè\ 2. yell loudly), 哼(\hēng\ hum; croon), 呵(\hē\ 2.breathe out with the mouth open), 吼(\hǒu\ roar), 呼(\hū\ 1 . shout, 2.exhale), 唤(\huàn\ call out); English: hail, hoot, howl, hoop ( .utter the cry hoop), hurl, hurrah, whoop[hu:p].

Pharynx is the main articulator needed when howling and the corresponding consonant is \h.

S3.2.4.5. **Pipe** and other related or similar things

e.g. Chinese: 管(\guǎn\ .pipe); Latin: gula (2.esophagus, gullet), guttur (2.trachea), canalis (pipe, conduit, canal); English: canal, gully, gut, kennel.

This is the association by contiguity from S3.2.4.1 throat.

S3.2.5. **Face** and other related or similar things (association starting point: “lips” or “lower lip”, “front” consonant concerned: p, b, m, w, f, v)

e.g. Chinese : 表(\biau\ surface; outside) , 面(\mien\ 1.face, front part of head; 2.surface) , 貌(\mau\ looks, facial features), 毛(\mau\ hair, feather), 膜(\mo\ membrane), 皮(\pi\ skin, fur, peel), 肤(\fu\ 1.skin, superficial); Latin : pellis (skin, hide, leather), pilus (hair), bucca (1.cheek), barba (beard), membrana (skin, membrane), facies (1.face, looks, 2.appearance, 3.form,shape), frons (1.fore- head, brow; 2.front, facade; 3.look, appearance, exterior) ; English: peel, pelt ( . animal's skin with the fur or hair on it), beard, mane, membrane, face, feature (1.one of the named parts of the face, 2.the face as a whole), visage, vamp, veneer.

Lips are in the front of the mouth and near the cheeks and beard. It may be associated with face, skin or hair by contiguity.

S3.2.6.**Nose** and other related or similar things (association starting point: “nose passage”, consonant concerned: n, m)

e.g. Chinese: 鼾(\naŋ\ snuffle), 衄(\ni<sup>w</sup>\ nosebleed); Latin: naris (nose; nostril), nasalis (nasal), nasus (nose), nasica (long-nosed), nasutus (big-nosed); English: nasal, nose, nostril, nuzzle.

It is quite natural to associate the nose with the movement of breathing out through nose. Besides, \n\ in initial consonants, like in sniff, can also cause the same association item (see S4.4.).

S3.3. Associating the place of articulation of consonants with positions

S3.3.1. **Edge** and other related or similar things (association starting point: “lips” or “lower lip”, consonant concerned: p, b, m, w, f, v)

e.g. Chinese:边(\bien\ edge, side, border, boundary); Latin: margo (edge, border, boundary), finis (boundary, border; bound, limit; end); English: bank ( .land along each side of a river or canal), brink, border, bound, boundary, march (frontier areas), mete, fringe.

Lips are the edges of the mouth and lip, in English, means either edge of the mouth or the edge of a hollow vessel or opening. It evinces that there is association between lips and edge.

S3.3.2. **Front, outside** and other related or similar things (association starting point: “front” (location of closure in oral cavity), consonant concerned: p, b, m, w, f, v)

e.g. Chinese: 外(\we\ out, outside); Latin: prae (1.in front, before), prae-(in front, before), pro (in front of,on the front of), broccus (protrude), foras (out, outside), foris (out of doors, outside; from outside), frons (4.front, facade); English: pre-, prior, fore, front, future, van.

S3.3.3. **Front** and other related or similar things (association starting point: “front of tongue”, consonant concerned: j, ʃ, tʃ, dʒ)

e.g. Chinese: 幺(\jau\ one; the youngest), 一(\ji\ one), 先(\ʃien\ earlier (as opposed to “later”)), 序(\ʃi<sup>w</sup>\ prelude; initial), 绪(\ʃi<sup>w</sup>\ the beginning), 前(tʃien\ front, forward).

S3.3.4.**Hind** and other related or similar things (association starting point: “back of tongue”, consonant concerned: k, g, h)

e.g. Chinese: 根(\gən\ root), 跟(\gən\ heel, back part of the human foot), 后(\hou\ behind; back; rear, as opposed to “front”); Latin: calx (heel); English: heel, hind.

The initial consonants of Chinese words “前”(see S3.3.3.) and “后”(see S3.3.4.)are corresponding to the front and back of the tongue. “根”(see S3.3.4.)is associated with the root of the tongue.



S3.3.5. **Inner, from inner** and other related or similar things (association starting point: “inner” (location of closure in oral cavity), consonant concerned: k, g, h)

e.g. Chinese: 含(\han\ hold something in the mouth; have or hold within itself), 函(\han\ 1.contain), 涵(\han\ contain), 怀(\huai\ 1.contain; harbor; conceal), 骨骼(\gugè\ skeleton, usually refers to endoskeleton), 好(\hau\good, praise from one's heart), 恨(\hèn\ hate), 怀(\huai\ 2.mind, keep in mind), 坏(\huai\as opposed to 'good'), 骸(\hè\ bones of a body), 核(\hè\ core; pit, stone-like seed of fruits, kern); Latin: contineo (hold together; confine; enclose; contain, include); English: core, kern, kernel, heart, happy, hate.

The place of articulation is in the depth of the mouth.

S3.3.6. **Height** and other related or similar things (association starting point: “palate”, consonant concerned: k, g, h)

e.g. Chinese: 高(\gāu\ high), 岗(\gāng\ mound, hillock), 冈(\gāng\ mountain ridge); Latin: cacumen (height, extremity, treetop), caput (head; top; mouth), collis (hill), columen (height, summit); English: high, height, heaven, head.

From the same starting point, palate is associated with arch form from the angle of shape (see S3.1.8.) and also associated with height from the angle of position.

S3.4. Associating positions or objects with the directions that the tip of the tongue points to when pronouncing consonants

The tip of tongue is often used to point to some indisposed part in the mouth. It shows that the tip of tongue can point to something as the index finger.

S3.4.1. **Rearward, reverse** and other related or similar things (association starting point: “curl back tongue”, consonant concerned: r)

e.g.Chinese: 而(\r\ conj., used to connect two elements opposite in meaning that show a contrast), 入(\ru\ come into, as opposed to “go out”); Latin: rursus (back, backward; in return; again), re-, revoco (call back), recello (spring back), recedo (move back), reboo (mack resound); English: rear ( .back part), re-, recall, regress, reject,

The movement of “curling back tongue” has obvious intimation of pointing backwards.

S3.4.2. **Height** and other related or similar things (association starting point: “lifting tip of tongue”, consonant concerned: t, d, n, l, r, s, ts, dz)

e.g. Chinese: 顶(\dǐng\ 1. topmost part), 颠(\diān\ top), 巅(\diān\ mountain top, peak), 上(\shàng\ upper, upper part), 山(\shān\ mountain), 耸(\sǒng\ towering), 天(\tiān\ heaven), 台(\tái\ a flat raised surface), 塔(\tǎ\ tower), 坛(\tán\ high terrace), 亭(\tíng\ pavilion), 凸(\tū\ raised), 崇(\chóng\ high; lofty), 翚(\huī\ soar), 矗(\chù\ 1.stand high), 卓(\zhuó\ tall and erect), 桌(\zhuó\ table); Latin: scando (climb, mount), scopulus (crag), supra (up on top, above), turris (tower, turret), celsus (high, lofty); English: desk, dome, dune, knoll, ,lofty, loft, lofty, roof, salient, soar, table, tableland, tall, top, tower.

When pronouncing these consonants, the first movement is to raise the tip of tongue and pointing to the top of oral cavity.

S3.4.3. **Pointing to some body/thing** and other related or similar things (association starting point: “lifting tip of tongue” / “lifting front of tongue”, consonant concerned: t, d, n, l, r, s, t s, dz j, ʃ, tʃ, dʒ)

e.g. Chinese: 点(\diǎn\ 1.point at; point to), 你(\nǐ\ you), 您(\nín\ you), 乃(\nǎi\ you, your), 侬(\nóng\ I, me), 那(\nà\ that those), 哪(\nǎ\ where; what; which; who), 尔(\ěr\ you; thou; that; this, those; these), 汝(\rǔ\ you), 斯(\s\ this; these; such, here), 厮(\s\ guy), 他(\tā\ he; him), 她

(ta\ she; her), 它(ta\ it), 咱(dzan\ we; us), 自(dz\ self; oneself; one's own) 伊(ji\ she;he), 己(dzi\ oneself), 今(dzin\ of today; of this year), 其(tfi\ that; that one's); Latin: nos (we, us; I, me), noster (our, ours; for us; my); English: the[ðə] \də, they[ðei] \de, this[ðis] \dis, self.

S3.5. Associating similar things with the shape of the vocal organs caused by articulation (metaphor)

S3.5.1. **Gather together** and other related or similar things (association starting point: “labialization”, consonant concerned: consonants followed by rounded vowels)

e.g. Chinese: 撮(tsuo\ gather), 簇(tsu\ cluster; form a cluster), 蹙(tsuo\ knit one's brows; frown), 吹(tsue\ blow with the mouth), 堆(tue\ heap up), 会(hue\ gather congregate), 汇(hue\ converge), 聚(dzi<sup>w</sup>\ gather; congregate; get together), 拢(lon\ bring together), 搂(lou\ gather up; rake together), 群(tfi<sup>w</sup>\ composed of people, things, etc.), 麇(tfi<sup>w</sup>\ flock together), 缩(suo\ shrink), 撮(dzuo\ draw liquid into the mouth by the use of the lip muscles (purse one's lips).

The shape of rounded lips has three characteristics (see S3.1.3.) and in Chinese, “To bring the lips together in tiny folds”, often intimates “to bring things together”.

S3.5.2. **Circulate, repeat** and other related or similar things (association starting point: “curl back tongue”, consonant concerned: r)

e.g. Chinese: 揉(rə\ rub repeatedly); Latin: rota (2.circulate), re-, reficio (repair; refresh), recolo (resume; revisit), ruga (wrinkle, crease); English: rally, ring ( . give out a clear, musical sound as when metal vibrates), rotate (2.take turns or come in succession), round (2.with a return to the starting-point), rock ( . sway or swing), re-, react, refresh, reset, ripple, ruck, ruffle, rumple.

The items “circulate”, “repeat” is the indirect association of “round”.

S3.5.3. **soft** and other related or similar things (association starting point: “curl back tongue”, consonant concerned: r)

e.g. Chinese: 壤(ran\ mold, loose and fertile soil), 荏(rən\ weak; weak- kneed), 韧(rən\ as opposed to “fragile”, pliable but strong), 绒(ron\ down, such as soft feathers, soft hair), 融(ron\ melt, soften, be softened), 柔(rou\ supple; gentle), 鞣(rou\ tan, to soften hide), 肉(rou\ soft tissue of a human or animal body below the skin), 软(ruan\ soft), 弱(ruo\ weak).

The tongue can be curled backwards. It shows that the tongue is quite soft. In Chinese, retroflex is often used to intimate something soft or state of soft.

S3.5.4. **Paired** or **juxtaposed** and other related or similar things (association starting point: “lips”, consonant concerned: p, b, m, w)

e.g. Chinese: 比(bi\ next to; juxtaposed), 并(bin\ two kinds of things place side by side), 半(ban\ one dividing into two), 百(bi\ two hundred), 配(pe\ make a couple), 捧(pəŋ\ hold in both hands), 媲(pi\ juxtaposed; be a match for), 匹(pi\ be a match for), 劈(pi\ split something into two parts), 骈(piən\ a pair of horses; to stand or lie side by side), 姘(pin\ a man and a woman who have an illicit relationship); Latin: par (a match for; pair), paro (equal), bis (twice, double), bini (a pair), bimus (two years old, for two years), bi-, bes (two-thirds); English: bicyclic, binary, both, pair, parents, pun (a word or a phrase that has two meanings), match, mate, wed.

When pronouncing bilabial, the shape of juxtaposed lips is used to intimate “double” or “side by side”.

S3.5.5. **Size** or **degree** and other related or similar things (association starting point: “the degree of mouth aperture”, consonant concerned: p, b, m, w)

e.g. Chinese: 满(\man\ hold as much as possible), 忙(\mar\ having a lot of work to do), 渺(\miau\ tiny), 藐(\miau\ small; petty), 密(mi\ 1.of space between two things small), 蔑(\mie\ little; light), 汪(\war\ deep and vast), 微(\we\ tiny; little; minute), 激(\we\ a light rain); Latin: minus (minor; less), minimus (very small), magis (more, all the more), magnus (1.great, large, big), macrocollum (large size of paper), major (older, elder), multus (much, many), medius (middle; intermediate; middling) , medietas (mean); English: midget, many, mass, massy, maximal, mighty, mean ( . average; in the middle position), mid, mild (1.not severe; slight), minor, much, wee, wide.

When labials and various vowels constitute syllables, the aperture of the lips varies with the vowels (wide, middle, narrow). It can be clearly felt by the speaker himself and easily understood by others because it is visible.

S3.5.6. **Show and mimik** and other related or similar things (association starting point: “lips” or “lower lip”, consonant concerned: p, b, m, f, v, w)

e.g. Chinese: 标(\biau\ mark, mark or label something), 描(\miau\ trace; copy mechanically), 摹(\mo\ trace; copy depict), 模(\mo\ 1.imitate; pattern), 明(\min\ show; reveal; make known; obvious), 法(\fa\ method; way; mode; model; something imitable), 范(\fan\ mould; pattern ;model to be followed; good example), 仿(\far\ imitate; copy), 方(\far\ method; way); Latin: modus (way, method; size; like), moneo (remind; instruct, foretell), monstro (point out, show; inform; appoint), planus (2.clear), figura (shape, form; nature, kind), forma (form, shape, appearance), via (1.way ,method, fashion); English: pattern, pose , pout, plain ( .easy to see) , manner, mean ( .to represent or express), mien, mime, mimic, mock, modal, mode, model, mo(u)ld ( .give a shape or form to) , wise ( .a way; manner), form.

The movement of labials is the most obvious among all the consonants. So adults always teach babies to speak by showing them how to pronounce labial and the words babies learn first by imitating are those started with labials like 'mammy' and 'papa'.

