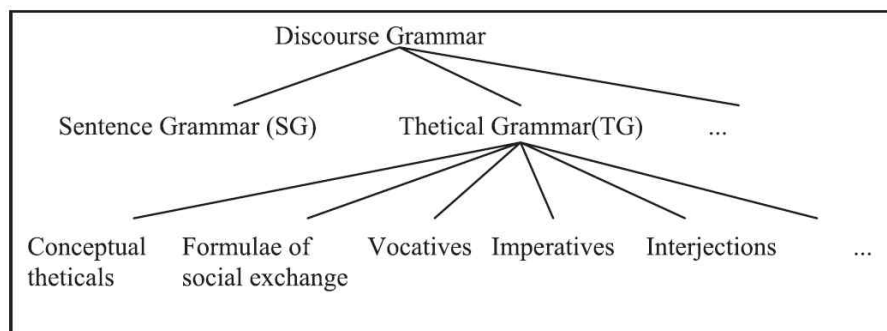


Grammar of Sound: Ideophones and Synesthetic Perception in Korean

1. Introduction

- How much of language is covered by the notion of ‘grammar’?
- Diffloth (1994: 107): “From the start, one must admit that the study of sound symbolism has a tarnished reputation in current linguistics. Among several reasons, the poor quality of the evidence is sufficient to explain why many theoreticians show a definite lack of interest in this topic.”
- objections to onomatopoeia (Saussure 1959: 69; as cited in Nuckolls 1996: 7-8)
 - (1) (i) “onomatopoeic formations are never organic elements of a linguistic system”
 - (ii) numerically insignificant
 - (iii) subject to change over time and thus not purely imitative
 cf. Kita (1997) two-dimensional semantic representation (analytic & affecto-imagistic)
 cf. Samarin (2001) semantic contribution
- (2) A sketch of the architecture of Discourse Grammar (Kaltenböck et al. 2011, Heine 2013: 1217)



- Ideophones can be a good candidate of a Discourse Grammar component (Heine, p.c.).
 - African languages systematically and extensively utilize ideophones (Samarin 1971; Voeltz & Kilian-Hatz 2001 and works therein; Frajzyngier, p.c.).
 - Native American languages, Asian languages, Australian languages also have rich ideophone systems (works in Hinton et al. 1994, Bodomo 2006).
 - Japanese has a large inventory of ideophones (Hamano 1994, Kita 1997, Akita 2012, 2013, 2017, Dingemanse & Akita 2017, Katsuki-Pestemer 2014)
 - Korean has arguably one of the richest inventories of color terms, taste terms, and smell terms across languages (Rhee 2016, Rhee & Koo 2017).
 - Many of these involve ideophones (cf. c. 29,600 entries in an authoritative dictionary)
- (3) Korean ideophone examples¹⁾
- a. *-usulum* [-ʌsʌrʌm] (-으스름): (< 으스르) sound coming from minimal friction of a gliding motion (e.g. of a sliding door smoothly opening along a rail)
 - b. *tululu* [tʌrʌrʌ] (드르르): sound coming from a round or lubricated object rolling on a smooth surface (e.g. of a bead rolling on a platter)

1) Some Romanization, phonemic and phonetic renderings are presented in a loose manner for convenience’s sake.

- c. *chikchik* [ʃ^hikʃ^hik] (칙칙): sound of a wet stubby object brushing on a surface repeatedly (e.g. of a paint brush on canvas, or of an aerosol paint sprayed unto canvas)
- d. *swuk* [suk] (숙/수옥): sound of an object moving into an object with minimal friction for certain depth (e.g. a well-sharpened knife deeply driven into a pumpkin)
- e. *tengteng* [tɛŋdɛŋ] (땡땡): sound of a metal object hitting another metal object (e.g. a metal club hitting a bell)
- f. *cwukcwuk* [ʃukʃuk] (죽죽): sound of a sharp object scratching on a surface (e.g. a chalk drawing long lines on a blackboard)
- g. *thwungthwung* [t^hunt^hun] (툭툭): sound of a wooden container hit by an object (e.g. an oak-barrel hit by a stick)

2. Preliminaries: Ideophones and Sound Symbolism

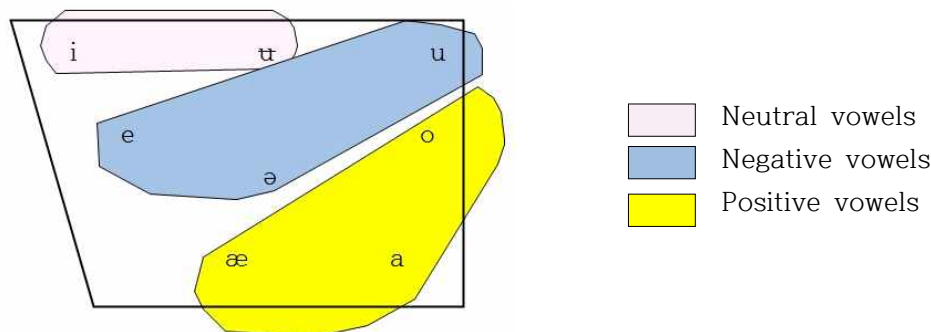
2.1 Ideophones

- terminology: ‘expressives’, ‘mimetics’, ‘sound-symbolic words’, ‘phonaesthetic words’, ‘onomatopoeia’
- Doke (1935: 118) ‘ideophone’: “A vivid representation of an idea in sound. A word, often onomatopoeic, which describes a predicate, qualificative or adverb in respect to manner, colour, sound, smell, action, state or intensity” (as cited in Voeltz & Kilian-Hatz 2001: 1)
- Trask (1993: 131-132): “One of a grammatically distinct class of words, occurring in certain languages, which typically express either distinctive sounds or visually distinctive types of action”
- Crystal (1997: 189): “any vivid representation of an idea in sound, such as occurs through onomatopoeia”
- Hinton et al. (1994): Corporeal sound symbolism (cough, etc.), Imitative sound symbolism (barking, etc.), Synesthetic sound symbolism (properties, size, shape, etc.), Conventional sound symbolism (*gl-* words in English)

