Sound, Metaphor and Shape in Thai

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1. Introduction

1.1 Background

While it has been a fundamental tenet in Saussurean linguistics that the relationship between form and meaning (FM) is arbitrary, there have been numerous attempts, both inside and outside Asian linguistics, to come to terms with groups of words whose 'sub-morphemes' bear varying degrees of related meaning. Attempts to unravel earlier systems of **derivative morphology** for Sino-Tibetan have been launched by Benedict in his *Conspectus* and by scholars such as Downer and Tsou. Processes which remain productive in Tiddim Chin have been described by Hendersen. In the Tai area, Li's *Handbook* and Diller's review of it both commented on the suggestive nature of Tai data in relation to an early derivational system and Prapin has attempted some Downer-like analyses. Matisoff's **allofams** represent an approach to Sino-Tibetan FM with less of a demand for paradigms and more interest in universal semanatics. In *Austronesian Root Theory* Blust launches a discussion of the problem of FM in diachronic terms but raises the synchronic issue of a missing level of language between phonology and morphology. Discussion of **expressives** in Semai by Diffloth has been synchronic, involving universals in **sound symbolism** as the study of FM is generally called today. Still, study of expressives, along with study of Japanese **mimetics**, such as Hamano's, and the study of African **ideophones**, such as Childs', reflect analysis of FM as applied to restricted cross-sections of individual languages. Guthrie's *Comparative Bantu* reveals what he calls **osculant comparative series** involving the same FM issues as those raised in comparative Tai, an issue broader than that of ideophones or expressives. In the wider linguistic tradition, Bloomfield, who is reputed to have written his doctoral thesis on FM relations, finds a place in his definitive text *Language* to discuss the place of **sub-morphemes** while Bolinger has written extensively on **phonesthemes** involving synchronic sociolinguistic and pragmatic aspects of FM relationships. While Bloomfield and later Chomsky, shepherds in American linguists, may have steered away from the study of FM relations, recent issues of *Language* (the journal) include Woodbury's work on **meaningful phonological processes** in Central Alaskan Yupik Eskimo and a paper calling for a re-evaluation of the work of Jesperson, who inclined heavily towards sound symbolism in his study of English. This is the background of the study of the relationship between form and meaning against which this paper is set.

1.2 Form and Meaning Associations

There are at least two levels of arbitrariness or non-arbitrariness which must be considered in the debate over the relationship between form and meaning.

The most basic level is that which relates to the work of Ohala on **Frequency Code**. Ohala's underlying hypothesis, which might be termed macro-evolutionary, relates meaning-bearing features of human and animal communication. This is sound symbolism 'proper' where there are perceived to be direct high-vowel 'small' low-vowel 'big' universal, but crude correspondences between form and meaning. Sound symbolism is seen as a product of basic instinct. While it is the most highly disputed approach to the study of non-arbitrariness, it is useful to the extent that it makes no distinction between the core vocabulary FM relations treated

in diachronic linguistics and expressive vocabulary FM relations treated in synchronic linguists.

The second level of arbitrariness relates to Bolinger's work on **phonesthemes**. Bolinger's underlying hypothesis, which might be termed micro-evolutionary, is that sound symbolism in language is self-generating (Bolinger, 1980:24), the product of a universal process of forms molding themselves on other forms with like meaning, and meanings molding themselves on other meanings, conveyed with like words (Bolinger, 1969:248). Sound symbolism is a product of human cognition, of the need to organise and make associations. Folk etymologies and malaproprisms are examples of associations in natural language which may not accord with a language's history yet are meaningful for speakers. At this level non-arbitrariness is common sense.

The position taken here is that human cognition is the primary generator of form and meaning relations, redefined as **form and meaning associations**, though neither the frequency code factor nor defunct systems of derivative morphology are ruled out as contributing factors to synchronic, language specific sound symbolism.

1.3 Prototype Categories

In the study of human cognition there are two distinct schools, each with a theory of how we make sense of experience using categorisation.