S3.5.7.**Close or shelter** and other related or similar things (association starting point: “mouth closed”, consonant concerned: p, b, m, w, f, v)

e.g. Chinese: 包(\bau\ wrap, envelop, bag, sack), 庇(\bi\ shelter; cover), 蔽(\bi\ cover, shelter, hide), 闭(\bi\ shut; close), 埋(\me\ cover up; bury; hide), 瞒(\man\ hide), 昧(\me\ 1.hide), 门(\mən\ door, a movable flat, that opens and closes the entrance to a building), 闷(\mən\ tightly closed), 焖(\mən\ boil in a covered pot), 蒙(\mən\ cover), 秘(mi\ something keep hidden), 密(mi\ 2.close; keep hidden), 幕(mi\ cloth cover; cover), 丐(\mien\ sheltered; covered; out of sight), 幔(\man\ curtain), 幔(\man\ pull the wool over somebody's eyes), 瞑(\min\ close one's eyes), 没(\mo\ to go under the surface of water), 幕(mu\ canopy), 墓(mu\ grave, where a dead person is buried), 篷(pəŋ\ awning, a movable soft covering), 棚(pəŋ\ a covering, usu. made from bamboo), 披(pə\ drape over one's shoulders), 屏(pin\ screen, which is used as a small movable wall for protecting people from view,from cold air, etc.), 幌(pin\ covering), 幌(pin\ same as屏), 罔(war\ deceive), 帷(we\ same as帷), 帷(we\ a kind of shelter or cover), 幄(wo\ tent, a movable shelter), 捂(wu\ cover up), 扉(fe\ door), 坟(fən\ same as墓), 封(fəŋ\ seal (up); close), 袱(fu\ covering cloth; cloth-wrapper), 伏(fu\ 1.lean on; bend over; 2.hide; lurk), 覆(fu\ cover; envelop; coat); Latin: bero (bag), bulga (wallet), mantica (knapsack), obruo (cover over, bury), bustum (grave), mergo (immerse; bury), merso (immerse), mentior (deceive; feign), pallium (coverlet; cloak), pera (bag), porta (gate;entrance,outlet), uter (bag), fallo (deceive), velum (1.awning; curtain), vestis (coverlet, tapestry, blanket; clothes);

English: bag, bin, box, pack, package, pocket, pouch, mantle, mask, muffle, mulch, veil, visor.

When closing and holding the air stream to pronounce labials, the mouth is closed or nearly closed. So it is naturally associated with “close”, “shelter” or “bag”, etc.

S3.5.8. **Close relation** and other related or similar things (association starting point: “mouth closed”, consonant concerned: p, b, m w f, v)

S3.5.8.1. **Hold together** and other related or similar things

e.g. Chinese: 并(\biŋ\ combine; merge), 巴(\ba\ stick to; cling to), 毗(\pi\ adjoin; be adjacent to), 摸(\mo\ feel;stroke;touch), 摩(\mo\ touch; stroke) 维(\we\ hold together), 晤(\wu\meet) 附(\fu\ 1.add; append, 2.depend on, 3.approach; near; be close by), 抚(\fu\ stroke; press lightly; console; comfort), 缚(\fu\ tie up;bind up), 扶(\fu\ support something with the hand; lend a hand); Latin: basio (kiss), palpo (stroke; flatter), mulceo (stroke, caress; soothe) vincio (bind; fetter), finitimus (neighbouring; adjoining), vicinus (neighbouring; nearby); English: marry, meet, merge wed, weld, with feel (to get knowledge of by touching with the fingers), fetter.

When closing and holding the air stream to pronounce labials, the lips touch (p, b, m) or nearly touch (w) each other. That is also associated with “touch”.

S3.5.8.2. **Intimate** and other related or similar things

e.g. Chinese: 爸(\ba\ pa), 妈(\ma\ ma), 母(\mu\ mother), 朋(\pəŋ\ pal; buddy; chum), 密(\mi\ 3.intimate; close), 伴(\ban\ 1.companion; partner, 2.accompany), 陪(\pe\ accompany) 偎(\we\ cuddle; snuggle up to) 父(\fu\ father); Latin: pater (father), mater (mother), maritus (nuptial), benignus (friendly; favourable); English: baby, buddy, mummy, magnet (a person that tends to attract people), pal, pet friend.

This is the indirect association of S3.5.8.1.on relationships.

S3.5.9. **Unoccupied** and other related or similar things (association starting point: “mouth well open”, consonant concerned: k, g, h)

e.g. Chinese: 宽(\kan\ wide; beoad; roomy), 旷(\kuaŋ\ empty and vast), 空(\koŋ\ unoccupied; empty), 阔(\kuo\ wide; beoad; vast), 扩(\kuo\ expand; enlarge; extend), 廓(\kuo\ 2.wide; extensive; boundless; expand; enlarge; spread), 广(\guaŋ\ wide; vast; extensive; expand; spread), 光(\guaŋ\ 1.nothing left; all gone; 2.light, that making sight possible); Latin: capax (spacious; roomy), capacitas (1.spaciousness; 2.capacity), cassus (empty; devoid of), careo (be without), calvus (bald); English: hollow.

When pronouncing these consonants, the mouth is widely open and the front of tongue is low and flat. Thus the oral cavity seems to be spacious and unoccupied.

S3.5.10. **Container** and other related or similar things (association starting point: “mouth well open”, consonant concerned: k, g, h)

e.g. Chinese: 缸(\gaŋ\ vat; jar; crock), 罐(\gvan\ jar; pot; tin), 壳(\kə\ shell; case), 库(\ku\ warehouse; storehouse), 筐(\kuaŋ\ basket), 函(\han\ 2.case; casket, 3.envelope), 盒(\hə\ box; case), 壶(\hu\ kettle); Latin: calyx (wine cup; cooking pot), calyx (shell, seashell), capsula (box), gabata (bowl; tray), hama (water bucket), hirnea (jug); English: keg, kettle, can, case (box; container; covering), casket, hutch.

When pronouncing these consonants, the mouth is widely open and the front of tongue is low and flat. Thus the oral cavity looks like an empty container.

S3.5.11. **Cover** and other related or similar things (association starting point: “palate”, consonant concerned: k, g, h)

e.g. Chinese: 盖(\ge\ cover of a utensil; canopy; put a cover on; cover), 冠(\gvan\ hat;

crown), 扣(\kou\ cover with an inverted cup, bowl), 克(\kè\ overwhelm; overcome); Latin: corona (garland, crown); English: cap, cape, clothing, coat, cope (long loose garment), cowl, crown, cover, hat, whelm[hwelm].

This is the indirect association of “arch form” and “height”(see S3.1.8.and S3.3.6.).

S3.5.12. **Be set together** and other related or similar things (association starting point: “3.5.10. container” and “3.5.11. cover”, consonant concerned: k, g, h)

e.g. Chinese: 和(\hè\ 1.together with; and; sum, 2.work together with one accord; harmonious), 合(\hé\ 1.close; shut, 2.join; combine; 3.whole), 阖(\hè\ 1.close; shut , 2.entire; whole), 囫(\hú\ whole), 汇(\huè\ converge; join), 会(\huì\ 1.gather; congregate; join together; 2.meet; meeting), 概(\gài\ to sum up; summary), 公(\gōng\ 1.public; collective, 2.common), 共(\gòng\ 1.altogether; together, 2.common), 括(\kuò\ include; sum up; summarize); Latin: cum (with), co- ,com- ,con- ,col- , cogo (gather together; collect) ,harmonicus (harmonious); English: co- , com- , con- , col- , whole.

This is the indirect association of “mouth well open” and “palate” to intimate that things are set or covered together.

S3.5.13. **Hold together** and other related or similar things (association starting point: “contact of articulators (back of tongue to palate)”, consonant concerned: k, g)

S3.5.13.1. **Close, catch** and other related or similar things

e.g. Chinese: 轧(\gǎ\ 1.clip), 关(\guān\ 1.close); Latin: capio (catch; capture; occupy), captus (grasp), catena (fetter; bond); English: capture, catch, clamp, claw, clench, clip, close[kləʊs], close[kləʊz], clutch, grab, grasp, grip, gripe.

The back of tongue touch the soft palate to intimate “close”, “catch”, etc.

S3.5.13.2. **Connect** and other related or similar things

e.g. Chinese: 轧(\gǎ\ 2. associate with), 干(\gān\ be implicated), 媾(\gòu\ mate; copulate), 遭(\zāo\ encounter), 关(\guān\ 3.be connected; juncture), 勾(\gōu\ 2.collude with; gang up with;), 沟(\gōu\ channel; trench, communication trench; gully); Latin: copulo (couple, join; associate); English: connect, copulate, couple, gang (gangway).

Raise the back of the tongue to point out that the oral cavity and pharynx are joined here.

S3.5.14. **Separate** and **control** and other related or similar things (association starting point: “lifting and dropping back of tange”, consonant concerned: k, g, h)

S3.5.14.1. **Separate** and other related or similar things

e.g. Chinese: 隔(\gé\ separate), 榻(\gá\ partition in a room), 膈(\gè\ membranous wall separating two cavities), 割(\gē\ cut apart; sever), 关(\guān\ 2. barrier), 阕(\huè\ cut off from).

The raised tongue back is like a wall and it separates the vocal tract into two parts (oral cavity and pharynx).

S3.5.14.2. **Control** and other related or similar things

e.g. Chinese: 控(\kòng\ control), 改(\gǎi\ chang), 更(\gēng\ alter 改换), 管(\guǎn\ .control 节制), 化(\huà\ change; turn), 幻(\huàn\ changeable), 换(\huàn\ change).

The raised tongue back is like a movable wall and the separation may be controlled.

S3.5.15. **Dribs** and other related or similar things (association starting point: “tip of tongue” / “front of tongue”, consonant concerned: t, d, n, l, s, ts, dz j, ʃ, tʃ, dʒ)

e.g. Chinese: 点(\diǎn\ 2.drop; dot; a little), 丁(\dīng\ small cubes; a little bit), 滴(\dī\ 1.drop, very small quantity), 少(\shǎo\ few; little; less), 稍(\shāo\ a little; a bit), 砂(\shā\ same as 沙), 沙(\shā\ sand; sand-like substance), 糝(\sǎn\ crushed grain), 尘(\chén\ dust; particles); Latin:

sabulo (sand), stilla (a drop), cinis (ashes); English: dot, dribs, drop, sand, tad jot.

When people make gestures, they indicate “a little”, “a few” by holding up the tip of little finger. Similarly, when people speak, they may use the tongue tip instead of the tip of little finger.

S3.5.16. **Erect** and other related or similar things (association starting point: “lifting tip of tongue”, consonant concerned: t, d, n, l, r, s, ts, dz)

e.g. Chinese: 陡(\dou\ steep), 立(\li\ stand; erect; upright), 竖(\su\ upright; vertical), 树(\su\ tree; plant; set up), 矗(\tsu\ 2.stand upright), 站(\dzan\ stand), 植(\dz\ set up), 直(\dz\ 1.vertical, 2.straighten), 峙(\dz\ stand erect; stand towering), 伫(\dzu\ stand for a long while); Latin: sto (stand; stand firm), status (standing); English: ramp (standing on the back legs), rear ( .1.rise upright on the back legs), stake, stand, steep.

In initial consonant cluster “st”, s and t are both associated with “erect”. The combination emphasizes the intimation of “erect”.

S3.5.17. **Sole** and other related or similar things (association starting point: “lifting tip of tongue”, consonant concerned: t, d, n, l, r, s, ts, dz)

e.g. Chinese 单(\dan\ single; alone), 独(\du\ single; alone; only), 仃(\dir\ lonely; solitary), 索(\suo\ 1.all alone;all by oneself); Latin:secubo (sleep by oneself; live alone), singuli (one each, single, one), solus (only, alone; lonely, forsaken); English: lone, single, sole, solo, solitary.

This is similar with intimating “single” by holding up one finger.

S3.5.18. **Lift** and other related or similar things

S3.5.18.1 Association starting point: “lifting tip of tongue”, consonant concerned: t, d, n, l, r, s, t s, dz

e.g. Chinese: 抬(\te\ lift, raise), 提(\ti\ lift; raise; promote; heighten; move up), 挑(\tiau\ raise something with a stick), 担(\dan\ carry something on a shoulder pole), 顶(\dir\ 2.carry on the head; push up), 登(\deng\ ascend, ascend from a low place to a high place), 垫(\dien\ raise by putting something under something), 堆(\due\ pile up; heap up; place one on top of another), 垛(\duo\ pile up neatly), 凌(\li\ rise high; tower(or soar)aloft), 拎(\li\ same as 提), 升(\ser\ rise; hoist; go up), 陟(\dz\ ascend; rise up); Latin: tollo (lift, raise); English: lift, raise, rear ( .2.raise; lift up), rise.

S3.5.18.2. Association starting point: “lifting front of tongue”, consonant concerned: ʃ, tʃ, dʒ

e.g. Chinese: 掀(\ʃien\ lift a cover or a lid), 兴(\ʃir\ get up;rise), 晋(\dʒin\ promote), 起(\tʃi\ go up; rise; get up; stand up), 企(\tʃi\ stand on tiptoe), 乔(\tʃiau\ tall), 跷(\tʃiau\ lift up (a leg); hold up (a finger)), 翘(\tʃiau\ hold up;curl up; (of one end)turn upwards), 举(\dʒi<sup>w</sup>\ lift; raise; hold up).

Only Chinese has this association item.

S3.5.19. **Leave** or **divide** and other related or similar things

S3.5.19.1. Association starting point: “dropping tip of tongue”, consonant concerned: t, d, n, l, ts, dz

e.g. Chinese: 离(\li\ 1.leave; part from; be away from), 落(\la\ left out; leave behind), 断(\duan\ break; break off), 段(\duan\ division), 褪(\tue\ scald in order to remove bristles or feathers), 褪(\tue\ take off (clothes)), 蜕(\tue\ mo(u)lt, lose or throw off most of feathers, hair, or fur), 脱(\tuo\ 1.take off; cast off; break away from), 斩(\dzan\ chop; cut); Latin: de-, e.g. decedo (depart), dis-, e.g. dispergo (disperse, space out), solvo (loosen, release; dissolve, separate, break up); English: leave, lose, loosen, divide, de-,e.g.deice, demarcate, dis-, e.g. dissever.

The tongue tip leaves the upper alveola or the palate when it comes down.

S3.5.19.2. Association starting point: “dropping front of tongue”, consonant concerned: ʃ, tʃ, dʒ

e.g. Chinese: 掀(\ʃien\ lift a cover or a lid), 擲(\ʃie\ pluck, pull off), 滌(\ʃie\ get rid off; remove), 揭(dʒie\ peel off; remove; take off; strip off), 解(dʒie\ 1.separate; divide, 2.untie, 3.remove; relieve), 剪(dʒien\ cut(with scissors); clip), 距(dʒi<sup>m</sup>\ distance from; away from), 起(tʃi\ 3.remove; take off), 切(tʃie\ cut; chop); (祛(tʃi<sup>m</sup>\ drive away; dispel; remove), 去(tʃi<sup>m</sup>\ leave; depart; be off; lose; remove; get rid of; be away from); e.g. English: chop.

The front of the tongue leave the palate when it comes down. Only Chinese has this association item.