2.2 Vowel Polarity

- Korean has a very elaborate system of sound symbolism for consonants and vowels (Jung 1938, Kim 1976, Kim-Renaud 1976, Martin 1962, Koo 2007)

(4) vowel polarity



- (5) (i) ‘positive’ vowels: [a], [o], [æ], and diphthongs involving them describing small, delicate, and bright objects, and movements arousing such sensation
 - (ii) ‘negative’ vowels: [ə], [e], [u], and diphthongs involving them describing big, crude, and dark objects, and movements arousing such sensation
- cf. Diffloth (1994): [i] for big, [a] for small (contra Sapir 1929, Newman 1933, Jespersen 1933, Tarte 1974)

2.3 Iconicity of Force Dynamics

- Force-dynamic iconicity: Forces involved in tensing and aspiration in articulatory gestures are systematically represented in semanticization of word derivation and new word coinage (Koo 2007: 201-202).
- Plain-Tensed-Aspirated tripartite correlation
p-ph-pp [b-p^h-p'], t-th-tt [d-t^h-t'], k-kh-kk [g-k^h-k'], c-ch-cc [tʃ-tʃ^h-tʃ'], etc.

(6) Tensed: more localized and intensified force

- a. [bogʌlbogʌl] e.g. water boiling in a small pot
- b. [b'ogʌlb'ogʌl] e.g. thick stew boiling (Koo 2007: 201)

(7) Aspirated: more strongly exerted, but diffused, force

- a. [dʒolanʒolan] e.g. a colt walking behind its mother
- b. [tʃ^holanʒ^holan] e.g. a colt trotting along behind its mother (Koo 2007: 202)

2.4 Reduplication: Iconicity of Multiplicity

- Korean onomatopoeic words often involve phonological (partial) reduplication.

(8) reduplication: repetition of sound or motion

- a. [p^hʌŋdʌŋ] e.g. a big object falling into deep water
- b. [p^hʌŋdʌŋp^hʌŋdʌŋ] e.g. big objects falling into deep water in succession
- c. [p^hʌŋdʌdʌŋ] e.g. a big object with irregular surface falling into deep water, thus creating multiple splashes
- d. [p^hʌŋdʌdʌdʌŋ] e.g. a big object with irregular surface falling into deep water in a more extended duration of event than (c)

3. Color & Taste Terms

3.1 Color Terms

- Lexicographers list a large number of native color terms across nominal, adjectival and adverbial categories.

(9) Color studies and lexical entries

- a. Park (1989): 362 adjectives/verbs and 98 adverbs that describe colors and hues
- b. Nam (1992): 41 nouns that denote color names
- c. Kim (1994): 560 color terms
- d. Hong (2015): 429 adjectives in the 'black', 'white', 'red', 'yellow' and 'grue' categories
- e. Rhee (2016): 127 color terms in the 'red' category
- f. *Phyocwun Kwuke Taysacen* [A Comprehensive Standard Korean Dictionary]: 752 color terms (a la Hong 2015: 13)

- NB: But the listing is not exhaustive. cf. Koo (2009)
- In lexicalizing colors & hues in adjectival/adverbial categories, diverse strategies are recruited.

[Prefixation] (for saturation)

(10) prefixation of intensifying prefix

prefixes: *say-* [sæ-], *says-* [sæt-], *si-* [si-], *sis-* [sit] for darker, stronger hue
(higher saturation)

- a. Plain: *phalah-* [parat-] 'be grue (blue/green)'
Prefixed: *saysphalah-* [sætparat-] 'be strongly grue'
- b. Plain: *hayah-* [hayat-] 'be white'
Prefixed: *sayhayah-* [sæhayat-] 'be very white'

[Vowel Polarity] (for luminosity)

(11) positive vowels for bright hue vs. negative vowels for darker hue

Positive: [a], [o], [æ] Negative: [ə], [e], [u]

a. Positive: *nolah-* [norat-] 'be (bright) yellow'

Negative: *nwuleh-* [nurət-] 'be dark yellow'

b. Positive: *ppalkah-* [p'algat-] 'be (bright) red'

Negative: *ppelkeh-* [p'əlgət-] 'be dark red'

[Consonant Tensing/De-tensing] (for saturation)

(12) tense consonants for stronger hue vs. non-tense consonant for weaker hue (Note: If the base form is already tense, the alternative is de-tensification.)

a. Tensed (base form): *ppalkah-* [p'algat-] 'be red'

De-tensed: *palkah-* [balgat-] 'be reddish'

b. Plain (base form): *kem-* [gəm-] 'be black'

Tensed: *kkem-* [k'əm-] 'be dark black, pitch black'

[Reduplication] (for evenness of distribution)

(13) reduplication of color terms for multiple occurrences of saturated coloration over a space (i.e. spotty)

a. Plain: *pwulk-* [bulk-] adj. 'be red'

Reduplicated: *pwulkuspwulkus* [bulgʊtbulgʊt] adv. 'be reddish here and there'

b. Plain: *nolah-* [norat-] adj. 'be yellow'

Reduplicated: *nolusnolus* [norʊtnorʊt] adv. 'be yellowish here and there'

[Phonetic Extension via Suffixation] (for distribution & saturation)

- Phonetic extension by way of suffixing invokes the sense of extended surface and/or subdued hue.