In classical objectivism, meaning transcends life. Categories are characterised by literal properties shared by their members existing independently of any body doing the categorising. Human reason is an incomplete blueprint of transcendental reason. Imaginative aspects of reason — metaphor, metonomy and mental images — are peripheral and inconsequential. Correct reason mirrors the logic of the external world (Lakoff, 1987:xi-xvii).

In experiential realism, bodily experience and the way we use imaginative mechanisms are central to how we construct categories to make sense of experience. Our conceptual systems grow out of our bodily experience. The existence of a real world, a stable body of knowledge about the world and the recognition that reality constrains human conceptualisation are accepted, but reason is only made possible by and is grounded in our experience of seeing, moving and feeling. Human reason is creative and our imaginative capacity takes us from concrete seeing and feeling to abstract conceptualistion (ibid).

My work so far in dealing with Thai has met with only minimal success in trying to engineer the construction of classical categories from form and meaning associations. Classical analysis asks me to ignore a pervasive metaphorical nature of categories which I perceive and which it superficially reveals. It has provided no way to compare the infinite and multidimensional nature of meaning with the relatively finite nature of a language's forms, a shortfall pointed out some time ago by Bloomfield. In contrast, general experientialist principles of human categorisation summarised by Lakoff including centrality, chaining, experiential domains, idealised models, specific knowledge and motivation help characterise reasons for category membership where the controlling conceptual system is fundamentally metaphorical. Rosch's theory of prototypes and basic level categories can furthermore be adapted to provide a method for integrated study of phonology and semantics so that form and meaning associations can be identified and graded. This method, which is described here, is accessible to psycholinguistic testing.

2. The Method

2.1 Definition

From here on I will use the term **metaphone** to stand for a meaning-bearing form:

(i) consisiting of a phoneme, prosody, or group of phonemes or prosodies;
(ii) which is less than or equal to a morpheme in both form and function; and
(iii) with which is associated a **set** or network of words bearing this form;
(iv) which together form a basic conceptual category;
(v) with an identiable conceptual core; and
(vi) prototype words which can stand as exemplars;
(vii) along with **clusters** of subsidary semantic elements;
(viii) which are linked according to principles of human categorization.

2.2 Overview

The method in its present crude form is able to accomplish two things:

1. Identify and grade core and radial forms, meanings, and form-meaning composites for a given metaphone.
2. Calculate the number of occurrences of a form which belong to a basic category of meaning.

2.3 Forms and Data

The basic method involves identification and examination of all words within the language which bear a proposed form in order to establish whether it functions as metaphone or not. Phonological elements chosen for this analysis will vary according to the language under study and the desired level of abstraction between phonology and morphology. For the three Thai examples here I have chosen rhyme as the level for analysis. Words ending in [ee], [əʔ] and [ooŋ] have been selected and are listed in Table 1. Hence leel, ləʔl and looŋl are proposed as metaphones in the analysis. Tone is ignored, though for a more detailed level or a different phonological cross-section tonal restrictions could be considered.

Whatever the source of the data, meanings ideally should be provided in the language under study as the method makes use of **circular definitions**. Circular definitions are usually considered to be a negative factor in semantics but they are a feature of natural language and find a place here. They are important, at least in the case of Thai, because definitions often contain forms belonging to the same metaphonic set. The data set needs to be extensive and from one rather than several sources. Inadequate detail and uncontrolled variety in the data set will affect category links.

The source used here is the *Rachabanditsathaan* (2525) dictionary, the most comprehensive Thai language lexicon available at the time of writing. This has been treated as an 'informant'. For the purpose of this pilot study, I have chosen to restrict the data set to occurrences of monosyllables. Examples are only admitted into the data set if they have a monosyllabic entry in the dictionary. This means that relevant material, including instances of reduplication, is ignored. In addition, in listing forms, a standard of pure arbitrariness was administered whereby one form is equal to one meaning and vice versa. Multiple entries for the same form were listed only once and meanings treated as variants of the one form. Note that this falsely forces an association between meanings which may otherwise show no relationship. Where an entry has a variant form listed alongside the main entry, the variant form, if it includes the relevant metaphone, is listed separately (though this