### S3.5.20. **Go down** and other related or similar things

S3.5.20.1. Association starting point: “dropping tip of tongue”, consonant concerned: t, d, n, l, r, s, ts, dz)

e.g. Chinese: 滴(di\ 2.drop, (of liquids) fall in drops), 倒(dau\ fall; topple), 跌(die\ fall down; drop; go down), 掉(diau\ fall; drop; shed; reduce), 墮(duo\ fall; sink), 沥(li\ drip; drop), 沦(luən\ sink; fall; come down), 落(luo\ drop; fall; go down; lower; decline), 塌(ta\ collapse; sink; slump), 坍(tan\ collapse), 頹(tue\ declining; dispirited; decadent), 退(tue\ decline; decrease), 脱(tuo\ 2.drop; shed; lose), 澄(dəŋ\ solid impurities in a liquid cause to sink), 坠(dzue\ fall; drop; weigh down); Latin: de- destillo (drop down), decido (1.fall down; come down), defluo (flow down; fall; droop); English: dip, down, drip, drizzle, droop, drop (2.fall; something that is dropped), sink, tip ( .empty the contents of something out by slanting).

S3.5.20.2. Association starting point: “dropping front of tongue”, consonant concerned: ʃ, tʃ, dʒ

e.g. Chinese: 下(\ʃia\ down; lower; descend), 卸(\ʃie\ unload; lay down), 陷(\ʃien\ bogged down; sink), 降(dʒian\ fall; drop; go down; reduce), 萧(\ʃiau\ withered), 谢(\ʃie\ wither), 夕(\ʃi\ sundown), 西(\ʃi\ the direction towards which the sun sets).

Only Chinese has this association item.

S3.5.21. **Move up and down** and other related or similar things (association starting point: “lifting and than dropping tip/front of tongue”, consonant concerned: t, d, n, l, ts, dz tʃ, dʒ)

e.g. Chinese: 打(da\ knock; hit), 踏(dau\ tread), 踩(duo\ stamp), 点(dien\ 3.touch once), 虱(du\ lightly touch with a finger, stick, etc.;tap), 踏(ta\ tread), 挞(ta\ flog; whip), 跳(tiau\ jump; move up and down), 踢(ti\ kick), 蹑(nie\ walk on tiptoe) 踐(dʒien\ trample; tread); Latin: tundo (beat, thump, hammer; pound); English: dab, dance, drub, tap (to hit lightly against something), tip ( .touch or strike lightly), tramp, tread, knock.

Intimating “move up and down' or 'move down and up” by lifting and then dropping the tip of the tongue.

S3.5.22. **Contact and obstructed** and other related or similar things (association starting point: “contact of articulators (tip/front of tongue to upper teeth-ridge)” and “obstructed”, consonant concerned: t, d, ts, dz, n, l tʃ, dʒ)

There are four association items caused by tongue tip touching the alveola (S3.5.22.1 ~ S3.5.22.4). They have something in common with the associaton items caused by the tongue back touching the soft palate and the lips touching each other, but still have some differences with the other two association items because of the different places of articulation.

### S3.5.22.1. **Touch** and other related or similar things

e.g. Chinese: 达(da\ reach), 逮(de\ 1.reach), 到(dau\ arrive; reach), 抵(di\ reach; arrive

at), 踮(\dien\ touch ground with toes), 顶(\dir\ 3.butt, push with the head), 推(\tue\ push; shove), 托(\tuo\ support with the palm), 触(\tsu\ come into contact; touch), 着(\dzau\ touch; contact), 至(\dz\ reaching) 及(\dzi\ 1.reach), 搵(\tjin\ push); Latin: tango (2.touch, handle), tactus (touch, handling); English: tactile, tiptoe, touch, tentacle, tangency.

#### S3.5.22.2. **Hold together** and other related or similar things

e.g. Chinese: 搭(\da\ connect; join; put up), 逮(\de\ 2.catch), 戴(\de\ 2.wear something on the head, neck, etc.), 带(\de\ carry with oneself; have something attached), 得(\de\ get, obtain), 蒂(\di\ base of a fruit, connecting the fruit and the branch), 连(\lien\ link; connect; including), 联(\lien\ unite; join; ally with), 链(\lien\ chain, a series of joined links), 拿(\na\ take; hold; catch), 黏(\nien\ stick to; cling to; cleave to), 拈(\nien\ grasp something with two or three fingers; nip), 捏(\nie\ hold between the finger and thumb; put together), 镊(\nie\ pick up something with tweezers), 贴(\tie\ 1.paste; stick, 2.keep close to; nestle closely to), 粘(\dzan\ glue; stick; paste; join or connect objects with a sticky substance), 抓(\dzua\ take hold of something by grabbing; clutch; seize), 捉(\dzuo\ clutch; grasp; grab; catch capture; seize) 及(\dzi\ 2.take into account; and), 系(\dzi\ tie; tie up), 交(\dziau\ join; cross; copulate; together), 胶(\dziau\ glue; gum; gelatin; stick or fasten with glue), 结(\dzie\ 1.tie; knot), 接(\dzie\ connect; join; link), 颈(\dzin\ neck, by which the head is joined to the shoulders), 揪(\dziəu\ seize; hold tight), 拘(\dzi<sup>w</sup>\ arrest; detain), 擒(\tjin\ capture; catch; seize); Latin: ligo(tie up; unite), necto(tie, fasten, connect; bind), tenax (gripping, tenacious; sticky); English: take, tie, tight, tote, nab, nip, knit[nit], knot[nɒt], leash, link chain, join, joint, junction.

#### S3.5.22.3. **Stay** and other related or similar things

e.g. Chinese: 呆(\de\ dull; stay), 待(\de\ stay; wait), 耽(\de\ delay; hold up; stay), 宕(\dan\ delay), 等(\dər\ wait; await), 定(\dir\ fix; fixed; settled), 钉(\dir\ fix something to a position with a nail), 订(\dir\ subscribe to; book; staple together), 盯(\dir\ fix one's eyes on), 逗(\dəu\ stay; stop), 停(\tir\ stop; halt; pause; stay), 伫(\dzu\ stand for a long while; stand waiting), 住(\dzu\ stay; stop; cease), 驻(\dzu\ halt; stay; be stationed) 栖(\tji\ dwell; stay), 羁(\dzi\ stay; detain).

#### S3.5.22.4. **Obstruct** and other related or similar things

e.g. Chinese: 挡(\dan\ block; shelter from), 堤(\di\ dike, structures set up along a river or sea to prevent floods), 堵(\du\ block up; stop up; stifled; suffocated), 杜(\du\ stop; shut out; prevent), 拦(\lan\ bar; block; hold back), 栏(\lan\ hurdle; fence; railing), 阑(\lan\ same as 拦, 栏), 障(\dzan\ hinder; obstruct), 嶂(\dzan\ screen-like mountain peak), 窒(\dz\ obstruct; block; choke) 緘(\fien\ seal; close; shut), 掐(\tjia\ pinch; nip), 卡(\tjia\ cram; jam; withhold); English: dam, dike, tamp choke.

S3.5.23. **Making parted** and other related or similar things (association starting point: “approach of articulators”, consonant concerned: f, v s, z ʃ)

e.g. Chinese: 放(\fan\ relax the hold), 分(\fən\ divide; separate; part), 粉(\fən\ powder; broken into pieces), 份(\fən\ share; part; portion), 缝(\fəŋ\ chink; slit; crack; seam), 撕(\s\ separate or pull apart by force), 松(\soŋ\ untie; unfasten; release), 酥(\su\ crisp, crumbly), 碎(\sue\ break to pieces; smash); Latin: fatisco (1.crack, split), findo (split, divide; burst), fissum (slit, fissure); English: far, fission, fissure, flaw ( .crack), flay, fork, fraction, fracture, separate, sever, scatter, smash, spall, split.

When pronouncing these consonants, the articulators are approached each other but are separated. There is a split between the articulators all the time.



S3.5.24. **Wealthy** and other related or similar things (association starting point: “lower lip”, consonant concerned: f, v)

e.g. Chinese: 肪(\fɑŋ\ fat), 肥(\fē\ fat; rich; fertile; fertilizer), 丰(\fəŋ\ rich; good looks; fine appearance), 幅(\fu\ the width of cloth), 福(\fu\ luck; good fortune; blessing), 富(\fu\ rich; wealthy; plenty); Latin: farcio (stuff; fill full), fecundus (fertile; fruitful; fertilising; abundant, rich), felix (1.fruitful; auspicious, favorable), ferax (fruitful), fertilis (fertile; fertilising); English: fat, fill, fortune, fruitful.

Plump lips are usually conspicuous and regarded as a symbol of honesty (in Chinese) or sexiness. There is a word “lebea” in Latin specially describing plump lips. When pronouncing labiodental, the upper teeth approach the lower lip. This movement may intimate others to notice the lower lip and associate it with “wealthy” from “plump”.

S3.5.25. **Place in between** and other related or similar things (association starting point: “approach of articulators (front of tongue to palate)”, consonant concerned: j, ʃ, tʃ, dʒ)

e.g. Chinese: 垭(\ja\ strip of land that provides passage between two mountains), 咬(\jau\ bite, the food is bit between the upper teeth and the lower teeth), 牙(\ja\ tooth, which grows in the upper and lower parts of the mouth), 掖(\je\ thrust in between), 腋(\je\ junction of the arm and shoulder), 翼(\ji\ wing, which stretches out to one side from main part, in other words, the main part is between the two wings), 溪(\ʃi\ rivulet 'sandwiched' in between two mountains), 峡(\ʃia\ running water 'sandwiched' in between two mountains), 衔(\ʃien\ hold in the mouth: the thing is “sandwiched” in between the lips), 馅(\ʃien\ stuffing sandwiched in between two layers), 厢(\ʃian\ wing-room), 楔(\ʃie\ wedge, which is filled in between two parts of a thing), 挟(\ʃie\ seize somebody on both sides by the arms), 芯(\ʃin\ fuse as in a firecracker; wick as in a candle), 心(\ʃin\ centre; core: 江心 the middle of a river) 夹(\dʒia\ 1.press from both sides; place in between, 2.be wedged between two things, 3.folder; clip; tongs, 4.double-layered), 荚(\dʒia\ pod, which encloses one or more seeds), 颊(\dʒia\ cheek, the nose and mouth are in between both cheeks), 岬(\dʒia\ narrow passage between mountains), 嚼(\dʒiao\ crush food between lower and upper teeth), 肩(\dʒien\ shoulder, the neck is between both shoulders), 间(\dʒien\ 1.between two sides or two things, 2.space in between), 涧(\dʒien\ ravine 'sandwiched' in between two mountains), 挟(\dʒien\ pick up with chopsticks, the food is clipped between two chopsticks), 睑(\dʒien\ eyelid, the eye is in between the both eyelids), 介(\dʒie\ in between), 津(\dʒin\ 1.ferry crossing is in between two banks), 经(\dʒin\ 1.warp, each warp is placed in between two wefts), 钳(\tʃien\ pincers vice(vise), a tool with two metal jaws, things can be held between the jaws), 骑(\tʃi\ ride, the animal or bicycle is between the two legs); English: jaw[dʒɔː].

When pronouncing these consonants, the front of the tongue and the palate together form a long extending stricture along the direction of air stream. The front of the tongue and the palate are associated with something that can give pressure on other things from both sides, and air stream is associated with something being pressed from both sides or fluid flowing through two sides.

S3.5.26. **Narrow chink** and other related or similar things (association starting point: “approach of articulators (front of tongue to palate)”, consonant concerned: j, ʃ, tʃ, dʒ)

e.g. Chinese: 细(\ʃi\ thin (in diameter); slender), 隙(\ʃi\ crack; chink; crevice), 蹊(\ʃi\ narrow road; narrow path), 狭(\ʃia\ narrow), 瑕(\ʃia\ flaw), 罅(\ʃia\ crack; rift; cleft; fissure; chink), 纤(\ʃien\ long and slender), 巷(\ʃian\ narrow street; lane), 小(\ʃiau\ small; little), 径(\dʒin\ path; track), 阡(\tʃien\ footpath), 渠(\tʃi<sup>w</sup>\ canal; ditch); English: channel.

Associate the stricture between the front of the tongue and the palate with other things. Both the speaker and the listener can feel the narrow but long passage though it is invisible. Therefore it is reasonable to associate these consonants with something long and thin.

S3.5.27. **Guide** and other related or similar things (association starting point: “approach of articulators (front of tongue to palate)”, consonant concerned: j, ʃ, tʃ, dʒ)

e.g. Chinese:沿(\jan\ along; follow), 引(\jin\ guide; lead), 由(\jou\ passthrough; follow the wishes of), 泄(\jie\ leak out; let out(a fluid or gas)), 循(\ji<sup>w</sup>n\ follow; be in line with) 牵(\tʃien\ lead along), 挤(\dʒiŋ\ 1. squeeze, force one's way by pressing), 经(\dʒiŋ\ 2.pass through).

Air stream flows along the narrow but long passage between the front of the tongue and the hard palate. This situation is associated with “going along the way” or “guide”.

S3.5.28. **Approach** and other related or similar things (association starting point: “approach of articulators (front of tongue to palate)”, consonant concerned: j, ʃ, tʃ, dʒ)

e.g. Chinese:倚(\ji\ lean on), 依(\ji\ 1.be attached to; stay close to), 严(\jien\ tight; close closely fastened), 向(\jiaŋ\ near upon; towards; with the face towards), 系(\ji\ relate to) 近(\dʒin\ near; close; close to; approaching; closely related), 紧(\dʒin\ close; tight), 就(\dʒiou\ come near; move towards), 挤(\dʒi\ 2.squeeze, press closely together), 妻(\tʃi\ wife), 妾(\tʃie\ concubine), 戚(\tʃi\ relative; family member), 切(\tʃie\ 1.close to;near), 亲(\tʃin\ next of kin; kin; be close to), 趋(\tʃi<sup>w</sup>\ tend toward; tend to); Latin: jungo (bring together; mate; associate), juxta (1.near by, close; close to); English: jam, jostle.

S3.5.29. **Resemble** and **come to an agreement** and other related or similar things (association starting point: “approach of articulators (front of tongue to palate)”, consonant concerned: j, ʃ, tʃ, dʒ)

S3.5.29.1 **Resemble** and other related or similar things (consonant concerned: j,ʃ)

e.g. Chinese: 样(\jaŋ\ same as; form), 象(\jiaŋ\ shape; imitate), 像(\jiaŋ\ be like; resemble; be same or similar in image), 肖(\jiau\ resemble; be like), 形(\jiŋ\ form; shape), 型(\jiŋ\ mould; model; pattern); Latin: juxta (2.alike; just the same as); English: shape.

When the front of the tongue approaches the palate, it resembles the palate in shape.

S3.5.29.2. **Join** and **come to an agreement** and other related or similar things (consonant concerned: j, ʃ, tʃ, dʒ)

e.g. Chinese: 依(\ji\ 2.comply with; listen to, 3.according to), 效(\jiau\ imitate; follow the example of), 谐(\jie\ in harmony; come to an agreement), 协(\jie\ harmonize; join; common), 携(\jie\ join hands), 偕(\jie\ together with), 邂(\jie\ meet by chance), 学(\ji<sup>w</sup>e\ learn; imitate; mimic), 循(\ji<sup>w</sup>n\ abide by), 徇(\ji<sup>w</sup>n\ submit to; comply with) 齐(\tʃi\ uniform; at the same time; together), 契(\tʃi\ agree), 洽(\tʃia\ in harmony; agree), 恰(\tʃia\ proper; appropriate), 切(\tʃie\ 2.conform to; correspond to).