(14) suffixes: [-ək'eha-, -əreha-, -əsrəmha-, -ək'ərəmha-, -əmureha-, -ək'umureha-], etc.

a. Plain: *nolah-* [norat-] 'be yellow'

Suffixed: *nolukkeyha-* [norək'eha-] 'be slightly yellowish'

b. Plain: *phalah-* [parat-] 'be grue'

Suffixed: *phalukkeyha-* [parək'eha-] 'be slightly grue'

[Phonetic Extension via Reduplicative Suffixation] (for distribution, saturation & attitude)

- Reduplicative suffixation invokes the sense of extended surface, uneven distribution, spottiness, and evaluation of the color being less pleasurable.

(15) reduplicative suffixes: [-əsuksukha-, -əɖʒapɖʒapha-/ -əɖʒəpɖʒəpha-,

-əɖʒokɖʒokha-/ -əɖʒukɖʒukha-/ -əɖʒəkɖʒəkha-, -əʃikʃikha-/ -əʃukʃukha-/ -əʃəkʃəkha-,

-əʃuŋʃuŋha-, -ədədəha-/ -ədədəha-, -ətwehweha-/ -ətwithwiha-, -ədɛndɛnha-/

-ədɪndɪnha-/ -əduŋduŋha-/ -ətunʈunʈa-], etc.

a. Plain: *kem-* [gəm-] 'be black'

Suffixed: *kemwucwukcwukha-* [gəmuɖʒukɖʒukha-] 'be unevenly, unpleasingly black'

b. Plain: *phwulu-* [puru-] 'be grue'

Suffixed: *phwuluthwungthwung* [purutunʈun] 'be unevenly, unpleasingly grue'

[Phonetic Extension via Discontinuous Reduplicative Suffixation] (for distribution)

- Discontinuous reduplicative suffixation invokes the sense of extended surface and uneven distribution.

(16) discontinuous reduplicative suffixes: [-ut -utha-, -ut̚ -utha-, -sun̚ -sun̚ha-, -d̥ʒək̚ -d̥ʒək̚ha-, -sil̚ -sil̚ha-], etc.

- | | | | | |
|----|-----------|--------------------------|--------------------|---------------------|
| a. | Plain: | <i>kkam-</i> | [k'am-] | 'be strongly black' |
| | Suffixed: | <i>kkamwuskkamwusha-</i> | [k'amutk'amutha-] | 'be spotty black' |
| b. | Plain: | <i>nolah-</i> | [norat-] | 'be yellow' |
| | Suffixed: | <i>nolusnolusha-</i> | [nor̥at̥nor̥utha-] | 'be spotty yellow' |

3.2 Taste Terms

- Taste terms form a very large inventory, often with fuzzy distinction with smell terms.

(17) Taste/Smell studies and lexical entries

- Park (1989): 105 adjectival taste terms
- Nam (1989): 83 adjectival taste terms:
- Nam (1992): 137 adverbial taste and/or smell terms
- Maeda (1978): 90 taste terms
- Lee (1986): 70 taste terms (& 22 synthetic taste terms w/ touch, vision, hearing, etc.)
- Rhee & Koo (2017): 268 taste terms (plus other taste descriptors on the web and broadcasting)

(18) Taste terms by category (Rhee & Koo 2017)

A. Primary Taste Category (146 terms)

Sweet: 20	Salty: 17	Sour: 26
Bitter: 10	Umami: 20	Pungent: 26
Fishy: 13	Bland: 14	

B. Extended Taste Category (41 terms)

Sweet + Sour: 6	Sweet + Bitter: 7	
Sour + Sweet: 6	Sour + Bitter: 5	
Pungent + Sweet: 4	Pungent + Bitter: 4	Pungent + Salty: 4

C. Tactility-Based Common Taste Terms (61 terms)

Astringent: 8	Burning: 11	Refreshing: 8
Slippery: 6	Sharp: 6	Lacking-stimulation: 15
Lacking-purity: 7		

D. Food Texture & Mastication (32 terms)

Dryness: 7	Substantiveness: 7	Resilience: 6
Crunchiness: 12		

[Consonantal Sound Symbolism]

- Consonantal force-dynamic sound symbolism modulates tastes.

(19) A. sweet: plain vs. aspirated

- plain [g]: *talkomha-* [dalgomha], *talkumha-* [dalgumha]...
- aspirated [k^h]: *talkhomha-* [dalk^homha], *talkhumha-* [dalk^humha]...

- B. sour: plain vs. aspirated
- plain [g]: *saykomha-* [sægomha], *saykumha-* [sægumha]...
 - aspirated [k^h]: *saykhomha-* [sæk^homha], *saykhumha-* [sæk^humha]...
- C. salty: plain vs. tensed
- plain [dʒ]: *ccapcalha-* [ʃ'apɔʒarha], *ccapcolumha-* [ʃ'apɔʒorumha]...
 - tensed [ʃ']: *ccapccalha-* [ʃ'apʃ'arha], *ccapccolumha-* [ʃ'apʃ'orumha]...
- D. umami: plain vs. tensed
- plain [g]: *kosoha-* [gosoha], *kosolomha-* [gosoromha]...
 - tensed [k']: *kkosoha-* [k'osoha], *kkosolomha-* [k'osoromha]...

[Reduplication]

(20) Reduplicative forms:

- sweet (*tal-*): *taltalha-*, *taltalumha-*...
- salty (*cca-*): *ccapccalha-*, *ccapcalha-*, *ccapccalumha-*...
- sour (*si-*): *sikhumsikhumha-*, *sikumsikumha-*...
- bitter (*ssu-*): *ssupssulha-*, *ssupssuleyha-*, *ssapssalha-*...