Table 1 Thai rhyme examples for analysis of proposed metaphones |ee|, |ɔʔ| and |ooŋ|

|ee| (43 forms)

เก	kee	เท	thee	เร่	rêe
เก่	kèe	เท่	thêe	เลห	lee
เก๊	kée	เบ๋	bêe	เล่ห	lêe
เก๋	kěe	เป๋	pêe	เว๋	wée
เข	khěe	เป๋	pěe	เส	sěe
เข้	khêe	เปร	pree	เห	hěe
เขว	khwěe	เปล	plee	เห่	hèe
เง้	ŋée	เผ	phěe	เหม่	mèe
เจ	cee	เผล	phlěe	เหย	yěe
เฉ	chěe	เผล๊	phlêe	เหล่	lèe
เซ	see	เผล่	phlèe	เหว่	wèe
เด	dee	เพ	phee	เอ๊	ʔêe
เด่	dèe	เพล	phlee	เฮ	hee
เต	tee	เม	mee		
เตร่	trèe	เย้	yée		

|ɔʔ| (17 forms)

เกรอะ	krɔ̀ʔ	เซอะ	sɔ́ʔ	เยอะ	yɔ́ʔ
เขรอะ	khrɔ̀ʔ	เดอะ	tɔ̀ʔ	เลอะ	lɔ́ʔ
เขลอะ	khlɔ̀ʔ	เถอะ	thɔ̀ʔ	เหนอะ	nɔ̀ʔ
เคอะ	khɔ́ʔ	เบอะ	bɔ̀ʔ	เหวอะ	wɔ̀ʔ
เงอะ	ŋɔ́ʔ	เปรอะ	prɔ̀ʔ	เหอะ	hɔ̀ʔ
เจอะ	cɔ̀ʔ	เฟอะ	fɔ́ʔ		

|ooŋ| (48 forms)

โกง	kooŋ	โซ่ง	sôoŋ	โมง	mooŋ
โก่ง	kòoŋ	โด่ง	dòoŋ	โม่ง	môoŋ
โกรง	krooŋ	โต่ง	tòoŋ	โยง	yooŋ
โกร่ง	kròoŋ	โต้ง	tôoŋ	โย่ง	yôoŋ
โกลง	klooŋ	โถง	thǒoŋ	โรง	rooŋ
โขง	khǒoŋ	โปง	pooŋ	โลง	looŋ
โข่ง	khòoŋ	โป่ง	pòoŋ	โล่ง	lôoŋ
โขลง	khlǒoŋ	โป้ง	pôoŋ	โล้ง	lóoŋ
โค่ง	khôoŋ	โปร่ง	pròoŋ	โวง	wôoŋ
โค้ง	khóoŋ	โปล่ง	plòoŋ	โหง	hǒoŋ
โครง	khrooŋ	โผง	phǒoŋ	โหน่ง	nòoŋ
โคร่ง	khrôoŋ	โพง	phooŋ	โหม่ง	mòoŋ
โคลง	khlooŋ	โพรง	phrooŋ	โหย่ง	yòoŋ
โงง	ŋooŋ	โพลง	phlooŋ	โหรง	rǒoŋ
โง่ง	ŋóoŋ	โพล่ง	phlôoŋ	โหวง	wǒoŋ
โจง	cooŋ	โพล้ง	phlóoŋ	โอ่ง	ʔòoŋ

probably skews the statistics in relation to real usage). While these inadequacies will need attention in the future, they are far from rendering the results useless.

2.4 Semantic Elements

Once the data set has been identified, it is necessary to review the meanings given for each of the forms. The goal is to identify as objectively as possible recurrent semantic elements which which may be the basis for establishing the metaphone as a conceptual category. In this case a table of correspondences is constructed for each proposed metaphone. Table 2 shows an example of a correspondence set for the metaphone lɔʔl. Listed down the left-hand column are the 17 monosyllables which use this proposed metaphone. Along the top are semantic elements taken from the definitions in the dictionary.