Refer to S3.5.29.1.

S3.6. Associating the feeling caused by the change of air stream in articulation with other similar things (metaphor).

S3.6.1. **Gather** and other related or similar things (association starting point: “air accumulated”, consonant concerned: t, d, ts, dz, tʃ, dʒ)

e.g. Chinese: 堆(\due\ pile up; heap up), 垛(\duo\ pile up neatly), 屯(\tuən\ store up; collect; stock), 墩(\duən\ mound), 囤(\tuən\ gather; store or hoard up), 藏(\tsaŋ\ store; collect), 仓(\tsaŋ\ storehouse; warehouse), 舱(\tsaŋ\ cabin), 存(\tsuən\ 1.store; accumulate), 储(\tsu\

store; stockpile), 攒(\tsuan\ collect together; save up), 栈(\dzan\ storehouse; warehouse), 贮(\dzu\ store; save; lay aside) 积(\dʒi\ accumulate; pile up), 集(\dʒi\ gather; collect; put together), 聚(\dʒi^w\ assemble; gather; congregate), 辑(\dʒi\ collect; compile), 纠(\dʒiou\ gather together), 加(\dʒia\ two or more things or numbers are joined or united), 群(\tʃuən\ group; throng; cluster), 麇(\tʃuən\ flock together).

Associate the accumulation of the air with gathering of other things.

S3.6.2. **Swell** and other related or similar things (association starting point: “air accumulated”, consonant concerned: t, d, ts, dz k, g)

e.g. Chinese: 大(\da\ big; large; great (in volume, area, quantity, etc.)), 多(\duo\ many; much; more; a lot of), 肚(\du\ belly, belly-shaped(prominent and round-sharped) thing), 礞(\duən\ stone block), 砣(\duən\ stone roller), 肿(\dzɔŋ\ swollen; tumid), 胀(\dzaŋ\ grow in size; distend; swell; be bloated), 涨(\dzaŋ\ of solids swell after absorbing water, etc.) 鼓(\gu\ bulge; swell), 臃(\gu\ bulge; swell); Latin: tentio (1.swell), tumeo (swell; swollen; turgid), tuber (swelling), tumor (swelling, bulge), turgeo (swell, be swollen); English: tumid, tumescent, tumour, distend.

There are some similar association items (see S3.1.11.) but still some differences. When pronouncing \p\, \b\, air pressure builds up behind the closure of lips and makes the cheeks bulged. This is visible. But when pronouncing \t\, \d\, \ts\, \dz\, \k\, \g\, air pressure builds up behind the closure of tongue to palate. the swell can just be felt but not seen. Therefore, some association items of the two groups of consonants are different.

S3.6.3. **Tension** and other related or similar things (association starting point: “air accumulated”, consonant concerned: p, b t, d, ts, dz)

e.g. Chinese: 逼(\bi\ force; compel; press), 憋(\bie\ blockage in the respiratory system; feel oppressed), 屏(\bin\ hold one's breath), 迫(\po\ compel; force; press) 拖(\tuo\ tow; drag), 拽(\dzuai\ trail; drag), 张(\dzaŋ\ 1.tension; draw a bow; stretch; spread), 镇(\dzəŋ\ press down; suppress); Latin: paco (2.subdue), premo (press; compress; tighten), presso (press) tendo (strain; stretch), tentio (2. tension), traho (drag; pull; pull out); English: bear (1.support a weight or load; 2.endure), push, pull tense, tension (degree of being tense, expansive force of gas or vapour), tow, tug.

Associated things are corresponding to the pressure or tension the articulator get: the oral cavity is pressed when \p\, \b\ are articulated and the tongue is under tension when \t\, \d\, etc. are articulated.

S3.6.4. **Puff** and **pay** and other related or similar things (association starting point: “air accumulated” “plosive”, consonant concerned: p, b t, d ts, dz tʃ, dʒ)

S3.6.4.1. **Puff** and other related or similar things

e.g.汉语: 抛(\pau\ pitch; fling), 排(\pe\ dislodge; drain), 喷(\pən\ (of liquid, gas, powder) spurt; spout), 屁(\pi\ fart), 泼(\po\ forcibly pour or scatter liquid; sprinkle; splash; spill) 逃(\tau\ escape; run away), 吐(\tu\ force something out of one's mouth; spew; spit), 唾(\tuo\ spit), 丢(\diou\ throw; cast; toss), 脱(\tuo\ get out of; escape from; extricate oneself from) 遣(\tʃien\ send; send away; drive away), 倾(\tʃiŋ\ overturn and pour out; empty out; dump); Latin: bucino (blow shepherd's horn, military trumpet); English: breath, brook (small stream), bugle, pelt ( .attack by throwing things at), pitch, piss, pour, puff (3.send out in puffs), puke toss, drain.

Associating the sudden release of the imprisoned air with 'puff'.

S3.6.4.2. **Pay** and other related or similar things

e.g.汉语: 赔(\pe\ compensate) 给(\ge\ give); 英语: pay give, gift.

S3.6.5. Frictionless and other related or similar things (association starting point: “frictionless continuants (approximant)”, consonant concerned: l, r)

S3.6.5.1. **Slick** and other related or similar things

e.g. Chinese: 利(\li\ with least resistance; smoothly; smooth going), 痢(\li\ of bowels emptying too easily), 溜(liou\ slide; glide; smooth; glossy; sleek; slippery), 润(ruən\ sleek); Latin: labor (1.slide; glide; slip away), lapsus(slip), lēvis ( .smooth; beardless, delicate), lēvo (smooth, polish), lubricus (1.slippery; gliding); English: lax (of bowels emptying too easily), lube, rink.

Consonants \l and \r are frictionless continuants. They are articulated without audible friction. Therefore it is reasonable to associate them with “frictionless”. So do the \l in the clusters \sl and \gl, see 4.1.

S3.6.5.2. **Nimble and lithe** and other related or similar things

e.g. Chinese: 灵(liŋ\ nimble; quick; clever; bright; flexible); Latin: lubricus (1.slippery; gliding; 2.fleeting), levis ( light; easy; slight; trivial; nimble, fleet), levo (lighten, ease; alleviate, lessen); English: leap, light ( .of little weight; quick and graceful in movement; cheerful), lilt, limber, lissome (1.quick and graceful in movement), lithe, lively.

Consonants \l, \r are frictionless continuants. According to people's experience, the movement is certainly nimble without friction.

S3.6.6. **Capacious and fertile** other related or similar things (association starting point: “air stream strong”, consonant concerned: l, r)

e.g. Chinese: 溢(\lan\ overflow; flood), 涝(\lau\ excessive water in the fields), 饶(\rau\ 1.rich; fertile, 2.forgive), 荣(\ron\ thrive; flourish), 容(\ron\ contain; capacitate; tolerate); Latin: laetus (1.fertile; rich; exuberant, 2.glad, cheerful), largus (copious, ample; liberal, bountiful), latus (broad; wide; extensive), laxus (wide, loose, roomy), lucrum (profit, gain; wealth); English: loose, lot, loud, lump, rank ( .growing too luxuriantly), rich, rife (1.full of, 2.wide-spread), roomy.

The \l and \r are the most sonorous consonants articulated with the strongest air stream. Therefore it naturally has this association item.

S3.6.7. **Become weak** and other related or similar things (association starting point: “friction”, “weak air stream”, “strident”, consonant concerned: f, v)

e.g. Chinese: 乏(\fa\ tired, weary), 妨(\fan\ hinder, impede), 烦(\fan\ worried; be tired of), 妇(\fu\ 2. the weaker sex; female, woman); Latin: fatigo (tire, exhaust; worry, importune; torment), fatisco (2.become exhausted), femina (female, woman), flaccesco (flag, droop), fluo (1. fall away); English: fade, fag, fail, faint, fear, feeble, female (the weaker sex), few, flag ((of plants etc.) hang down; become tired or weak), frail, frazzle, friction.

The item S3.6.6. and S3.6.5 form sharp contrast.

S3.6.8. **Thin and less** and other related or similar things (association starting point: “weak air stream”, consonant concerned: j, w s ʃ)

e.g. Chinese: 么(\jau\ petty; small; insignificant; paltry), 婴(\jir\ baby; infant), 幼(\jou\ infant; child), 微(\we\ tiny; little; minute) 少(\sau\ few; little; less), 稍(\sau\ a little; a bit), 梢(\sau\ thin end of a twig) 希(\ʃi\ 2.few; rare), 稀(\ʃi\ rare; few; thin), 细(\ʃi\ fine; in small particles; narrow; thin; slender), 鲜(\ʃien\ 2.little; rare), 纤(\ʃien\ fine; minute; tiny), 小(\ʃiau\ small; little; petty; minor), 屑(\ʃie\ bits; scraps), 糶(\ʃi\ broken rice).

When pronouncing these consonants, the tongue and the palate are shortly apart (see S3.5.26) and furthermore the air stream is weak.

S3.6.9. **Fluid** and other related or similar things (association starting point: “continuant”, “air stream strong”, consonant concerned: l, r)

S3.6.9.1. **Liquid** and other related or similar things

e.g. Chinese: 泪(\le\ tears), 淋(\lin\ pour; sprinkle; spray), 淋漓(\linli\ dripping), 溶(\ron\ dissolve, make or become liquid by putting into liquid), 熔(\ron\ melt; fuse), 融(\ron\ thaw), 濡(\ru\ soak; moisten), 乳(\ru\ milk), 溽(\ru\ damp; humid), 润(\ruən\ moist); Latin: liquidus (fluid; liquid; flowing), liquor (fluidity; liquid), lacrima (tear), lac (milk), latex (water; any other liquid), lotium (urine), lavo (wash; bathe ;wet; soak), lotio (wash); English: liquid, liquor, run ( .melt).

S3.6.9.2. **Run** and other related or similar things

e.g. Chinese: 澜(\lan\ rapids; swift current), 澜(\lan\ billows; surf), 浪(\lan\ waves; billow), 涟(\lien\ ripples), 湍(\lien\ overflowing;rippling), 流(\liou\ rapids), 流(\liou\ 1.(of liquid)flow, 2.stream of water, 3.current), 溜(\liou\ swift current); Latin: rivus (stream, brook), libratus (lever), libramentum (lever surface); English: lave, lever, race (1.strong, fast current of water, 2.course of the sun or moon, or (figurative) of life), riffle, rill, rip ( .stretch of rough water in the sea or an estuary), river, run ( .flow or make something flow), runlet/runnel, rush.

Associate the strong air stream in articulation with strong current.

S3.6.10. **Fluid** and other related or similar things (association starting point: “continuant”, “weak air stream”, consonant concerned: j, w f, v s, ts, dz ʃ, tʃ, dʒ)

3.6.10.1. **Liquid** and other related or similar things

e.g. Chinese: 液(\je\ liquid; fluid; juice), 溢(\ji\ overflow; spill), 洒(\jin\ (of liquid)spread or penetrate on paper), 濛(\jin\ (of current)swirl around), 瀛(\jin\ sea; ocean), 涌(\jon\ (of water)gush; emerge from water), 油(\jou\ oil; liquid fat; grease), 源(\i<sup>w</sup>an\ source of a river), 渊(\i<sup>w</sup>an\ deep water; deep pool), 湾(\wan\ bend of a river; bay), 泫(\wan\ shed tears) 泛(\fan\ 2.float, 3.flood) 渗(\sən\ ooze; seep), 渾 or 沈(\sən\ juice), 湿(\s\ wet; damp; humid), 水(\sue\ water; liquid; fluid), 溲(\sou\ urinate), 尿(\sue\ urine), 沾(\dzan\ soak; moisten), 蘸(\dzan\ dip in liquid), 汁(\dz\ juice 溪(\ʃi\ small stream; rivulet), 洫(\ʃi<sup>w</sup>\ ditch running between plots of farmland), 血(\ʃi<sup>w</sup>e\ blood), 涎(\ʃien\ saliva), 洗(\ʃi\ wash), 涧(\dzien\ brook; creek), 渐(\dzien\ flow into; soak), 浆(\dzian\ thick liquid), 酱(\dzian\thick sauce), 江(\dzian\river), 糨(\dzian\ (of a liquid) thick), 津(\dzin\ 2.saliva; spit; body fluid), 浸(\dzin\ soak; (of liquid)seep), 浇(\dziau\ pour liquid; sprinkle; irrigate), 涓(\dzien\ tiny stream), 酒(\dziau\ any alcoholic drink including beer, liqueurs, and wine), 泣(\tʃi\ weep; sob; tears), 渠(\tʃi<sup>w</sup>\ channel; trench), 泉(\tʃi<sup>w</sup>en\ springs), 芡(\tʃien\ sauce made of the starch); Latin: unda (water; stream; surge; wave) fluo (3.flow; overflow), vena (vein; water course) sal (2.sea; brine), saliva (saliva, spittle; taste), sanguis (blood; bloodshed), sanies (diseased blood; venom), serum (whey; serum); English: water, weep fluent, fluid, flush ((of water)rush out in a flood), flux, vein, vortex sap (liquid in a plant), sauce, serum juice, jell, gel.

S3.6.10.2. **Other fluid** and other related or similar things

e.g. Chinese: 雾(\wu\ fog; fine spray of water), 焚(\fən\ burn), 雾(\fən\ mist; air), 风(\fəŋ\ wind; breeze; gale), 肺(\fe\ lung) 吸(\ʃi\ inhale(liquid or gas into the body), 息(\ʃi\ 2.breath; pant; gasp), 香(\ʃian\ fragrant, having a sweet or pleasant smell), 熏(\ʃi<sup>w</sup>n\ subject things to smoke,gases), 气(\tʃi\ gas), 汽(\tʃi\ vapour); Latin: flabellum (fan), flabilis (airy), flagro (blaze; burn), flamen (blast; gale; wind), flammo (blaze; burn), flo (blow), fumus (smoke; steam), vapor (steam; vapour), ventus (wind); English: waft, wheeze, whiff, whistle, wind,

window fan, fart, flaw ( .e.g.The old man could hardly stand on his feet in the flaw.) , flood, flow, flue, fluid, fog, fragrant, fume, fummy, vapo(u)r.

S3.6.11. **Line-like things** and other related or similar things (association starting point: 'continuant', 'air stream strong', consonant concerned: l, r)

S3.6.11.1. **Long-things** and other related or similar things

e.g. Chinese: 缆(\lan\ hawser; mooring rope), 廊(\lan\ corridor; veranda), 里(\li\ traditional unit of length), 缕(\li<sup>w</sup>\ thread), 纶(\luən\ black silk ribbon; fishing line); Latin: lana(wool), linea (line; string; plumbline), linum (flax; thread; line; rope), regula (ruler; stick); English: lace, ladle, lance, lane, lank, lash, leash, lath, limb, line, rein, rope.