[Onomatopoeia]

(21) a. *thelthel* [t^həl^həl]: about something traveling over an uneven surface thus producing clattering sound (e.g. a vehicle on a bumpy unpaved road)

sikumthelthel [sigumt^həl^həl] (sour); *sikumteltelha-* [sigumtəldəl] (sour)...

b. *-ccekkcikun* [ʃ'əkʃ'igun]: about something stricken with an impact which leaves trailing, lingering effect on it (e.g. a tree, struck by lightning, breaking down with its limbs splitting apart at the moment of impact (cf. *wucikkun* [udʒik'un]), and, on a more bodily level, muscles cramped as a result of excessive labor giving the sensation (and imaginary sound) of splitting into threads at muscle movement (cf. *ppekcccekcikun* [p'əkʃ'əkʒ'igun]).

tulccekkcikunha- [dultʃ'əkʒ'igunha](sweet); *saychekkcikunha-* [sæʃ'əkʃ'igunha] (sour);

sichikunha- [siʃ'igunha](sour); *sicikunha-* [sidʒigunha](sour);

alccakcikunha- [alʃ'əkʒ'igunha](pungent); *elccekkcikunha-* [əlʃ'əkʒ'igunha](pungent);

pichekkcikunha- [biʃ'əkʒ'igunha](fishy); *pilichekkcikunha-* [biriʃ'əkʒ'igunha](fishy);

pilichikunha- [biriʃ'igunha](fishy)...

c. *-ulum* [urum]: about some sound or state extended in space or time with gradation

-tululu [duruu]; a round or lubricated object rolling on a smooth surface (e.g. a bead rolling on a platter; sliding door or roller traveling along a guiding channel)

-sululu [sururu]: when initial sound is softer (e.g. a snake slithering in the bush; a thief silently slipping away)

-tuley [dure]: about something rolling on a smooth surface

ccapccolumha- [ʃ'apʃ'orumha](salty); *ccipccilumha-* [ʃ'ipʃ'irumha](salty);

ssupssulumha- [s'ups'urumha](bitter); *ssupssuleyha-* [s'ups'ureha](bitter);

ssapssalumha- [s'aps'arumha](bitter); *mingtingkululuha-* [mindingururu](bland)...

talpotuleyha- [dalbodureha](sweet); *ssupssuleyha-* [s'ups'ureha](bitter)...

d. *ssa* [s'a]: about something light that travels in a fast and sweeping manner (e.g. a gust of wind suddenly blowing into a person's face and then swiftly passing away; inflicting a sharp, stinging sensation at the initial contact, often involving pain)

ssaha- [s'aha] (pungent);

alssaha- [als'aha] (pungent)...

[Food texture & mastication]

- Terms related to food texture and mastication also form a part of taste vocabulary.

- (22) a. dryness ($n=7$): *phakphakha-* (e.g. unseasoned steamed potato), *phekphekha-* (e.g. roasted chicken breast), *ppakppakha-* (e.g. steamed egg yolk), ...
- b. substantiveness ($n=7$): *pattalaci-* (+substantive), *thophopha-* (+substantive), *khalangkhalangha-* (-substantive), *hungtenghungtengha-* (-substantive), ...
- c. resilience ($n=6$): *cilki-*, *ccolkisccolkisha-* (e.g. cold noodle, starchy cake), *ccilkisccilkisha-*, *cilkiscilkisha-*...
- d. crunchiness ($n=12$): *asakasakha-* (fresh vegetables with much juice and fiber, e.g. celery or cucumber), *selkengselkengha-* (crunchy, uneven tenderness, e.g. unevenly cooked potato), *phesekphesekha-*, *pasakpasakha-* (e.g. crisp chips), *phasakphasakha-*...

4. Discussion

4.1 Iconicity

- There is an iconic relationship between the perceived state of affairs in the world and the linguistic forms in intricate application of elaborate sound symbolism.

(23) Color terms

- saturation (intensity): intensifying prefixes (stronger), tensed consonants (stronger)
- luminosity: positive vowels (brighter)
- extent: reduplicative/onomatopoeic suffixes (larger area)
- solidity: reduplicative/onomatopoeic suffixes (uneven, spotty)
- pleasurability: reduplicative/onomatopoeic suffixes (less pleasurable), positive vowels (more pleasurable)

(24) Taste terms

- intensity: tensed consonants (stronger and sharper)
- extent: reduplicative/onomatopoeic suffixes (diffused), aspirated consonants (diffused)
- duration: reduplicative/onomatopoeic suffixes (longer and gradual decay)
- solidity: reduplicative/onomatopoeic suffixes (uneven, spotty sensation)
- pleasurability: reduplicative/onomatopoeic (less pleasurable), positive vowels (more pleasurable)

4.2 Synesthesia of Multiple Senses

- Color term formation borders on, and sometimes blends into, other related perceptual domains such as auditory perception, distance perception, opacity perception, etc.
- Taste term formation operations closely resemble those of color term formation.
- Some of the suffixes are sound-onomatopoeic, suggesting that extended color distribution is similarly conceived of as sound ringing out in the air.

4.3 Evaluatives

- Color term formation incorporates value judgment on the object being described.
- Color terms derived from suffixation of certain suffixes tend to carry negative connotation. e.g. *-cwukcwukha-* [-ʃukʃukha-], *-ukkiliha-* [-ʊk'iriha-], *-teyngteyngha-* [-tendɛŋha-], *-kkwumuleyha-* [-k'umureha-], *-kkumuleyha-* [-k'umureha-], *-twungtwungha-* [-tungdungha-], *-thwungthwungha-* [-t^hung^hung^hha-], *-thepwunha-* [-t^həbunha-], *-thepthepha-* [-t^həpt^həpha-], etc.