To understand the nature of semantic elements listed here, it is important to consider the types of information provided in the dictionary entries which are the source here. Dictionary entries usually include synonyms, paraphrases, explanations, descriptions of form and function, examples and contexts. Any of these types of information might contain semantic elements which are recurrent in the data set but do not alone explicate the given form.

There is a need to handle with care those words such as [pay, maa, khûn, loŋ, mâak] 'go', 'come', 'rise', 'fall' and 'a lot' whose presence is arguably syntactic rather than semantic. For, example, in the case of the metaphone leel, whose core meaning is 'not straight' [mây troŋ], [pay] and [maa] are part of the concept of alternating movement from a point of straightness as in the rocking of a cradle or boat or the swinging of a pendulum. However, [pay] in the definition [hěe pay] for entries [khwěe] and [chěe] appears to add nothing to the meaning. In the case of the metaphone lɔʔl contextual information involving the word [nǎa] 'thick' is taken to establish connections between [tɔ̂ʔ] and [bɔ̂ʔ] where the definition given for [tɔ̂ʔ] is [mâak] 'a lot' but specifically for things which are 'very thick' [nǎa bɔ̂ʔ, nǎa tɔ̂ʔ].

Another issue in defining semantic elements is the size of the semantic element, perhaps particularly in Thai where the writing system does little to help to establish word boundaries. There is a general linguistic principle here that smaller linguistic segments correspond with less specific meaning, larger segments with more specific meaning. In the analysis, using larger segments may result in less chance of identifying links in meaning between one form and another, but smaller segments may result in meanings too general to establish a metaphonic category. For example, [sĭaŋ daŋ] 'loud sound' is taken as a semantic element for looŋl and is the second most common meaning yielded for looŋl. If [sĭaŋ] 'sound' and [daŋ] 'loud' had been taken separately, additional examples of [sĭaŋ] would most likely have resulted in this being established as the core meaning for the metaphone. The usefulness of this result is questionable as our general knowledge of expressives and onomatopoeia already indicates that sound is a commonly recurring semantic element which exploits forms throughout the language. With leel, [phìt] 'wrong' is a relevant semantic element but for looŋl [phìt thammádaa] 'unnatural' is relevant. For looŋl again, [phâa khlum hǔa] 'wrap a cloth around the head' seems an overly large semantic element, but higher recurrence is not gained by reducing this to [phâa khlum] 'wrap a cloth', [khlum hǔa] 'wrap around the

TABLE 2

Stage 1 of table for establishing networks for the metaphone /lə?l/

TOM/F. Total Occurrences of Meaning/Form.

f No independent entry in source.

Translations (where available) from So, 1982: krə̀? to filter, to leach; khə́? clumsy, awkward; khɔ̌ən shy, embarrassed; mâynɛ̂ɛpniam not neat; sə̂ə thick-headed, stupid, clumsy; nǎa thick, viscous; lɔ́? untidy, dirty, confused; phlěɛ wound, sore, blemish; prə̀? foul, dirty, soiled, untidy; lǔa to remain; monthin blemish, flaw; sápsɔ́ɔn to pile up, complicated; sàpsǒn confused; phóp to meet; mâak a lot; thə̀? 'let us'; nǐaw strong, tough, sticky.

	krə̀?	khrə̀?	khlə̀?	khə́?	ŋɔ́?	cə̀?	sɔ́?	tə̀?	thə̀?	bə̀?	prə̀?	fɔ́?	yɔ́?	lɔ́?	nə̀?	wɔ́?	hə̀?	TOM
TOF	3	2	2	2	3	1	2	2	2	5	3	1	5	2	1	1	2	39
nǐaw																X		1
thə̀?																	X	1
f thə́?									X									1
mâak						X				X			X					3
f há?					X								X					2
hə̀?					X													1
phóp				X														1
sàpsǒn										X								1
monthinsápsɔ́ɔn	X	X	X															3
lǔa										X			X					2
prə̀?											X	X						2
phlěɛ										X	X		X					3
lɔ́?								X			X			X				3
wə̀?								X										1
nǎa							X			X								2
sə̂ə							X							X				2
mâynɛ̂ɛpniam					X								X					2
khɔ̌ən															X		X	2
khɔ́?				X														1
krə̀?		X	X						X									3
khlə̀?	X																	1
khrə̀?	X																	1

head', [phâa ... hǔa] 'cloth...head' or even [phâa] 'cloth', [khlum] 'wrap around' or [hǔa] 'head'.