S3.6.11.2. **Bright, light** and other related or similar things (association starting point: “frictionless continuants (approximant)”, consonant concerned: l)

e.g. Chinese: 朗(\lan\ light; bright), 烺(\lan\ bright and cheerful), 亮(\lian\ bright; light; well-lit; shine); Latin: lanterna (lamp), luceo (shine; be light; be daylight), lucerna (lamp), lumen (light; lamp, torch), luna (moon; month; crescent), lux (light; daylight); English: lamp, light ( .opposite of darkness), luminous, lustre/luster, leer, look.

It conforms to man's experience that smooth surface shines to associate frictionless continuant \l with 'smooth' (see S3.6.5.1.). It conforms to the fact light has no weight to associate \l with 'light' (see S3.6.5.2.). It conforms to the fact that light travels continuously straight way to associate \l with “line” (see S3.6.11.1.). And “air-stream strong” symbolizes “cheerful” (see S3.6.4. S3.6.5.). Therefore, it is conforms to man's association to symbolize 'light' with sound \l.

S3.6.12. **Line-like things** and other related or similar things (association starting point: “continuant”, “weak air stream”, consonant concerned: s ts, dz j, ʃ tʃ)

S3.6.12.1. **Thread** and other related or similar things

e.g. Chinese: 丝(\s\ silk; something like a thin thread), 纱(\sa\ yarn), 纛(\sau\ reel silk from boiled cocoons), 绳(\səŋ\ line, cord), 索(\suo\ 2.large rope or chain), 蛇(\sə\ a snake), 瘦(\sə\ thin; long and thin) 肠(\tsaŋ\ intestine; sausage), 周(\dzou\ circumference), 丈(\dzaŋ\ unit of length), 杖(\dzaŋ\ stick; cane) 弦(\ʃien\ string), 线(\ʃien\ thread; string), 纤(\ʃien\ long and slender), 继(\ʃie\ ropes; reins), 絮(\ʃi<sup>w</sup>\ coarse silk floss), 绪(\ʃi<sup>w</sup>\ end of a silk thread) 豇(\dziaŋ\ cowpea, with long and thin pods), 缰(\dziaŋ\ rein), 韭(\dzioʊ\ chives, with long, flat leaves), 纤(\tʃien\ rope for towing a boat); Latin: serica (silks), Sericus (Chinese; silk), tamen (thread; string), serpens (snake; serpent), circus (circle); English: sash, silk, snake, serpent, slender, string, strap, thread (\ sred\ 1.very thin cord), yarn.

In this association item, some of the associated things are exactly the same in the three languages, as silk, thread, snake. It shows that associating the continuous weak air stream with line-like things is quite natural.

S3.6.12.2. **Line of vision** and other related or similar things

e.g. Chinese: 视(\s\ look at; look upon; line of vision), 示(\s\ show), 伺(\s\ watch), 覗(\s\ peep), 睃(\suo\ look askance at), 搜(\sou\ look for;search), 索(\suo\ 3.search; look for; seek) 瞻(\dzaŋ\ look forward; look up), 张(\dzaŋ\ 2.look; glance), 找(\dzau\ look for), 照(\dzau\ 1.shine; light up, 2.mirror, 3.look after) 显(\ʃien\ show; display; be obvious), 现(\ʃien\ show; become visible), 晓(\ʃiau\ dawn), 晞(\ʃi\ first light of day), 熙(\ʃi\ bright; sunny), 曦(\ʃi\ sunlight), 旭(\ʃi<sup>w</sup>\ brilliance of the rising sun), 晖(\ʃi<sup>w</sup>en\ bright brilliant), 炫(\ʃi<sup>w</sup>en\ (of strong light)dazzle) 见(\dzien\ see), 瞧(\tʃiau\ look; see; watch); Latin: specto (look; observe; watch), servo (watch; observe); English: see, sight, search, show, shine.

In both Chinese and English, there are phrases 'a thread of light' and 'a line of vision'. It tells us there really exist the association course: continuous weak air stream line-like things vision, light.

### S3.6.12.3. **Thoughts** and other related or similar things

e.g. Chinese: 思(\s\ think; consider; thoughts), 识(\s\ know; knowledge), 神(\səŋ\ spirit; mind), 圣(\səŋ\ holy; sage) 知(\dz\ know; realize; knowledge), 智(\dz\ wisdom; wise; brainpower) 悉(\ʃi\ know; learn), 解(\ʃie\ understand; see), 心(\ʃin\ mind; thought; mood), 省(\ʃin\ become conscious; be aware; self-examination), 惺(\ʃin\ clever; realize; come to the senses), 醒(\ʃin\ become conscious; clear in mind); Latin: sapiens (wise man; philosopher), scio (know; know how to), sensus (thoughts), sentio (feel, see, perceive; understand; think, judge); English: thread (\sred\ 2. a line of reasoning connecting the parts of an argument or story), savvy, thought (\sɔ:t\), thinking (\sɪŋkiŋ\).

Weak air stream is continuous like thread. Besides, English word “thread” has another meaning – a line of reasoning connecting the parts of an argument or story. It tells us that there exists the following association course: continuous weak air stream thread thought.

S3.6.13. Continuous and other related or similar things (association starting point: “continuant”, “air stream strong”, consonant concerned: l, r)

#### S3.6.13.1. **Link** and other related or similar things

e.g. Chinese: 累(\le\ continuously; time and again), 类(\le\ a series of many similar things), 连(\lien\ one after another; link; join; connect), 漪(\lien\ (the ripples of water connected with each other), 链(\lien\ chain, metal rings connected to one another), 列(\lie\ line up; put in order; list; enter in a list), 邻(\lin\ live close by; neighbour; adjacent), 鳞(\lin\ scales(of fish, etc.), in perfect order adjacent to another), 屢(\li<sup>w</sup>\ time and again), 峦(\luan\ mountains in a range); English: latter, last ( .after the others), link, list, rank ( .line of persons or things), row ( .a neat line (of people or things) side by side).

#### S3.6.13.2. **Lengthen** and other related or similar things

e.g. Chinese: 拉(\la\ lengthen), 老(\lau\ of long standing), 历(\li\ go through; course), 离(\li\ 2.space distance; time interval); Latin: lente (slowly; calmly; coolly), lentus (lasting; lingering), longus (long; vast; tedious); English: lag, last ( .continue for the stated length of time; go on), lengthen, life (period between birth and death, or between birth and the present, or between the present and death), live (continue to be alive), long.

S3.6.14. Continuous and other related or similar things (association starting point: “continuant”, “weak air stream”, consonant concerned: j, w f, v s, ts, dz ʃ, tʃ, dʒ)

#### S3.6.14.1. **Link** and other related or similar things

e.g. Chinese: 绍(\sau\ continue; carry on), 顺(\suəŋ\ in sequence; put in the proper sequence), 随(\sue\ follow) 续(\ʃi<sup>w</sup>\ continue; join; connect), 继(\dʒi\ continue; succeed; follow); Latin: sequor (follow; go with; (time)come after, come next, ensue), sequax (pursuing; following), series (row, sequence, succession); English: series, sequence.

#### S3.6.14.2. **Lengthen** and other related or similar things

##### S3.6.14.2.1 **Lengthen** and other related or similar things

e.g. Chinese: 延(\jan\ prolong; extend; be continuous), 衍(\jan\ extend; develop), 迤(\ji\ extending or moving towards a direction), 遥(\jau\ distant; remote; far), 悠(\jou\ remote in time or space), 远(\i<sup>w</sup>an\ distant; remote; far), 永(\jɔŋ\ lasting; abiding), 久(\dʒiou\ lasting; for a long time)

### S3.6.14.2.2. **Go forward** and other related or similar things

e.g. Chinese: 往(\wan\ go; go towards) 发(\fa\ 1.send out ; deliver; launch, 2.enlarge; extend; develop, hair) , 泛(\fan\ 1.overflow; flood), 蕃(\fan\ reproduce; grow in abundance), 繁(\fan\ 2.multiply; procreate), 访(\fan\ visit,go and spend time in(a place)or with(someone)), 放(\fan\ 3.give out; emit; expand;enlarge), 赴(\fu\ go to; attend) 展(\dzan\ spread; extend; unfold), 绽(\dzan\ split(open); burst(open)), 长 (\dzar\ grow; develop), 伸(\sən\ (of part of something)stretch; extend),舒(\su\ 1.stretch) 兴(\fij\ rise; prosper; set up), 行(\fij\ go; travel; march forward),驱(\tfi<sup>w</sup>\ spur; gallop), 趋(\tfi<sup>w</sup>\ hurry ahead; tend toward), 去(\tfi<sup>w</sup>\ go); Latin: fluo (2.run evenly; proceed; tend), vado (go; go on), venio (go as far as), vergo (turn; incline), via (2.road,street,way; march), vulgo (spread; publish; broadcast) serpo (creep, crawl; spread slowly); English: vector, via, visit(go and spend time in(a place)or with(someone)) span, spread, stretch.

When pronouncing continuants, air stream flows continuously through the vocal tract and makes man have the feeling of “going forward”.

### S3.6.14.2.3 **Cruise** and other related or similar things

e.g. Chinese: 帆(\fan\ sail), 飞(\fe\ fly; flit) 巡(\fi<sup>w</sup>n\ go the rounds; tour; cruise), 徙(\fi\ move from one place to another), 翔(\fijar\ hover in the air); Latin: vagor (2.wander, rove, go far afield), velifer (carrying sail), velum (2.sail), volatus (flight), volito (fly about, hover; soar), volo (fly; speed); English: flit, fly, volant, feather, fin, fledge, vane, voyage.

This is the follow-up association of “go forward”.

S3.6.15. **Slow** and **consume** and other related or similar things (association starting point: “friction”, “weak air stream, continuant”, consonant concerned: h s, ts, dz ʃ)

e.g. Chinese: 耗(\hau\ 1. consume, 2.waste time), 恒(\həŋ\ permanent; persevere), 缓(\huan\ slow; delay; relaxed) 守(\sou\ keep watch), 寿(\sou\ long life, longevity), 舒(\su\ 2.leisurely; slow), 睡(\sue\ sleep), 常 (\tsar\ constant; often), 存 (\tsuən\ 2.live; exist;survive;retain), 迟(\ts\ slow; tardy), 弛(\ts\ relax; slacken) 习(\fi\ habit, a tendency to behave in a particular way, esp. regularly and repeatedly over a long period), 遐(\fia\ lasting), 仙 (\fien\ life indefinitely), 徐(\fi<sup>w</sup>\ slowly and calmly); Latin: haereo (linger) segnis (slow, sluggish, lazy), senex (old(over 45)), serus (late; too late), serpo (creep, crawl; spread slowly); English: halt slack, slow, sluggish, sleep.

S3.6.16. **Split** and **leakage** and other related or similar things (association starting point: “vocal tract is narrowed slightly”, consonant concerned: l, r)

e.g. Chinese: 裂(\lie\ split; crack; rend; break open) , 烂(\lan\ tattered; worn out) , 漏(\lou\ seep or fall out of a hole or crevice) , 痿(\lou\ fistula, long pipe-like ulcer with a narrow mouth) , 露(\lu\ reveal) , 罗(\luo\ net,snare; sieve) , 络(\luo\ web; net; a net-like structure) , 滤(li<sup>w</sup>\ filter) , 沥(li\ 2.strain water or liquids; filter) , 漉(\lu\ seep through; filter); Latin: liquor (strain liquid) , lacer (torn, mangled, lacerated) , rima (crack, chink), rete (net; snare) , reticulum (small net); English: loose, leach, leak, lose, loss, riddle, rip ( .tear; a long tear).

When pronouncing \l and \r\, the tongue tip 'stands' in the center of the vocal tract and breaks the air stream into two parts.

S3.6.17. **Disperse** and **leak** and other related or similar things (association starting point: “revealing closed teeth”, consonant concerned: s, ts, dz ʃ, tʃ, dʒ)

e.g. Chinese: 撒(\sa\ scatter; sprinkle) , 洒(\sa\ sprinkle; spray) , 散(\san\ disperse; distribute) , 伞(\san\ umbrella, in which the frame can be spreaded or folded) , 筛(\se\ sieve;



sifter;sift) , , 渗(\sən\ seep) , 支(\dz\ branch) , 肢(\dz\ limbs, the 'branches' of a body) , 枝(\dz\ branches of a plant); Latin: spargo (scatter, sprinkle; strew; disperse; spread), sacco (to filter); English: sow, scatter, sift, sifter, sieve, seep, slit, slot, seam, sprinkle; spray, separate, strew  
chink.

After flowing through the interstices of the closing teeth, air stream is dispersed. Besides, this situation is similar to sifting out or leaking out liquid or powder.

### S3.7. Associating the feeling caused by the timbre of consonants with other similar things

S3.7.1. **Sudden** and other related or similar things (association starting point: “plosive”, consonant concerned: p, b t, d ts, dz tʃ, dʒ k, g)

e.g. Chinese: 暴(\bau\ sudden and fierce), 爆(\bau\ explode; burst), 崩(\bəŋ\ collapse; burst), 嘣(\bəŋ\ (onom.)sound of something bursting), 迸(\bəŋ\ suddenly burst into fragments), 炮(\pau\ cannon; firecracker), 啪(\pa\ (onom.)bang), 碰(\pəŋ\ bump), 扑(\pə\ pounce on) 突 (tu\ 3.suddenly, 4.break through) 炸(\dza\ burst; blast; explode blow up), 骤(\dzou\ sudden), 撞(\dzəŋ\ bump; knock) 急(\dʒi\ rapid and violent; urgency), 亟(\dʒi\ urgently), 激(\dʒi\ swash; violent), 惊(\dʒiŋ\ become nervous due to sudden stimuli), 切(\tʃie\ 3.urgent) 咳(\kə\ cough, expel air from the lungs suddenly); Latin: batuo (beat), pello (knock), plango (beat noisily), plaudo (clap; beat), pulso (batter; knock; strike); English: bang, bash, blast, bomb, break, bump, burst, bust, pat, ping, pink(make high knocking sounds), pit-a-pat, plop, plump ( .fall or drop,suddenly and heavily), pop, pounce, puff (short, quick sending out of air,etc.), punch dash, torrent jab, jerk, jump.

S3.7.2. **Turning point** and other related or similar things (association starting point: “plosive” turning to “continuant”, consonant concerned: dʒ, dz)

e.g. Chinese: 机(\dʒi\ turning point; crucial point), 褶(\dʒien\ pleat), 折(\dzə\ turn;turn in the course of an event), 褶(\dzə\ pleat; crease), 肘(\dzou\ elbow, the joint where the arm bends), 轴(\dzou\ axis), 皱(\dzou\ wrinkle), 绉(\dzou\ crepe, cloth with a wrinkled surface).

The plosive turns to continuant during the articulation of affricate. The transition of articulation causes this association item.