(25) A. Black objects

- a. *kkamah-*: pupil (eye), cherry, bean, etc. (positive)
- b. *kkemwucwukcwukha-*: irregularly tanned face, face with patches of freckles, discolored skin after contusion, etc. (negative)

B. Yellow objects

- a. *nolah-*: melon, tulip, chrysanthemum, banana, etc. (positive)
- b. *nwulikkiliha-*: discolored face with jaundice, discolored teeth, dust-covered land, etc. (negative)

C. Blue/green objects

- a. *phalah-*: clear sky, ocean, grass, leaves, berries, etc. (positive)
- b. *phwulutwungtwungha-*: blackened spot from contusion, decomposing body, skin affected by frostbite, unripe pumpkin, etc. (negative)

- Taste term formation also incorporates value judgment on the gustatory event.

(26) A. sweet: base form *tal-* [dal] (positive [a])

- a. *tal-*, *talkhomha-*, *talkomha-*, *talkhumha-*, *talccakcikunha-*...
- b. *tulkhumha-*, *tulccekcikunha-*, *tulchekcikunha-*... (containing neutral [ʌ])

B. salty: base form *cca-* [tʃ'a] (positive [a])

- a. *cca-*, *ccapcolomha-*, *ccapccalha-*, *ccapccalumha-*...
- b. *ccipccilha-*, *ccipccilumha-*, *ccipcilumha-*, *ccipccileyha-*... (containing neutral [i], [ʌ])

C. sour: base form *si-* [si] (neutral [i])

- a. *si-*, *sikumha-*, *sikhwumha-*, *sikumwuleyha-*, *sicikunha-*...
- b. *saykhomha-*, *saykomha-*, *saykumha-*, *saykomsaykomha-*... (containing positive [æ], [o])

D. bitter: base form *ssu-* [s'ʌ] (neutral [ʌ])

- a. *ssu-*, *ssupssulha-*, *ssumssuleyha-*, *ssupssulumha-*...
- b. *ssapssalha-*, *ssapssalayha-*, *ssapssalomha-*... (containing positive [a], [o])

E. fishy: base form *pili-* [biri] (neutral [i])

- a. *pili-*, *pilisha-*, *pilichekcikunha-*...
- b. *payli-*, *paylisha-*, *paylichekcikunha-*... (containing positive [æ])

4.4 Productivity and Novel Coinage

- Equipped with a rich derivation system, Korean has a paradigm of extraordinarily fine-grained color/taste terms that defies faithful translation into other languages.
- Since the sound symbolism has a robust representation in the minds of the native speakers, when new color/taste terms are encountered, they can conceive of the colors and hues or the gustatory experience denoted by the novel expressions without trouble.

(27) a made-up term not listed in Park (1989) & Nam (1992) (see appendix for "red"-terms)

ppwulkumwuliha- [p'ulgʊmuriha-] 'reddish':

- (i) red hue < base *pwulk-*
- (ii) dark hue < negative vowel *wu*[u]
- (iii) has a point of concentration < tensed consonant *pp* [p']
- (iv) extended surface < suffix *-umwuli-*
- (v) displeasurable < suffix *-umwuli-* & negative vowel *wu* [u]

- (28) a made-up term not listed in taste terms in Rhee & Koo (2017)
talkunsaykholomha- [talɡʊnsæk^horomha-] ‘sweet & sour’:
 (i) composite taste of sweet and sour < *tal-* ‘sweet’ & *say-* ‘sour’
 (ii) weak sweetness < non-aspirated [talɡ-] vs [talk^h-]
 (iii) strong sourness < aspirated [sæk^ho-] vs. [sægo-]
 (iv) long duration of sensation and gradual decay < onomatopoeic suffix [-orom-]
 (v) pleasurable < positive vowels [a], [æ]. and [o]

5. Summary & Conclusion

- The color/taste lexicalization pattern in Korean shows the following:

- (29) a. There exists an elaborate iconic relationship between the perceived states of affairs and linguistic coding via sound symbolism.
 b. Linguistic coding of perception of color/taste reveals synesthetic perception.
 c. Color/taste lexicalization patterns incorporate value judgment as a semantic component (i.e. pleasurable or displeasurable).
 d. The derivational processes in color/taste lexicalization are highly productive, and thus the color vocabulary is systematically expandable.

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Appendix 1: 127 RED-words in Korean (a la Rhee 2016)

BRT: bright; DRK: dark; EXT: extended surface; INT: intense; SPT: spotty; UND: undesirable; WK: weak