One particular difficulty is defining semantic elements with not circular but **mirrored** definitions. One of the definitions for [lɔ́ʔ] is [lɔ́ʔ thɔ́ʔ] 'dirty, untidy'. As can be seen from Table 2, [thɔ́ʔ] has been included as a semantic element. While theoretically this form strengthens the relationship of proposed metaphone lɔ?ĺ to [lɔ́ʔ], as [thɔ́ʔ] has no independent entry in the dictionary, it is arguable whether it should be included as a semantic element at all. Understanding 'meaningless' syllables, common in reduplication in Thai, will be an interesting key to understanding FM association and metaphones. Their problematic nature is one of the reasons for restricting this particular study to monosyllables.

The activity of listing recurrent forms should not be one of interpretation but of recording occurrences. 'Relevance' and 'usefulness' are terms used here in relation to establishing which semantic elements have the best balance of meaningfulness and recurrence of meaning.

2.5 Grading Centrality of Form and Meaning

As semantic elements are recorded occurrences are marked in Table 2 with an X. Recurrences of meaning (**shared meanings**) are then tallied down the table and recurrences of form (**shared forms**) across the table. TOM and TOF are the total occurrences (ie recurrences) for shared meanings and shared forms. For each individual occurence of a FORM+MEANING, the total of shared meanings is multiplied out by the total of shared forms (TOM*TOF) to give a **r a w metaphonic value**. These values are recorded in Table 3 in place of the X for each occurrence. These figures give an approximate value of the strength of a FORM+MEANING correspondence. To refine these figures and place them in context of the overall system these raw metaphonic values are totalled, in Table 3 TVM and TVF, the total values of meanings and forms. The highest figure in the bottom row signifies the most frequently occurring or shared meaning. The highest figure in the right hand most column signifies the form with the most meanings, ie the most frequently shared form. These values can be multiplied out as required to find the **exact metaphonic value** of a form within the overall system. In this case multiplying out the TVM and TVF values (TVM*TVF) establishes for us the **core** and **subsidiary** exemplars of the metaphone lɔ?ĺ:

> 65*33 = 2145 FORM: [yɔ́ʔ] MEANING [phlɛ̆ɛ] wound, sore, cut, blemish
> 65*27 = 1755 FORM: [yɔ́ʔ] MEANING [mâak] a lot
> 65*27 = 1755 FORM: [yɔ́ʔ] MEANING [lɔ́ʔ] untidy, dirty, confused
> 50*33 = 1650 FORM: [bɔ̀ʔ] MEANING [phlɛ̆ɛ] wound, sore, cut, blemish
> 65*20 = 1300 FORM: [yɔ́ʔ] MEANING [lǔa] to remain

The core of the network is marked on the table with the raw metaphonic value in outline. This metaphone shows a typical type of result, with a metaphonic FORM [lɔ́ʔ] included among the core MEANINGs. These are only the first five occurrences but exact metaphonic values could continue to be calculated for all occurrences within the set. Following are the core and some subsidiary exemplars for metaphones leel and looŋl for comparison:

TABLE 3

Stage 2 of table for establishing networks for the metaphone /ləʔl.

TVM/TVF Total value of meanings/forms.

† No independent entry in source.

• Translations (where available) from So, 1982: krə̀ʔ to filter, to leach; khə́ʔ clumsy, awkward; khə̀ən shy, embarrassed; mâynêɛpniam not neat; sə̂ə thick-headed, stupid, clumsy; nǎa thick, viscous; lɔ́ʔ untidy, dirty, confused; phlĕɛ wound, sore, blemish; prə̀ʔ foul, dirty, soiled, untidy; lŭa to remain; monthin blemish, flaw; sápsɔ́ɔn to pile up, complicated; sàpsŏn confused; phóp to meet; mâak a lot; thə̀ʔ 'let us'; nĭaw strong, tough, sticky.