S3.7.3. **Unclear** and other related or similar things (association starting point: “nasal”, consonant concerned: m, n)

e.g. Chinese: 霾(\me\ haze), 颩(\man\ muddle and careless), 盲(\maŋ\ blind), 茫(\maŋ\ boundless and indistinct; in the dark), 眊(\mau\ blurred eyesight), 昧(\me\ 2.have hazy notions about; gloomy; dim; hide), 濛(\məŋ\ misty), 矇(\məŋ\ (of daylight)dim), 朦(\məŋ\ (of moonlight)dim; obscure;hazy), 懵(\məŋ\ muddled, 梦(\məŋ\ dream), 迷(\mi\ be confused), 谜(\mi\ riddle; puzzle), 眠(\mien\ sleep), 冥(\miŋ\ obscure; gloomy; dull), 溟(\miŋ\ misty), 暝(\miŋ\ dusk; evening twilight), 喃喃(\nannan\ (onom.)murmur), 龢(\naŋ\ snuffle), 嚶嚶(\naŋnaŋ\ (onom.)murmur), 啾啾(\noŋnoŋ\ (onom.) murmur), 呢(\ni\ “enclitic”, indicating a question); Latin: misceo (mix, mingle; confuse, embroil), nebula (mist, vapour, cloud), nidor (steam), niger (dark;black), nimbus (cloud,), nox (darkness, night; obscurity), nubes (cloud; gloom; veil), -ne (enclitic, introducing a question); English: mess, mingle, mist, mix, moon, muddle, mull, murk, murmur (onom.), muss, muzzy, nebulous.

Nasals are acoustically unclear.

S3.7.4. **Mild** and other related or similar things (association starting point: “nasal”, consonant concerned: m, n)

S3.7.4.1. Soft and mild and other related or similar things

e.g. Chinese: 绵(\mien\ 1.silk floss; soft;weak), 棉(\mien\ cotton; cotton-like floss), 懦(\nuo\ weak; cowardly), 糯(\nuo\ glutinous and soft rice), 泥(\ni\ mud; wet), 泞(\niŋ\ mud; miry), 淖(\nau\ mire), 嫩(\nən\ tender), 暖(\nuan\ warm); Latin: malacus (soft), mitis (ripe; soft, mild; gentle.), mollis (soft, supple; tender, gentle; sensitive, weak); English: meek, melt (2.soften), mild (2.soft; gentle), milksop, mollify, mush (soft,thick mass), mo(u)ld ( .soft,rich soil).

#### S3.7.4.2. **Mildew** and other related or similar things

e.g. Chinese: 糜(\mi\ rotten) , 霉(\me\ mould; mildew); Latin: muceo (mildew); English: mildew, mo(u)ld ( .a soft greenish growth on bread, cheese, etc.), musty.

S3.7.5. **Prolonged** and other related or similar things (association starting point: “nasal”, consonant concerned: m, n)

e.g. Chinese: 曼(\man\ prolonged; long-drawn-out), 慢(\man\ slow; time- consuming), 漫(\man\ overflow; all over a place; extensive; long), 缅(\mien\ remote), 绵(\mien\ 2.continuous; unending), 袅(\niau\ slender and soft; (of sound)linger); Latin: manto (remain, wait) , mora (delay), moror (delay; stay); English: moderation.

S3.7.6. **Unclear** and **question** and other related or similar things (association starting point: “glottal”, consonant concerned: h)

e.g. Chinese: 糊(\hu\ blurred;messy; confused), 恍(\huan\ seem), 恍惚(\huanhu\ dimly; seemingly), 晦(\hue\ not obvious, dim), 昏(\huən\ dim; muddled; confused), 懵(\huən\ slow-witted; muddled), 浑(\huən\ muddy; murky; muddleheaded), 或(\huo\ perhaps; maybe; probably), 惑(\huo\ perplexed; puzzled; confuse), 何(\hə\ (interrog. pron.) e.g.: 何人(\hərən\ who), 人(\rən\ person); 何物(\həwu\ what), 物(\wu\ things); 何地(\hədi\ where), 地(\di\ place); 何故(\həgu\ why), 故(\gu\ causes)), 胡(\hu\ why), 乎(\hu\ (aux.) express doubt); English: haze, wh-[hw , h]( e.g.: who? what? when? where? why?).

Laryngeals [h] and velar [x] are not so clearly articulated as consonants like [k], [g]

S3.7.7. **Coarse (not slick)** and other related or similar things (association starting point: “strident”, consonant concerned: s, z ts, dz)

e.g. Chinese: 涩(\sə\ rasping;not smooth flowing), 啬(\sə\ stingy, spending or giving unwillingly) 擦(\tsa\ rub; come close to in passing), 糙(\tsau\ rough; coarse), 粗(\tsu\ coarse; rough; not smooth), 滞(\dz\ stagnant), 阻(\dzu\ hinder; obstruct; hard-going).

### S4. Association items of initial consonant cluster

S4.1.The association of different consonants in the initial consonant cluster is usually not mutually exclusive. What's more, the association of the sonorant in cluster is usually more obvious but always conforms to the association of the initial consonant.

#### S4.1.1.Sonorant \l:

e.g.Latin: **lengthen**(S3.6.13.2.): fluo (1. fall away 4. tend), flaccesco (flag, droop), flagrum (whip,lash); **slick** (S3.6.5.1.): glaber (smooth, bald) , glacies (ice) , clemens (mild, gentle), placo (calm; appease; reconcile) , planus (1.level, flat, plain, 2. clear); **bright, light** (S3.6.11.2.): plane (plainly;clearly) , clarus (bright; clear), flagro (blaze; burn; be on fire), flamma (flame, fire;torch), splendeo (be bright; shine; be illustrious); **fluid** (S3.6.9.): flabellum (fan), flabilis (airy), flabra (blasts; gusts; wind), fleo (weep; cry; lament), flo (blow), fluo (2.run evenly; proceed; 3.flow; overflow), fluxus (flowing; loose; leaky); **hold together** (S3.5.22.2): clatri (cage), claudio (shut; close; blockade), clavus (nail); **move up and down** (S3.5.21.): plango (beat noisily), plaudo (clap; beat ; stamp), **capacious and fertile** (S3.6.6.): plus (more).

e.g.English: **split and leakage**(S3.6.16.): cleave, cleft, flaw ( . crack), slit, flay, split; **hold together** (S3.5.22.2) clamp, clench, clinch, clip, close, clutch; **slick** (S3.6.5.1.): sleek, slew, slick, slide, slimy, slip, slippery, slither, glide, glossy, gloss, **lengthen** (S3.6.13.2.): slack, sleep, slow, sluggish, slumber, splay, slab, plane (1. flat or level surface,2. make wood smooth by using a plane), plain ( .area of level country, .easy to see), plank, plate; **long-things** (S3.6.11.1.): clew, slender, slight, slim, clue, splint; **bright, light** (S3.6.11.2.): flame, flare, flash, gloat, clear; **fluid** (S3.6.9.): flaw ( . e.g.The old man could hardly stand on his feet in the flaw.) , fleet (1.quick-move, 2.a group of buses, aircraft, etc., under one control) , flit, fly, float, flood, flow, flue, fluent, fluid, flush ((of water)rush out in a flood), flux , flee; **go down** (S3.5.20.1.): plump ( . fall or drop,suddenly and heavily).

#### S4.1.2.Sonorant \r\:

e.g.Latin: **rotate, circle, surround, curve** (S3.1.9.): crispus (curled; wrinkled; tremulous); circulate, **repeat** (S3.5.2.): frequens (1.repeated; frequent; regular); **right angle form** (S3.1.10.): crux (cross; gallows), tranato (swim across) , trans- (across, over); **capacious and fertile** (S3.6.6.): frequens (2. crowded;numerous; populous), crassus (thick; gross; dense), grandis (large; great; tall; strong), gravis (heavy; strong; bass), creatus (son of), creo (create; produce), cresco (be born; grow up; increase), pro-; **split and leakage** (S3.6.16.): brachium (forearm; branch), frango (break; shatter; crush), **lengthen**(S3.6.13.2.): trahol(drag; pull; pull out; lengthen).

e.g. English: **rotate, circle, surround, curve** (S3.1.9.): crown, crimp, crinkle, crisp, crook, crumple, friz, frizzle, scroll, scrunch, screw, troll, wrap, wreath, wrench, wrest, wring, wrist, writhe, wry; circulate, **repeat** (S3.5.2.): drub, trade, truck; **right angle form** (S3.1.10.): cross; **capacious and fertile** (S3.6.6.): breed, , troop; **split and leakage** (S3.6.16.): grate, grid, sprig, break, crumb, fraction, fracture; **lengthen** (S3.6.13.2.): drag, draw, drawl, spread, stretch, traction; **long-things** (S3.6.11.1.): street, string, track, trail; **fluid** (S3.6.9.): breath; **run** (S3.6.9.2.): brook, drain, spring[sprinj](water coming up from the ground), sprint, stream, travel; **bright, light** (S3.6.11.2.): bright; **go down** (S3.5.20.1.): dribble, drip, drop.

#### S4.1.3.Sonorant \m\:

e.g.English: **size** or **degree** (S3.5.5.): small; **nose** (S3.2.6.): smell, **face** (S3.2.5.): smile; **soft** and **mild** (S3.7.4.1.): smooth, **Unclear** (S3.7.3.): smoke, smut.

#### S4.1.4.Sonorant \n\:

e.g.English: **nose** (S3.2.6): snivel, sniff, snoot, snore, snort, snot, snout, snuff, snuffle; **prolonged** (S3.7.5.): snail; **hold together** (S3.5.22.2): snap, snatch; **unclear** (S3.7.3.): sneak.

#### S4.1.5.Sonorant \w\:

e.g.English: **rotate, circle, surround, curve** (S3.1.1.): twiddle, swirl, twirl, twist; **paired** or **juxtaposed** (S3.5.4.): twice, twin, two.

S4.2. The association of the non-sonorant following \s\ also conforms to that of the initial consonant and emphasizes intimating effect

#### S4.2.1. Non-sonorant \p\

e.g.Latin: **puff** (S3.6.4.1.): spiro (blow; breathe) , spuo (spit; spit out); e.g.English: **puff** (S3.6.4.1.): spew, spit, splash, spout, spurt; **pay** (S3.6.4.2.): spend; **sudden** (S3.7.1.): spank.

#### S4.2.2. Non-sonorant \t\

e.g.Latin: **erect** (S3.5.16): sto (stand;stand firm), station (standing still); **dribs** (S3.5.15): stilla (drop); **tip** (S3.1.5.1): stilus/stylus (pen; stake); e.g.English: **move up and down** (S3.5.21.): stamp, step, stomp; **erect** (S3.5.16): stand; **hold together** (S3.5.22.2.): sticking; **stay** (S3.5.22.3.):

stay, stop.

### S5. Association items of mid-consonants and end consonants

S5.1. The association of some consonants in the middle of the words conforms to that of the initial consonant.

S5.1.1. Middle \r\

e.g. Latin: **rotate, circle, surround, curve** (S3.1.9.): curvo (curve; bend; arch) , curvus (bent; curved; crooked) , orbis (circle; ring; disc; orbit) , **run** (S3.6.9.2.): curro (run; hasten; fly); English: **rotate, circle, surround, curve** (S3.1.9.): furl, turn, turbin, turret, vortex.

S5.1.2. Middle \l\

e.g. English: **slick** (S3.6.5.1.): bulb, bulla, polo; **capacious and fertile** (S3.6.6.): galore, voluble; **nimble and lithe** (S3.6.5.2.): mild (2.soft; gentle), milksop; **fluid** (S3.6.9.): milk, pulp, melt (become liquid through heating); **run** (S3.6.9.2.): runlet; **long-things** (S3.6.11.1.): belt, helve; **link**(S3.6.13.1.): follow.

S5.1.3. Middle \b\

e.g. **paired** or **juxtaposed** (S3.5.4.): double, duple; **bulge** or **ball** (S3.1.11.): bubble, cobble, jumbo, lubber, pebble, rubble, tuber.

S5.1.4. Middle \m\:

e.g. Latin: **intimate**: amo (love; like; be obliged), amans (fond; lover), amator (lover; paramour), amicus (friend; friendly; fond).

S5.1.5. Middle \ʃ\: **disperse** and **leak** (S3.6.17.): fissure; **go forward** (S3.6.14.2.2): issue.

S5.2. The association of the consonants in the end of the words usually conforms to that of the initial consonants

S5.2.1. Final \m\

e.g. English: **unclear** (S3.7.3.): dim, doom, gloom, loom , glum, dusk, brume, fume, seem; **soft** and **mild** (S3.7.4.1.): cream, lissome (2.lithe), loam; **close** or **shelter** (S3.5.7.): whelm, tomb[tu:m]; **show** and **mimic** (S3.5.6.): form; **edge** (S3.3.1.): hem.

S5.2.2. Final \f\:

e.g. English: **other fluid**(S3.6.10.2.): rife, huff, puff(short, quick sending out of air,etc.), whiff, cough; **lengthen**(S3.6.14.2.1): life, live, scarf; **make parted**(S3.5.23.): doff, half, halve.

S5.2.3. Final \l\:

e.g. **slick** (S3.6.5.1.): ball, bottle, bubble, circle, cycle, cobble, furl, hole, pearl, pebble, pill, quill, roll, scroll, shingle (small, rounded pebbles on the seashore), curl, reel, roll, whirl, whorl; **capacious and fertile** (S3.6.6.): voluble, full, howl, hurl; **nimble and lithe** (S3.6.5.2.): feeble, frail, frazzle; **long-things** (S3.6.11.1.): pole, drawl, haul, tattle; **run** (S3.6.9.2.): raffle, ripple, rill, runnel, vehicle.

S5.2.4. Final \b\

e.g. English: **bulge** or **ball** (S3.1.11.): orb, knob, scrub (low-growing plants), slab, tab, drib; **sudden** (S3.7.1.): dab, drub, throb.

S5.2.5. Final \ʃ\:

e.g. English: **disperse** and **leak** (S3.6.17.): crash, crush, smash , gash, mesh; **thread** (S3.6.12.1.): lash, leash, plush; **go forward** (S3.6.14.2.2): push, bash, dash, plash, flush, gush, publish, rush; **slow** and **consume** (S3.6.15.): finish, sluggish.

S5.2.6. Final \tf\:

e.g. English: **touch** (S3.5.22.1.): touch; **hold together** (S3.5.22.2.): catch, clench, clinch,

clutch, hitch, scotch, pinch, match; **sudden** (S3.7.1.): punch, quench; **puff** (S3.6.4.1.): pitch; **line of vision** (S3.6.12.2.): search; **narrow chink** (S3.5.26.): ditch, **disperse** and **leak** (S3.6.17.): leach, scrunch, scratch, hatch; **go forward** (S3.6.14.2.2.): stretch.

5.2.7.Final \w\:

e.g.English: **rotate**, **circle**, **surround**, **curve** (S3.1.1.): clew, dew, slew, screw, skew; **fluid** (S3.6.10.): flow; **lengthen** (S3.6.14.2.1): slow.