Korean	Translit.	Pronun.	Meaning	Korean	Translit.	Pronun.	Meaning
Noun				빨그땡땡하-	ppalkuteyngteynggha-	p'algederderha-	reddish DRK EXT
빨강	ppalkang	p'algan	red	빨그레하-	ppalkuleyha-	p'algreha-	reddish DRK
빨간색	ppalkansayk	p'algansak	red BRT	빨그름하-	ppalkulmha-	p'algramha-	reddish DRK
붉은색	pwulunsayk	bulgansak	red DRK	빨그무레하-	ppelkumwuleyha-	p'algamwureha-	reddish DRK EXT UND
Adjective (most derived with the light verb ha-)				빨그속속하-	ppelkusuwukha-	p'algsuksukha-	reddish DRK EXT UND
빨가이드르하-	palkayatululuha-	balgyadurunuha-	reddish BRT WK EXT	빨그스름하-	ppelkusulumha-	p'algsurumha-	reddish DRK EXT
빨가우리하-	palkawulihha-	balgauriha-	reddish BRT WK EXT	빨그죽죽하-	ppelkucwukwukha-	p'algjujukha-	reddish DRK EXT UND
발강-	palkah-	balgat-	reddish BRT WK	빨그빨긋하-	ppelkuspelkusha-	p'algap'algatha-	reddish DRK SPT
발그대대하-	palkutaytayha-	balgadadeha-	reddish BRT WK EXT	빨긋하-	ppelkusha-	p'algatha-	reddish DRK
발그땡땡하-	palkutayngtaynggha-	balgaderderha-	reddish BRT WK EXT	빨그름하-	ppolkulumha-	p'algramha-	reddish BRT
발그레하-	palkuleyha-	balgreha-	reddish BRT WK	빨그스름하-	ppolkusulumha-	p'algsurumha-	reddish BRT
발그름하-	palkulumha-	balgramha-	reddish BRT WK	빨그죽죽하-	ppolkucokokha-	p'algjujukha-	reddish BRT EXT
발그무레하-	palkumwuleyha-	balgamwureha-	reddish BRT WK EXT	빨긋빨긋하-	ppolkuspelkusha-	p'algap'algatha-	reddish BRT SPT
발그속속하-	palkusoksokha-	balgsoksokha-	reddish BRT WK EXT	빨긋하-	ppolkusha-	p'algatha-	reddish BRT
발그스름하-	palkusulumha-	balgsurumha-	reddish BRT WK EXT	빨그름하-	ppwulkusulumha-	p'ulgurumha-	reddish DRK
발그죽죽하-	palkucokokha-	balgjujukha-	reddish BRT WK EXT	빨그스름하-	ppwulkusulumha-	p'ulgurumha-	reddish DRK
발긋발긋하-	palkuspalkusha-	balgap'algatha-	reddish BRT WK SPT	빨그죽죽하-	ppwulkucwukwukha-	p'ulgjujukha-	reddish DRK EXT UND
발긋하-	palkusha-	balgatha-	reddish BRT WK	빨긋빨긋하-	ppwulkuspalkusha-	p'ulgatp'algatha-	reddish DRK SPT
발거이드르하-	pelkeyetuluha-	balgyedarunha-	reddish DRK WK EXT	빨긋하-	ppwulkusha-	p'ulgatha-	reddish DRK
발거우리하-	pelkewulihha-	balgauriha-	reddish DRK WK EXT	붉-	ppulk-	p'ulk-	reddish DRK
벌강-	pelkeh-	balgat-	reddish DRK WK	새빨강-	sayppalkah-	saep'algat-	red BRT INT
벌그대대하-	pelkuteyeyha-	balgadeha-	reddish DRK WK EXT UND	새빨강-	saysppalkah-	saetp'algat-	red BRT INT
벌그땡땡하-	pelkuteyngteynggha-	balgaderderha-	reddish DRK WK EXT UND	시빨강-	sippelkeh-	sip'algat-	red DRK INT
벌그레하-	pelkuleyha-	balgreha-	reddish DRK WK	시빨강-	sippelkeh-	sitp'algat-	red DRK INT
벌그름하-	pelkulumha-	balgramha-	reddish DRK WK	울긋불긋하-	wulkuspwukusha-	ulgatbulgatha-	reddish DRK (mixed)
벌그무레하-	pelkumwuleyha-	balgamwureha-	reddish DRK WK EXT UND	Verb (derived from the causative affix -ci-)			
벌그속속하-	pelkusuwukha-	balgsuksukha-	reddish DRK WK EXT UND	발개지-	palkayci-	balgaji-	become reddish BRT WK
벌그스름하-	pelkusulumha-	balgsurumha-	reddish DRK WK EXT	빨개지-	ppalkayci-	p'algaji-	become red
벌그죽죽하-	pelkucwukwukha-	balgjujukha-	reddish DRK WK EXT UND	벌개지-	pelkayci-	balgaji-	become reddish DRK WK
벌긋발긋하-	pelkuspelkusha-	balgap'algatha-	reddish DRK WK SPT	붉어지-	pwuleci-	bulgaji-	become red DRK
벌긋하-	pelkusha-	balgatha-	reddish DRK WK	빨개지-	ppelkayci-	p'algaji-	become reddish DRK
벌그대대하-	pelkutaytayha-	balgadadeha-	reddish BRT WK EXT	새빨개지-	sayppalkayci-	saep'algaji-	become red INT
벌그땡땡하-	pelkutayngtaynggha-	balgaderderha-	reddish BRT WK EXT	새빨개지-	saysppalkayci-	saetp'algaji-	become red INT