	TVF	TOF	nĭaw	thə̀ʔ	†thə́ʔ	mâak	†hə́ʔ	hə̀ʔ	phóp	sàpsŏn	monthinsápsɔ́ɔn	lŭa	prə̀ʔ	phlĕɛ	lɔ́ʔ	wə̀ʔ	nǎa	sə̂ə	mâynêɛpniam	khə̀ən	khə́ʔ	krə̀ʔ	khlə̀ʔ	khrə̀ʔ
krə̀ʔ	15	3									9											6	3	3
khrə̀ʔ	12	2			3						6								6	6		6		
khlə̀ʔ	12	2									6													
khə́ʔ	8	2																	4	4				
ŋɔ́ʔ	15	3				6															3			
cə́ʔ	1	1				6																		
sɔ́ʔ	10	2					4	2																
tə̂ʔ	10	2							1							5								
thə̀ʔ	6	2		2						3					9			4				9		
bə̀ʔ	50	5										10	10	15			10	10						
prə̀ʔ	21	3					4						4				4							
fɔ́ʔ	3	1																						
yɔ́ʔ	65	5				15						10		15	15									
lɔ́ʔ	7	2												3	3									
nə̀ʔ	3	1																						
wə̀ʔ	6	1	1																					
hə̀ʔ		2																						
TOM			1	1	1	3	2	1	1	1	3	2	2	3	3	1	2	2	2	2	1	3	1	1
TVM	245	39	1	2	3	27	8	2	1	3	21	20	14	33	27	5	14	14	10	10	3	21	3	3

|eel| 42*119 = 4998 FORM: [khwĕe] MEANING [mây troŋ] not straight
40*119 = 4760 FORM: [thee] MEANING [mây troŋ] not straight
36*119 = 4284 FORM: [pêe] MEANING [mây troŋ] not straight
24*119 = 2856 FORM: [hĕe] MEANING [mây troŋ] not straight
24*119 = 2856 FORM: [phlĕe] MEANING [mây troŋ] not straight
24*119 = 2856 FORM: [phlêe] MEANING [mây troŋ] not straight

|ooŋl| 126*95 = 11970 FORM: [pooŋ] MEANING [sïaŋ daŋ] loud sound
114*95 = 10830 FORM: [pôoŋ] MEANING [yày] large
126*85 = 10710 FORM: [pooŋ] MEANING [khûn] to rise
114*85 = 9690 FORM: [phooŋ] MEANING [yày] large
95*95 = 9025 FORM: [pôoŋ] MEANING [sïaŋ daŋ] loud sound

|eel| shows an unusally highly centralised meaning.In an earlier analysis with a Thai rhyme dictionary while the core concept was the same, [chĕe] and [kee] were the core forms. |ooŋl| is an example of what I have called a **spread core**, where there is no ocurrence (word) at the intersection of the shared form and shared meaning peak values, nor a direct intersection on either axis. A spread core is a good example of the type of chaining necessary to hold the network together.
The method of calculation described above has been adopted from methodology used in calculating the centrality of a network. In a future paper I will discuss these calculations and their further application in more detail.