## S6. Association items of pure vowel

S6.1 Association starting point of pure vowel

S6.1.1.The position of lips

Vowels can be divided into rounded vowels (\o\, \u) and unrounded ones (\a\, \e\, \i\, \ə\). The articulation movements of these two kinds are all visible.

S6.1.2. The aperture of mouth

There are “large (rounded)” (\o) and “small (rounded)” (\u) two kinds in rounded vowel group and “large (unrounded)” (\a), “mid (unrounded)” (\e\, \ə) and “small (unrounded)” (\i) three kinds in unrounded vowel group. The articulation movements of these two groups are also visible.

S6.1.3. The auditory articulation location

Conforming to the raised parts (front or back) of the tongue, the auditory places of articulation are successively: forefront (\i), mid-front (\e), front (\a), middle (\ə), back (\u), very back(\o).

S6.1.4. Sonority

The auditory sonority degrees are successively: strongest sonority (\a), strong sonority (\o\, \e), weak sonority (\u, \i).

Sonority is related to the aperture of mouth. Vowels with large aperture have strong sonority

S6.1.5.tone-colour

The auditory degrees of tone-colour are:

Brightest (\a), brighter (\e), bright (\i), middle (\ə), darker (\o), darkest (\u).

The brightness of the tone-colour is related to the articulatory places. Front vowels are bright while back vowels are dark. The brightness is also related to the aperture of mouth. Vowels with large aperture are usually bright.

S6.2. Intimated images associated from the shape of vocal organs caused by articulation

S6.2.1.Unrounded vowel

S6.2.1.1.Vowel \i\ (association starting point: “small (unrounded)”)

S6.2.1.1.1. **Thin, little, narrow, few** and other related or similar things

e.g. Chinese: 一(\ji\ one), 细(\ji\ in small particles; narrow; thin; slender), 希(\ji\ 2.few; rare), 稀(\ji\ rare; few; thin), 眯(\mi\ narrow one's eyes), 滴(\di\ drop,very small quantity); Latin: minime (least; very little), minus (less), minimus (least; smallest), mica (crumb; grain), fissum (slit; fissre), hilum (a whit), sigilla (little figures); English :little, midget, drib, pill, thin, bit, seam[si:m], brief[bri:f], teeny, wee, weeny=weenie.

S6.2.1.1.2. **Near** and other related or similar things

e.g.Chinese: 近(\dzin\ near), 密(\mi\ (of space between two things)small), 倚(\ji\ lean on), 依(\ji\ 1.be attached to; stay close to), 衣(\ji\ clothes,they are next to the skin) ; Latin: finitimus (neighbouring; adjoining; akin), vicinus (neighbouring; nearby); English: near, intimate[intimit], similar.

S6.2.1.2.Vowel \a\ (association starting point: “large (unrounded)”)

**Large, long, wide** and other related or similar things

e.g. Chinese: 大(\da\ big; large; great(in volume, area, quantity, etc.)), 发(\fa\ 2.enlarge; extend; develop, hair), 浩(\hau\ great; vast; grand; many; much), 庞(\paŋ\ massive; mammoth), 胖(\paŋ\ obese), 茂(\mau\ dense; rank( growing too luxuriantly); rich), 张(\dzaŋ\ 1.tension;draw a bow; stretch; spread), 长(\dzaŋ\ grow; develop), 长(\tsaŋ\ long; strong points; be strong in), 胀(\dzaŋ\ grow in size; distend; swell; be bloated), 涨(\dzaŋ\ of solids swell after absorbing water, etc.), 宽(\kuan\ wide; beaded; roomy), 满(\man\ hold as much as possible), 漫(\man\ overflow; all over a place; extensive; long), 海(\he\ sea; extra large; numerous), 遥(\jau\ distant; remote; far); Latin: amplius (large; spacious; great; abundant), magis (more), magnus (great; large; big; tall; loud), mare (sea), grandis (large; great; tall; strong), latus (broad; wide; extensive), massa (lump; mass), saxum (rock; boulder), vage (far afield); English: large, vast, vat, salle, many, maximum, fat, brag, cram, far, grand, quaff, mass, mighty, magnate, massive, mammoth, rank ( .growing too luxuriantly), spacious.

S6.2.2. Rounded vowel

S6.2.2.1.Vowel \u\ (association starting point: “small (rounded)”)

S6.2.2.1.1. **Rotate, circle, surround, curve** and other related or similar things

e.g. Chinese: 团(\tuan\ something ball-shaped), 转(\tuan\ to roll round with the hand), 滚(\guən\ roll), 碾(\guən\ stone roller), 辊(\guən\ roller), 环(\huan\ ring,loop), 回(\hue\ surround; revolve; return(turn to original place)), 徊(\huai\ walk around), 还(\huan\ return(turn to original place)), 寰(\huan\ globe; earth), 纆(\huan\ noose), 环(\huan\ a annular thing), 鬟(\huan\ bun of hair), 眶(\kuaŋ\ eye socket), 框(\kuaŋ\ a circle, circumscribe), 廓(\kuo\ 1. the circumference of the object; outline), 轮(\luən\ wheel), 涡(\luo\ whorl in a fingerprint), 螺(\luo\ spiral shell), 珠(\dzu\ pearl; bead), 转(\dzuan\ turn; rotate), 啭(\dzuan\ warble); Latin: uber (breast), umbilicus (navel, log), uncus (crooked), unio (pearl); English: hoop[hu:p] ( .ring, band), loop[lu:p].

S6.2.2.1.2.**Envelop** and other related or similar things

e.g. Chinese: 储(\tsu\ store; stockpile), 贮(\dzu\ store; save; lay aside), 墓(\mu\ grave, where a dead person is buried), 幕(\mu\ canopy), 捂(\wu\ cover up), 袱(\fu\ covering cloth; cloth-wrapper), 伏(\fu\ 1.lean on; bend over; 2.hide; lurk), 覆(\fu\ cover; coat), 裹(\guo\ enfold in; pack in); Latin: humo (bury); English: roof[ru:f], room[ru:m], muffle, mulch, tomb[tu:m].

The aperture of mouth is very small and nearly closed.

S6.2.2.2.vowel \o\ (association starting point: “large (rounded)”)

S6.2.2.2.1. **Hole or orb** and other related or similar things

e.g. Chinese: 口(\kou\ mouth,entrance), 洞(\doŋ\ hole), 孔(\koŋ\ aperture), 果(\guo\ fruit), 饽饽(\bobo\ steamed bun), 脖(\bo\ neck), 馍馍(\mo\ steamed bun), 磨(\mo\ mill; millstones,which is a pair of large round stones), 周(\dzəu\ circumference); Latin: os ( . mouth; face; entrance, opening), orbis (circle; ring; disc; orbit), sol (sun), mola (millston), globus (ball; sphere), ovum (egg), monile (necklace); English: oral, orb, bore (make a round hole), cobble, dome, dough, foam, froth, knob, pock, polo, pox.

S6.2.2.2.2.**Bulk** and other related or similar things

e.g. Chinese: 厚(\hou\ thick), 扩(\kuo\ expand; enlarge; extend), 阔(\kuo\ wide; beaded; vast), 隆(\loŋ\ bulge; grand; prosperous), 容(\roŋ\ contain; capacitate; tolerate), 硕(\suo\ large; huge), 胴(\doŋ\ torso), 肿(\dzon\ swollen; tumid), 冢(\dzon\ tomb); Latin: bos (ox; cow), os

( bone); mons (mountain), moles (mass; bulk; pile); English: bloat, block, rock ( large, detached stone or boulder), body, bole, bone, cob, clod, broad, mound, mount, mow, podge, tomb, torso.

#### S6.2.2.2.3. **Galore, great, weighty** and other related or similar things

e.g. Chinese: 多(\duo\ many; much; more; a lot of), 博(\bo\ rich; abundant; big), 宏(\hon\ great; grand; magnificent), 鸿(\hon\ great; grand), 众(\dzon\ many; numerous), 重(\dzon\ heavy; weighty); Latin: boo (cry aloud), potius (rather; more); English: galore, lot, more, most.

### S6.3. Associate the auditory places of articulation with the intimated things

#### S6.3.1. Vowel o\ (association starting point: “very back”)

##### **Intimating oneself** and other related or similar things

e.g. Chinese: 我(\wo\ I), 我们(\womən\ we); Latin: ego( I ), nos (we, us; I, me), noster (our, ours; for us; my), English: our, own.

#### S6.3.2. Vowel i (association starting point: “forefront, weak sonority”)

S6.3.2.1. The **feeling of stretching or leaving from oneself** and other related or similar things

e.g. Chinese: 离(\li\ be away from; space distance; time interval), 弃(\tʃi\ discard; desert), 移(\ji\ move; remove; shift), 迤(\ji\ go(or extend) towards), 轶(\ji\ be lost), 逸(\ji\ escape; run away); Latin: disto (be apart; be distant; be different), linquo (leave,quit; let alone), migro (remove; pass away), mission (sending; release); English: leave, flee, free, cede, deep (going far in from the outside or the front edge), de-[di:](4.leave).

People usually think that the farther the sound source is, the weaker the sound they hear. Therefore “forefront, weak sonority” causes the feeling of stretching or leaving from oneself.

##### S6.3.2.2. **Intimating the third person** and other related or similar things

e.g. Chinese: 伊(\ji\ he or she), 彼(\bi\ that; those; the other; another), 其(\tʃi\ his; her; its; their; he; she; it; they; that; such); Latin: is, ea, id (he,she, it; this, that, the; such), ille (that, that one; he, she,it); English: he[hi:, i:], she, it.

#### S6.3.3. Vowel a (association starting point: “front, strong sonority”)

##### **Familiar feeling**

e.g. Chinese: 妈(\ma\ ma), 爸(\ba\ pa), 伴(\ban\ 1.companion; partner, 2.accompany), 达(\da\ reach), 到(\dau\ arrive; reach), 旁(\paŋ\ side; by the side of), 阿-<prefix > (\a-\used between a name or surname, to make it sound more endearing); Latin: mamma (ma), mater (mother), pater (father), avus (grandfather; ancestor), avia (grandmother), amans (lover), amator (lover; paramour), amatus (paramour), amicus (friend), amica (friend; mistress), blande (flattering; charming), frater (brother), papas (tutor); English:darling, father, pa, ma, paramour.

#### S6.3.4. Vowel u (association starting point: “back”)

**Intimating the second person and sometime intimating oneself** and other related or similar things

e.g. Chinese: 吾(\wu\ I or me; we or us), 汝(\ru\ you); Latin: tu (you; thou), uxor (wife); English: thou.

#### S6.3.5. Vowel e (association starting point: “mid-front”)

##### The **degree of the feeling of distance and familiarity is between those of |a| and |e|**

e.g. Chinese: 挨(\e\ one by one;be next to), 偎(\we\ cuddle;snuggle up to), 陪(\pe\ accompany), 媒(\me\ intermediary; medium; matchmaker), 介(\dʒie\ in between), 爷爷(\jeje\ grandfather), 奶奶(\nene\ grandmother); Latin: medius (middle; the middle of; intermediate;

middling), medietas (mean); English: friend[frend], centre.

#### S6.4. Associating the feeling of sonority with intimated things

##### S6.4.1. Vowel i (association starting point: “weak sonority”)

###### S6.4.1.1. **Weak** and **little** and other related or similar things

e.g. Chinese: 苗(\miau\ young plant), 芽(\ja\ sprout), 丫(\ja\ girl), 伢(\ja\ child; kid), 幼(\jəu\ infant; child), 嬰(\jij\ baby; infant); Latin: pipio (young bird), pipilo (chirp); English: weak, feeble, female (the weaker sex), chit, peep (weak, shrill sound made by young birds), duck-ling, dog-gie, dog-gy, lion-et[-it](young lion)

The <suffix >[-lij], [-gi], [-it] all indicate “young” and there is an \i\ in the three suffix.

###### S6.4.1.2. **Quiet** and other related or similar things

e.g. Chinese: 宁(\niŋ\ peaceful; quiet), 静(\dʒiŋ\ quiet; silent; calm), 幽(\jou\=\iou\ secluded valley; quiet), 寂(\dʒi\ quiet; silent; lonely), 休(\ʃiou\ cease), 息(\ʃi\ 1. cease; rest), 歇(\ʃie\ have a rest; cease), 秘(\mi\ something keep hidden), 隐(\jin\ hide; hidden; secret), 阴(\jin\ 1. hidden; shade; secret), 蔽(\bi\ cover, shelter, hide), 疑(\ji\ doubt; suspect); Latin: silens (silent; still); English: peace (calmness), serene, cease, sleep, peer, peep, secret, mystic, cryptic, fear, grieve.

##### S6.4.2. Vowel e (association starting point: “strong sonority”)

###### **Young** and other related or similar things

e.g. Chinese: 蓓蕾(\be\le\ a young tightly rolled-up flower), 孩(\he\ child), 健(\dʒien\ healthy); Latin: gemma (bud), herba (young plant; grass), spes (hope; expectation), spero (hope; hope for); English: fresh, maid\med\ (girl or young woman), maiden\medn\.

##### S6.4.3. vowel a (association starting point: “strongest sonority”)

###### S6.4.3.1. **Loud**, **strong** and other related or similar things

e.g. Chinese: 喊(\han\ shout; yell), 响(\ʃian\ loud and clear; sonorous), 闹(\nau\ boisterous; be bustling), 强(\tʃian\ strong; powerful), 壮(\dʒuan\ strong; robust; grand), 劳(\lau\ labour); Latin: clamo (shout), magnus (2. loud), valeo (be strong; healthy; be powerful), gravis (heavy; strong), labor (labour), validus (strong; powerful; healthy); English: bark, cry, grand, loud[laud].

###### S6.4.3.2. **Manly** and other related or similar things

e.g. Chinese: 汉(\han\ man), 悍(\han\ brave; bold; valiant), 男(\nan\ man; male), 阳(\jaŋ\ 1. male; manly), 刚(\gaŋ\ firm; strong; indomitable); Latin: mas (male; man; manly), English: man, jack.

##### S6.4.4. Vowel o (association starting point: “strong sonority”)

###### **Loud**, **powerful** and other related or similar things

e.g. Chinese: 轰(\hoŋ\ (of thunder)rumble; (of artillery)bombard), 洪(\hoŋ\ flood; vast), 哄(\hoŋ\ roars; hubbub), 吼(\hou\ roar), 迫(\po\ compel; force; press); Latin: boo (cry aloud); fortis (strong; sturdy; brave); English: bold, bomb, crow, force, strong, robust, roar, flood, sonorous, loud.