벌그레하-	pelkuleyha-	balgreha-	reddish BRT WK	시빨개지-	sippelkayci-	sip'algaji-	become red DRK INT
벌그름하-	pelkulumha-	balgramha-	reddish BRT WK	시빨개지-	sippelkayci-	sitp'algaji-	become red DRK INT
벌그무레하-	pelkumwuleyha-	balgamwureha-	reddish BRT WK EXT	Adverb ('in such a manner of being adjective')			
벌그속속하-	palkusoksokha-	balgsoksokha-	reddish BRT WK EXT	발그스름히	palkusulumhi	balgsurumhi	reddish BRT WK EXT
발그스름하-	palkusulumha-	balgsurumha-	reddish BRT WK EXT	발긋발긋	palkuspalkus	balgap'algat	reddish BRT WK SPT
발그죽죽하-	palkucokokha-	balgjujukha-	reddish BRT WK EXT	벌그름히	pelkulumhi	balgramhi	reddish DRK WK
발긋발긋하-	palkuspalkusha-	balgap'algatha-	reddish BRT WK SPT	발그스름히	pelkusulumhi	balgsurumhi	reddish DRK WK EXT
발긋하-	palkusha-	balgatha-	reddish BRT WK	발긋발긋	pelkuspalkus	balgap'algat	reddish DRK WK SPT
벌그대대하-	pwulkuteyeyha-	bulgadeha-	reddish DRK WK EXT UND	벌그름히	pelkulumhi	balgramhi	reddish BRT WK
벌그땡땡하-	pwulkuteyngteynggha-	bulgaderderha-	reddish DRK WK EXT UND	발그스름히	pelkusulumhi	balgsurumhi	reddish BRT WK EXT
벌그레하-	pwulkuleyha-	bulgreha-	reddish DRK WK	발긋발긋	pelkuspalkus	balgap'algat	reddish BRT WK SPT
벌그름하-	pwulkulumha-	bulgramha-	reddish DRK WK	발긋이	pelkusi	balgsi	reddish BRT WK
벌그무레하-	pwulkumwuleyha-	bulgamwureha-	reddish DRK WK EXT UND	벌그름히	pwulkulumhi	bulgramhi	reddish DRK WK
벌그속속하-	pwulkusuwukha-	bulgsuksukha-	reddish DRK WK EXT UND	발그스름히	pwulkusulumhi	bulgsurumhi	reddish DRK WK EXT
벌그스름하-	pwulkusulumha-	bulgsurumha-	reddish DRK WK EXT	발긋발긋	pwulkuspwulkus	bulgap'algat	reddish DRK WK SPT
벌그죽죽하-	pwulkucokokha-	bulgjujukha-	reddish DRK WK EXT UND	발긋이	pwulkusi	bulgsi	reddish DRK WK
발긋발긋하-	pwulkuspalkusha-	bulgap'algatha-	reddish DRK WK SPT	붉으랴푸랴	pwulkulakphwululak	bulgarakpurarak	reddish DRK WK (mixed)
발긋하-	pwulkusha-	bulgatha-	reddish DRK WK	빨그스름히	ppalkusulumhi	p'algsurumhi	reddish BRT EXT
붉-	pwulk-	bulk-	red DRK	빨긋빨긋	ppalkuspalkus	p'algap'algat	reddish BRT SPT
붉으랴푸랴	pwulkulakphwululakha-	bulgarakpurarakha-	reddish SPT (mixed)	빨그름히	ppelkulumhi	p'algramhi	reddish DRK
빨강-	ppalkah-	p'algat-	red	빨그스름히	ppelkusulumhi	p'algsurumhi	reddish DRK EXT
빨그대대하-	ppalkutaytayha-	p'algadadeha-	reddish BRT EXT	빨긋빨긋	ppelkuspalkus	p'algap'algat	reddish DRK SPT
빨그땡땡하-	ppalkutayngtaynggha-	p'algaderderha-	reddish BRT EXT	빨그름히	ppolkulumhi	p'algramhi	reddish BRT
빨그레하-	ppalkuleyha-	p'algreha-	reddish BRT	빨그스름히	ppolisulumhi	p'olgsurumhi	reddish BRT EXT
빨그름하-	ppalkulumha-	p'algramha-	reddish BRT	빨긋발긋	ppolkuspalkus	p'algap'algat	reddish BRT SPT
빨그무레하-	ppalkumwuleyha-	p'algamwureha-	reddish BRT EXT	빨긋이	ppolkusi	p'olgsi	reddish BRT
빨그속속하-	ppalkusoksokha-	p'algsoksokha-	reddish BRT EXT	빨그름히	ppwulkulumhi	p'ulgramhi	reddish DRK
빨그스름하-	ppalkusulumha-	p'algsurumhi-	reddish BRT EXT	빨그스름히	ppwulkusulumhi	p'ulgsurumhi	reddish DRK EXT
빨그죽죽하-	ppalkucokokha-	p'algjujukha-	reddish BRT EXT	빨긋빨긋	ppwulkuspwulkus	p'ulgatp'ulgat	reddish DRK SPT
빨긋빨긋하-	ppalkuspalkusha-	p'algap'algatha-	reddish BRT SPT	빨긋이	ppwulkusi	p'ulgasi	reddish DRK
빨긋하-	ppalkusha-	p'algatha-	reddish BRT	울긋불긋	olkuspulkus	ulgatbulgat	reddish BRT (mixed)
빨강-	ppelkeh-	p'algat-	reddish DRK	울긋불긋	wulkuspwulkus	ulgatbulgat	reddish DRK (mixed)
빨그대대하-	ppelkuteyeyha-	p'algadeha-	reddish DRK EXT UND				