2.6 Establishing and Measuring Category Membership
While we can calculate the relative centrality of each form in relation to the overall network, we have as yet no guarantee that all forms within the network are interrelated. While a raw metaphonic value of 1 indicates zero FM association in regard to a given metaphone (within the limits to the method described) and all raw metaphonic values of more than 1 indicate some chaining, we need to establish whether there is only one or more than one chain operating. Beginning from the core and working outwards links between common meanings and common forms (represented by occurrences along the same axis) must be traced until all links are covered. In Table 3 linked occurrences are shaded for the main network and enclosed by a solid line in subsidiary networks. As it turns out, in the case of the metaphone lɔʔl, there are 3 separate chains of meaning. The main network extends outwards from [yɔ́ʔ] meaning [phlɛ̌ɛ]. There is a separate network for the forms [khɔ́ʔ]/[ŋɔ́ʔ] and one for [thɔ̀ʔ]/[hɔ̀ʔ]. The existence of separate networks is not problematic: it can be likened to instances in morphology where the same form is used for different morphemes.
Having established the membership for this metaphonic set, we can calculate the percentage of FM association, dividing the number of forms in the main network by the number of total available forms. lɔʔl yields an FM rating of 64.7%, ie 64.7% of forms incorporating the phonological string [əʔ] have associated meanings. Metaphones |eel| and |ooŋl| have FM ratings of 56.8% and 66.6% respectively.

3. Meaning Relations

From the data and statistics at hand it would be possible to diagram in detail the internal relationships of each of the established categories. I will not do this here, but will give an overview of category concepts and metaphors.

3.1 /əʔ/

Sores [phlɛ̌ɛ] and their characteristics are the topic for the metaphone |əʔ|. In particular, the core FORM [yɔ́ʔ] and MEANING [phlɛ̌ɛ thîı nɔ̌ɔŋ lǎy prə̂ʔ lɔ́ʔ] 'a wound which flows foully with pus' involve what resembles a tropical ulcer. Additional forms and contexts [phlɛ̌ɛ bə̂ʔ, phlɛ̌ɛ wə̂ʔ] describe similarly messy wounds. Extensions of meaning can be grouped into:
  • bio-physical characteristics —thickness [nǎa tə̂ʔ], [nǎa bə̂ʔ]; wetness [prə̂ʔ pay dûay sìŋ thîı pìak] 'foul with something that is wet'; filthiness [lɔ́ʔ], [lɔ́ʔthɔ́ʔ]; and the general far-gone state of things [mâak] 'a lot' [mâak lǔa lǎay] 'more than a lot', [lǔa bə̂ʔ] 'more than a wound';
  • physical characteristics of materials —left to spoil and covered with dirt or other substances: [pen monthin sápsɔ́ɔn] 'to be flawed and built up', [prə̀ʔ sanĭm] 'rusty';
  • physical processes — removing the bad part [krə̂ʔ] such as filtering water or cleaning marked surfaces;
  • places, people or situations which are 'confused' [sàpsŏn]; and
  • people who are generally 'not together' [sumsɔ̂ɔ, sɔ̂ɔ mâak].

Note that for the same metaphone an earlier study using a Thai rhyme dictionary mentioned above, the metaphone |əʔ| showed core meanings of [sòkàpròk] 'dirty' and [lɔ́ʔ] 'untidy, dirty'.

One of the examples with no FM links is [nə̂ʔ] meaning [nĭaw] 'sticky'. The second network with [khɔ́ʔ] and [ŋɔ́ʔ] invovles characteristics of people including untidiness [mây nêɛpniam], being shy, embarrassed and uncomfortable [kə̂əkhɔ̌ən, khɔ́ʔkhɔ̌ən]. These examples appear to be related but the method has not permitted their inclusion.

3.2 /ee/

The metaphone |ee| relates to things that are not straight [mây troŋ] but naturally should be. I have attempted to illustrate the basic visual image involved in Diagram 1a: straight line deviation from either side of a trajectory. This may involve an deviation to one side alone, or alternation from one side to the other. The idea is classically demonstrated by rocking cradles [plee] and tipping boats [rua thee] whose position at rest is straight, but for which move from side to side is familiar. The category involves:
  • everyday actions —tipping with the purpose of emptying out the contents of a container: [thee náam] pour out water' [thee khàyà] 'tip out garbage';

• descriptions of buildings in disrepair —leaning houses [ruan see] sloping floors [phún thee], buildings about to collapse [yée] and having collapsed [phee];

• faces people make —either because of pain or dissatisfaction [tham pàak bêe] or smiling with contentment [phlèe]

• disabilities —being cross eyed or having similar eye problems [khĕe, lèe] or having a crooked leg [khăa pĕe];