#### S6.5. Associating the feeling of tone-colour with intimated things

##### S6.5.1. Vowel i (association starting point: “bright, weak sonority”)

###### **Limpid** or **snowy (bright)** and other related or similar things

e.g. Chinese: 清(\tʃiŋ\ pure; clear; limpid), 秀(\ʃiou\ elegant; clever), 洁(\dʒie\ clean; pure), 净(\dʒiŋ\ clean), 冷(\liŋ\ cool and fresh), 黎明(\li\miŋ\ dawn; daybreak), 晓(\ʃiau\ dawn; daybreak), 寅(\jin\ period of the day from 3 a.m. to 5 a.m.), 阴(\jin\ (2. female), 牝



(pin\ (of some birds and animals)female), 妣 ( \bi\ deceased mother ); Latin: limpidus (clear; limpid), lymphā (water; spring), nix (snow), nivalis (snowy), sincerus (clean; pure), virgo (maid, virgin; girl), mulier (woman; wife); English: clean, clear, chill, crystal, lily, limpid, female[fi:meil], pistil.

words like limpid, pure or white are often used to describe female.

S6.5.2. Vowel e (association starting point: “brighter, strong sonority”)

S6.5.2.1. **Azure, green (brighter)** and other related or similar things

e.g. Chinese: 彩(\tse\ colours; applause), 采(\tse\ spirit; esprit; vitality), 美(\me\ beautiful; pretty), 翠(\tsue\ emerald green; green), 蔚(\we\ luxuriant, azure); Latin: herbeus (grass-green), herba (young plant; grass), caeruleus (blue; dark green), ver/veris (spring); English: fair[fæə], meadow[medəu].

S6.5.2.2. **Moderate, pleased** and other related or similar things

e.g. Chinese: 悦(\iwe\ joyous; happy; merry), 捷(\dʒie\ agile; nimble), 媚(\me\ charming; fascinating), 爱(\e\ love; like; be fond of), 蔼(\e\ friendly; amiable), 慰(\we\ console; comfort; pleased), 谐(\jie\ in harmony); Latin: delecto (delight; amuse), beo (gladden; bless; enrich), belle (well; nicely), levis (light; gentle), laetus (2.glad; cheerful), celer (quick; swift), velox (quick; rapid), benign (willingly; courteously), beatus (happy; prosperous), felix (fruitful; favourable), mel (honey), creo (create), decet (suits), bene (well; correctly), melior (better), certe (assuredly); English: well, better, clever, favo(u)r\fevə\, bless, merry, gay\ge\, gentle.

S6.5.3. Vowel a (association starting point: “brightest, strongest sonority”)

**Fiery colour, hotly (brightest)** and other related or similar things

e.g. Chinese: 丹(\dan\ red; cinnabar), 胭(\jan\ rouge, a red substance), 阳(\jar\ 2.sunlight; sunny), 耀(\jau\ shine; flaunt; very bright light), 曜(\jau\ sunlight; shine), 照(\dzau\ 1.shine; light up), 烤(\kau\ bake; roast; warm oneself by a fire), 暖(\nuan\ warm; warm up), 旺(\wuɑŋ\ burgeoning; flourishing), 夏(\fia\ summer), 笑(\fiau\ laugh; smile), 欢(\huan\ joyous; happy; vigorously; love), 狂(\kuaŋ\ violent; heartily), 褒(\bau\ praise; commend), 赞(\dzan\ applaud; acclaim), 扬(\jar\ hoist; commend); Latin: flamma (flame; fire; fiery colour), candeo (shine; be white-hot), calor (warmth; heat), aestas (summer), caleo (be warm; be hot; be inflamed), amo (love; like), amatio (lovmaking), amor (love; strong desire), aveo (desire; long for), mactō (glorify), saltatus (dance), laus (praise; glory; fame), plaudo (clap; applaud); English: lamp, bask, laugh, happy, mad, dance, laud, bravo, applaud.

S6.5.4. Vowel o (association starting point: “darker, strong sonority”)

**Saffron, yellow (darker)** and other related or similar things

e.g. Chinese: 棕(\dzɔŋ\ brown); Latin: croceus (saffron; yellow); English: brown, yellow, loess.

S6.5.5. Vowel u (association starting point: “darkest, weak sonority”)

S6.5.5.1. **Dark, dirty, cool, damp (darkest)** and other related or similar things

e.g. Chinese: 乌(\wu\ black; dark), 污(\wu\ dirt; filth; defile), 秽(\hue\ dirty; unclean), 灰(\hue\ ash; dust; grey), 土(\tu\ soil), 怖(\bu\ fear; be afraid of), 怵(\tsu\ be afraid; fear), 慊(\tsu\ be afraid; shy), 糊(\hu\ blurred messy; confused), 晦(\hue\ not obvious, dim), 昏(\huən\ dim; muddled; confused), 悞(\huən\ slow-witted; muddled), 浑(\huən\ muddy; murky; muddleheaded), 混(\huən\ mix; confuse), 浊(\dzu\ turbid; murky), 溷(\huən\ muddy; murky), 暮(\mu\ dusk), 雾(\wu\ fog; fine spray of water), 瞽(\gu\ blind); Latin: pullus (dark-grey; mournful), furvus (black; dark), fuscus (dark; swarthy), bruma (winter solstice), brutus (heavy;

stupid), umbra (shadow; shade; ghost), nubilus (cloudy; gloomy; sad), uligo (moisture; marshiness), umeo (be damp; be wet), umor (moisture; liquid), uvesco (become wet), nubes (cloud; gloom); English: cool, murk, dull, dun, gloom, loom, dull, dust, dusk, brume, fume, fuddle, fuzz, muddle, muddy, funk, shudder, ugly.

#### S6.5.5.2. **Doom, rotten, mournful** and other related or similar things

e.g. Chinese: 哭(\ku\ cry; weep), 困(\kuən\ be trapped; hardship), 苦(\ku\ 2.hardship; suffering; pain), 酷(\ku\ cruel), 误(\wu\ harm; damage), 亡(\waŋ=uaŋ\ die perish; deceased), 卒(\dzu\ finish; end; die), 无(\wu\ nil; no; not), 枯(\ku\ wither), 腐(\fu\ rotten; decay; fetid), 毒(\du\ poison; poisonous), 蛊(\gu\ venomous insect), 骷((\ku\ withered skull), 髑(\du\ skull of a dead person); Latin: ululo (howl; cry out to), luctus (mourning; lamentation) , ulcus (sore; ulcer), pus (pus) , puter (rotten; decaying), funus (funeral; death; corpse; ruin; destruction), nullus (no; none; not; non-existent); English: ruth, funeral, funereal, glum, gruff, grumpy, humus, fungus, muck, musty, rust, punk, ulcer, ruin, doom, cruel, null, mute.

#### S6.5.5.3. **Hide; lurk** and other related or similar things

e.g. Chinese: 伏(\fu\ 2.hide; lurk), 妒(\du\ jealous; grudge), 躲(\duo\ hide oneself), 鬼(\gue\ ghost), 诡(\gue\ deceitful), 贿(\hue\ bribe), 诬(\wu\ slander, calumniate); Latin: fur (thief), furto (secretly) ; English: ruse, lurk, fudge, grudge.

### **S7. Symbolic meaning of Chinese single-morpheme words**

Most single-morpheme words in Chinese are single-syllable words. The symbolic meaning of the whole syllable is decided by the initial consonant and the following simple or compound vowel, for examples:

大(\da\ big; large; great), the consonant \d\ intimats “pointing to somebody / thing” (see 3.4.3.) and the following wide-open vowel \a\ intimats “big” (see S6.2.1.2.).

细(\fi\ thin (in diameter);slender), the consonant \f\ intimats “narrow” (see S3.5.26) and the following vowel \i\ intimats “the feeling of stretching” (see S6.3.2.1.).

小(\fiau\ small, little), the consonant \j\ intimats “narrow” (see S3.5.26) and the following rounded compound vowel \au\ is appropriate to \o\ for intimating “bulk”.

凸(\tu\ protruding; convex), the consonant \t\ intimats “pointing to somebody / thing” (see S3.4.3.) and the following rounded vowel \u\ intimats “protrude” (see S3.1.3.).

凹(\au\ concave; sunken; as opposed to “convex”), the rounded compound vowel \au\ intimats a cave (\au\ is similar to \o\).

打(\da\ knock; hit), the consonant \d\ intimats “move up and down” (see S3.5.21.) and the following vowel \a\ intimats “strong” (forceful, see S6.4.3.1.).

拉(\la\ lengthen), the consonant \l\ intimats “lengthen” (see S3.6.13.2.) and the following vowel \a\ intimats “strong” (forceful, see S6.4.3.1.).

推(\tue\ push; shove), the consonant \t\ intimats “touching somebody / something” (see S3.5.22.1.) and the following rounded vowel \ue\ makes lips protruded (see S3.1.3.) to intimat “forward”.

Table S1 The identified phonemes

The superscript <sup>h</sup> indicates aspirated sound. The superscript <sup>o</sup> indicates voiceless sound. The superscript <sup>w</sup> indicates rounded sound.

Ident.	Latin	English	Chinese	Ident.	Latin	English	Chinese
\P\	[P]	[P]	[p <sup>h</sup> ]	\m\	[m]	[m]	[m]
\b\	[b]	[b]	[b <sup>o</sup> ]	\n\	[n]	[n]	[n]
\t\	[t]	[t]	[t <sup>h</sup> ]	\ŋ\		[ŋ]	[ŋ]
\d\	[d]	[d]	[d <sup>o</sup> ]	\j\	[j]	[j]	[j]
\k\	[k]	[k]	[k <sup>h</sup> ]	\w\	[w]	[w]	[w]
\g\	[g]	[g]	[g <sup>o</sup> ]	\r\	[r]	[r]	[ɹ]
\f\	[f]	[f]	[f]	\l\	[l]	[l]	[l]
\v\	[v]	[v]	[v]	\h\	[h]	[h]	[x]
\s\	[s]	[s][θ]	[s] [ʃ]	\i\	[i][i:]	[i][i:]	[i]
\ts\	[ts]	[ts]	[ts <sup>h</sup> ][tʃ <sup>h</sup> ]	\e\	[e][e:]	[e][ei]	[ɛ][ei]
\z\	[z]	[z]		\a\	[a][a:]	[æ][ai][a:]	[a][A]
\dz\		[dz]	[dz <sup>o</sup> ][dʒ <sup>o</sup> ]	\o\	[o]	[əu][ɔ:] [ɔ]	[o][əu]
\ʃ\	[ʃ]	[ʃ]	[ɕ]	\u\	[u][u:]	[u][u:] [ʌ]	[u]
\tʃ\		[tʃ]	[tɕ <sup>h</sup> ]	\ə\		[ə][ə:] [ʌ]	[ɤ][ə]
\dʒ\	[dʒ]	[dʒ]	[dʒ <sup>o</sup> ]	\i <sup>w</sup> \			[y][ɥ]

Table S2 The identified phonemes of Chinese initial consonants

Initial	Ident.	IPA	Initial	Ident.	IPA	Initial	Ident.	IPA
b	\b\	[b°]	l	\l\	[l]	zh	\dz\	[dz°]
p	\p\	[p <sup>h</sup> ]	g	\g\	[g°]	ch	\ts\	[tʂ <sup>h</sup> ]
m	\m\	[m]	k	\k\	[k <sup>h</sup> ]	sh	\s\	[ʃ]
f	\f\	[f]	h	\h\	[x]	z	\dz\	[dz°]
d	\d\	[d°]	j	\dʒ\	[dʒ°]	c	\ts\	[tʂ <sup>h</sup> ]
t	\t\	[t <sup>h</sup> ]	q	\tʃ\	[tʃ <sup>h</sup> ]	s	\s\	[s]
n	\n\	[n]	x	\ʃ\	[ʃ]	r	\r\	[ɹ]

Table S3 The identified phonemes of Chinese vowels

Vowel	Ident.	IPA	Vowel	Ident.	IPA	Vowel	Ident.	IPA
a	\a\	[A]	i	\i\	[i]	uan	\uan\	[uan]
ai	\ai\	[ai]	ia	\ia\	[iA]	uang	\uaŋ\	[uaŋ]
ao	\au\	[au]	iao	\iau\	[iau]	uei	\ue\	[uei]
an	\an\	[an]	ian	\ien\	[ien]	uen	\uən\	[uən]
ang	\aŋ\	[aŋ]	iang	\iaŋ\	[iaŋ]	ueng	\uəŋ\	[uəŋ]
ê	\e\	[ɛ]	ie	\ie\	[iɛ]	uo	\uo\	[uo]
e	\ə\	[ɤ]	in	\in\	[in]	ü	\i <sup>w</sup> \	[y]
ei	\ei\	[ei]	ing	\iŋ\	[iŋ]	üe	\i <sup>w</sup> e\	[ɥɛ]
en	\ən\	[ən]	iou	\iou\	[iəu]	üan	\i <sup>w</sup> en\	[ɥɛn]
eng	\əŋ\	[ɤŋ]	iong	\ioŋ\	[iəŋ]	ün	\i <sup>w</sup> ən\	[ɥən]
o	\o\	[o]	u	\u\	[u]	si	\s\	[sɿ]
ou	\ou\	[əu]	ua	\ua\	[uA]	shi	\s\	[ʃɿ]
ong	\oŋ\	[oŋ]	uai	\uai\	[uai]	er	\r\	[əɿ]

able S4 The association starting points of initial consonants

\* Corresponding to English; # Corresponding to Chinese; - Having contact of articulators but no air accumulated

Category	Starting point	p	b	m	j	w	f	v	t	d	n	l	r	s	z	ts	dz	k	g	h	ʃ	tʃ	dʒ	
Position of lips	Spreading	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Rounding					+																		
Place of articulation [Location of closure in oral cavity] {Aperture of mouth}	Lips; [Front]; {Closed}	+	+	+		+																		
	Upper teeth to lower lip; [Front, On face]; {Closed}						+	+																
	Tongue tip to upper teeth-ridge; [Middle]; {Slightly open}								+	+	+	+		+	+	+	+					+	+	+
	Tip of tongue to palate; [Middle]; {Slightly open}												+											
	Front of tongue to palate; [Middle]; {Slightly open}				+																	+	+	+
	Back of tongue to palate; [Back, Inner]; {Well open}																	+	+	+	#			
	Glottis; [Back]; {Well open}																			+	*			
	Nose passage			+								+												
Separated movements	Lifting and dropping tip of tongue								+	+	+	+	+	+	+	+	+							
	Lifting and dropping front of tongue																					+	+	+
	Lifting and dropping back of tongue																	+	+	+	#			
	Curl back tongue												+											
	Revealing closed teeth														+	+	+	+				+	+	+
Manner of stricture [Air stream]	Contact of articulators (Obstructed); [Air accumulated]	+	+	-					+	+	-	-				+	+	+	+			+	+	
	Approach of articulators (Friction); [Weak]						+	+						+	+	+	+			+	+	+	+	
	Vocal tract is narrowed slightly (Approximant); [Strong]				+	+						+	+											
	Plosive	+	+						+	+						+	+	+	+			+	+	
	Continuant						+	+				+	+	+	+	+	+			+	+	+	+	
Features of sound	Nasal, Glottal			+							+									+				
	Strident													+	+	+	+				+			