Appendix 2: A partial list of taste terms in Korean (a la Rhee & Koo 2017)

A. 146 primary taste terms

- a. sweet: *tal-*, *taltital-*, *talkomha-* *talkumha-* *talkhomha-*, *talkhumha-*, *talkunha-*, *talkuntalkunha-*, *taltalha-*, *taltalumha-*, *talpotuleyha-*, *tulpwutuleyha-*, *talchakcikunha-*, *talchakccikunha-*, *talccakcikunha-*, *talccakccikunha-*, *tulkhumha-*, *tulccekcikunha-*, *tulchekcikunha-*, *kammilop-* (n=20)
- b. salty: *cca-*, *ccaticca-*, *ccapcolomha-*, *ccapccolomha-*, *ccapccalha-*, *ccapccalayha-*, *ccapccalumha-*, *ccapccolumha-*, *ccipccilha-*, *ccipcilumha-*, *ccipccilumha-*, *ccipccileyha-*, *kankanha-*, *kenkenha-*, *cimcimha-*, *kankanccapccalha-*, *kenkenccipccilha-* (n=17)
- c. sour: *si-*, *sitisi-*, *saykhomha-*, *saykhumha-*, *saykomha-*, *saykumha-*, *saykhomsaykhomha-*, *saykhumsaykhumha-*, *saykomsaykomha-*, *saykumsaykumha-*, *saykumwuleyha-*, *saychekcikunha-*, *ssaykhomha-*, *ssaykhumha-*, *sikumwuleyha-*, *sikumha-*, *sikwumha-*, *sikhumha-*, *sikumsikumha-*, *sikhumsikhumha-*, *sichekcikunha-*, *sikumttelttelha-*, *sikumthelthelha-*, *sicikunha-*, *sichikunha-*, *sikhwumha-* (n=26)
- d. bitter: *ssu-*, *ssutissu-*, *ssupssulha-*, *ssupssuleyha-*, *ssupssulumha-*, *ssapssalayha-*, *ssapssalha-*, *ssapssalumha-*, *ssapssalomha-*, *sothaykath-* (n=10)
- e. umami: *kosoha-*, *kkosoha-*, *kosolomha-*, *kkosolomha-*, *noli-*, *nwuli-*, *nolisha-*, *nwulisha-*, *nukkiha-*, *kwuswuha-*, *kkwuswuha-*, *eskwuswuha-*, *kwuttulha-*, *eskwuttulha-*, *koli-*, *kolisha-*, *kkoyliha-*, *kolithapwunha-*, *kkolikkoliha-*, *kamchilmas(i)jiss-* (n=20)
- f. pungent: *mayp-*, *maptimap-*, *maywumha-*, *maykhomha-*, *maykhumha-*, *maypssaha-*, *maykhommaykhomha-*, *elkunha-*, *elkhunha-*, *alkhunha-*, *alkunha-*, *ali-*, *alisha-*, *elisha-*, *alalha-*, *alccakcikunha-*, *alishalisha-*, *elccekcikunha-*, *elelha-*, *alssaha-*, *hwakkunha-*, *khalkhalha-*, *khelkelha-*, *hwanha-*, *ssaha-* (n=26)
- g. fishy: *pili-*, *pilisha-*, *payli-*, *paylisha-*, *pilichekcikunha-*, *pilichikunha-*, *pichekcikunha-*, *paylichikunha-*, *paylichakcikunha-*, *paylispaylisha-*, *molumha-*, *paythulha-*, *pithulha-* (n=13)
- h. bland: *singkep-*, *mingmingha-*, *mingkunha-*, *mayngmaynggha-*, *tamtamha-*, *temtemha-*, *simsimha-*, *kaysimsimha-*, *samsamha-*, *cimcimha-*, *sumsumha-*, *mingtingkululuha-*, *tampaykha-*, *tampakha-* (n=14)

B. 41 combined taste terms (a partial list)

- a. sweet + sour: *talkhomsaykhomha-*, *talkomsaykomha-*... (n=6)
- b. sweet + bitter: *talkomssapssalha-*, *talkomssupssulha-*... (n=7)
- c. sour + sweet: *saykhomtalkhomha-*, *sikhumtalkhumha-*... (n=6)
- d. sour + bitter: *saykhomssapssalha-*, *sikumssupssulha-*... (n=5)
- e. pungent + sweet: *elkuntelkunha-*, *elkhuntelkhunha-*... (n=4)
- f. pungent + bitter: *elkhunssapssalha-*, *elkhunssupssulha-*... (n=4)
- g. pungent + salty: *maypcca-*, *maykhomccapccalha-*... (n=4)

C. 61 tactility-based taste terms

- a. astringent: negative; causing puckery sensation on oral tissues as from unripe persimmon or acorn: *ttelp-*, *ttelttelha-*, *ttelttelumha-* ... (n=8)
- b. burning: largely negative; causing burning or prickly sensation as from hot pepper and garlic, many overlapping with the pungent class (see (6f) above): *elelha-*, *elkhunha-*, *alkhunha-*, *alalha-*, *alssaha-*, *hwakkunha-* ... (n=11)
- c. refreshing: positive; large in number and productive; causing clean and cool sensation normally from cool/cold food but hot food as well: *kaywunha-*, *kkalkkumha-*, *ssampakha-*, *sangkhumha-*, *siwenha-*, *sinsenha-* ... (n=8)
- d. slippery: negative; causing excessively creamy sensation or providing insufficient stimulation of refreshment; typically from too much fattiness: *nukkiha-*, *nukulnukulha-*, *mikkulmikkulha-*... (n=6)
- e. sharp; largely positive; causing sharp and stimulating sensation as from carbonated soda; some overlapping with the pungent class (see (6f) above): *ssaha-*, *thokssso-*, *khalkhalha-* ... (n=6)
- f. lacking-stimulation; negative; causing insufficient stimulation from weakness of flavor as from watery soup; many overlapping with the bland terms (see (6h) above): *mingmingha-*, *ningningha-*, *mingkunha-*, *mayngmaynggha-*, *simsimha-*, *cimcimha-* ... (n=15)
- g. lacking-purity; negative; causing overwhelmingly thick, dull and muddy taste for the lack of purity as from excessively thick broth: *thepthepha-*, *thepwunha-*, *thepthelumha-*, *kelccekcikunha-* ... (n=7)

D. 32 food texture- & mastication-related taste terms

- a. dryness: *phakphakha-*, *phekphekha-*, *ppakppakha-*... (n=7)
- b. substantiveness: *pattalaci-*, *thopthopha-*, *khalangkhalangha-*, *hungtenghungtenggha-*... (n=7)
- c. resilience: *cilki-*, *ccolkisccolkisha-*, *ccilkiscilkisha-*, *cilkiscilkisha-*... (n=6)
- d. crunchiness: *asakasakha-*, *selkengselkenggha-*, *phesekphesekha-*, *pasakpasakha-*, *phasakphasakha-*... (n=12)

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