• manners of walking —staggering [dɔ̀ɔn see] and walking about aimlessly [dɔ̀ɔn trèe, rêe];

• modes of dress —parting one's hair on the side [phŏm pĕe] or wearing a hat on a tilt [thêe];

• vice and evil —trickery [lee, lêe], gambling [phĕe, kee] and forgery [kée]; and

• songs —lullabies [hèe klɔ̀ɔm] and boat songs [hèe rua]

a.   b.
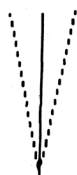
| ee | | ooŋ |

Diagram 1 Shape in Metaphones leel and looŋl

3.3 /ooŋ/

The metaphone |ooŋ| involves things that are large [yày, too] or tall [sŭuŋ], particularly larger or taller than they should be [môoŋ, yôoŋ] or larger than the group to which they belong [dòoŋ, khrôoŋ, tôoŋ]. I have again attempted to illustrate the basic visual image involved in Diagram 1b with a curved line deviation from one side of a trajectory, encapsulating the meanings 'larger than' and 'expanding'. The category includes:

• specific types of large male animals —a type of tiger [khrôoŋ], a type of rooster [tôoŋ] and a type of cat [phooŋ];

• processes —becoming tall [yòoŋ], becoming swollen [dôoŋ], selling at inflated prices [kooŋ];

• things which expand with air or gas [pòoŋ].such as gas marshes [pòoŋ], balloons [lûuk pòoŋ];

• human character—[sàmòoŋ pròoŋ] 'broad or open minded', [lôoŋ ʔòk lôoŋ cay] 'happy, lighthearted';

• emptiness and openness things (with no covering or with a partial covering) —
[rʉa thɔ̌oŋ] 'boat with a cabin or partially covered deck', [rɔ́t thɔ̌oŋ]
'convertibles' and [hôoŋ thɔ̌oŋ] 'partly covered room'; [looŋ] 'hole for a coffin'.

• manners of speaking —speaking openly and inappropriately without giving
thought [pôoŋ], [phlôoŋ]; speaking directly without fear or consideration [phɔ̌oŋ]

• containers —mortar or bowl for preparing medicine, a round shaped container
with a lip [krooŋ], container for drawing water from a deep well [phooŋ],
container for storing water with a narrow base and large mouth [ʔɔ̌oŋ];

• loud sounds —of something being hit [krooŋ], like that of a gun [pôoŋ], like
that of jumping into the water [phlôoŋ], a buffalo bell designed to make a loud
sound [pooŋ];

• manners of walking —walk or run on the toes to make oneself higher or lighter
[yɔ̌oŋ].

• death —death by unnatural means [hɔ̌oŋ], ghosts [hɔ̌oŋ, phooŋ]

Meaning listed here for looŋl and leel are not exhaustive. I have, overall, paid
little attention to plant life in meanings though there is room for studying form and
metaphonic associations involved. Analysis suggests that metaphones overlap, for
example between looŋl and lɔɔŋl; between lɔʔl and lɔɔl; and between leel and leʔl. In
addition, there is evidence of the role of a bisyllabic metaphone of lɔʔaʔl as an
extension of lɔʔl.

4. Conclusion

Phonology usually defines arbitrary structural elements. Morphology defines
elements of meaning. While there are clearly mixed cases where phoneme and
morpheme are mixed, phonemes ideally yield a 0% FM associationand morphemes
a 100% FM association. It should not be surprising, therefore, that we find that the
metaphones analysed here fall fairly well in the middle range with values around
60%. These results, however, are most likely conservative as, while the role of
these metaphones in bisyllables has not been systematically analysed, preliminary
inspection during this analysis shows that the relevant bisyllabic occurrences are
most likely to strengthen FM association.

This study has provided a means to measure statistically degrees of
association between form and meaning. Refinement of the method hopes to provide
less and less subjective interpretations of data. Metaphones are always subject to
personal associations, but trends in conceptual categories revealed in
metaphonology offer new and unchartered territory in the exploration of human
cognition.

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