The Acquisition of Accentual System in Thai : A Study from Pronunciation of Polysyllabic Words by 9- to 24-Month-Old Thai Children[1]

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Abstract

This paper aims to study the acquisition of the accentual system in Thai from the investigation of 9- to 24-month-old Thai children's pronunciation of polysyllabic words. By means of questionnaires, parents of 10 normally developing children are asked to report their children's pronunciation of Thai polysyllabic words. It is found that children's pronunciation is mostly monosyllabic and disyllabic. Monosyllabic and disyllabic one-word utterances of Thai children reflect the patterns of accent placement in the Thai accentual system. The monosyllabic one-word utterance is always the salient stressed syllable of the word primary accented syllable. The disyllabic one-word utterance is always the two salient stressed syllables of the word primary and secondary accented syllables. In addition to the accentual system, it is found that in cases of compounds and repetitives, specific characteristics of words and their distribution are also important factors in determining children's pronunciation of polysyllabic words. These findings demonstrate a number of counterexamples against the universal hypothesis of "unstressed syllable deletion process" (Ingram, 1968) and suggest a more appropriate language specific explanation for children's acquisition of accent.

1. Research Background

A number of researchers have agreed that at the very early period of lexical development, children perform "one-word utterances" (Benedict 1979, Ingram 1989, Clark 1993, and Bates *et al.* 1995). In terms of realization of "one-word utterances" in children's speech, it is usually reported that children's pronunciation of "one-word utterances" is either monosyllabic or disyllabic (Ingram 1989, Clark 1993, Wijnen *et al.* 1994, Vihman 1996). Consider the following examples:

Adults' forms		Children's forms	Sources
(a) /'kar/	'car'	[ka]	English : Vihman 1994
(b) /'ma'ma/	'mother'	[mama]	English : Vihman 1994
(c) /'sɛncjəs/	'coins'	[sɛ]	Dutch : Wijnen *et al.* 1994
(d) /' uder/	'under'	[ɔn]	Dutch : Wijnen *et al.* 1994
(e) /'sik'hʌys/	'hospital'	[sikhʌys]	Dutch : Wijnen *et al.* 1994

(f) /ˊfraxtˈauto/	'lorry'	[fraxaut]	Dutch : Wijnen *et al.* 1994
(g) /ˊcàkkaˈjaan/	'bike'	[jaan], [càkjaan]	Thai

From the above examples, we can clearly see that children's monosyllabic and disyllabic pronunciation does not need to be the same as the corresponding adult's forms as in (a) and (b). Moreover, children's monosyllabic pronunciation can be the consequence of either adult's monosyllabic (as in (a)) or disyllabic words (as in (c), (d), and (g)), while the disyllabic pronunciation can be the realization of either disyllabic (as in (b)) or trisyllabic words (as in (e), (f), and (g)) in adult language.

Evidence of monosyllabic or disyllabic pronunciation has been explained mostly in terms of children's incomplete anatomical development (Clark 1993). Some universalists have tried to explain this phenomenon in terms of phonological process. Ingram (1986) states that young children simplify adults' words to a limited range of sounds and syllable structures. The dropping of unstressed syllables and producing only the stressed one is categorized under the 'unstressed syllable deletion process'. However, less attention has been paid to the influence of linguistic characteristics of the mother language. The examples of "one-word utterances" in English and Dutch demonstrate a number of possibilities for dropping one-word utterances from the target polysyllabic words in the adult language. In the Thai data described in the following section, some of children's one-word utterances go beyond the explanation of the 'unstressed syllable deletion process'. This means that not only the universal hypothesis but also other factors determine children's choice of pronunciation in one-word utterances stage.

If we consider the above-mentioned examples again, we find that the pronunciation of children tends to relate to the pattern of accent in the target languages. It should be noted that the primary accent assigned to the first syllable of words is always pronounced by the children in both monosyllabic or disyllabic forms. Wijnen *et al.* (1994) suggest that such pronunciation does not indicate that children lack the ability to perceive the unaccented syllable of the word, but it is because they are able to realize the rhythmic pattern of strong and weak pronunciation of the word. However, their production ability has not yet been mastered, so the weak syllable is filtered. Hockberg (1988) also points out in her study of Spanish children learning Spanish stress that children at about 3 years of age learn the regular patterns of stress in Spanish and tend to regularize the irregularly stressed words. The results of these two studies indicate that language specific characteristics of Dutch and Spanish play a very important role in children's pronunciation of words in the early period of lexical development.

From a cross-linguistic perspective, the relationship between children's pronunciation of "one-word utterances" and the accentual system of Thai, which—as proposed by Luksaneeyanawin (1980)—has different patterns from those of English and Dutch, can provide insights into the role of language specific characteristics in the acquisition of the lexicon.

2. Accentual System of Thai

Luksaneeyanawin (1983) distinguishes the terms "accent" and "stress" and uses them in different levels of linguistic analysis. On the one hand, "accent" is used to refer to the potentiality of the syllable or the syllables in a word to be realized with stress either when the word occurs by itself or with other words in an utterance

(Luksaneeyanawin 1983, 74). On the other hand, "stress" is used to refer to the actual pronunciation of a particular word both contextually and decontextually. "Accent" is conceptualized within phonological level of the lexicon, while "stress" is the phonetic realization of the "accent". Not every syllable receiving accent need be realized with stress in normal speaking situation as shown:

Phonological Level	**Phonetic Level**
(Accent)	*(Stress)*
/ˋcak1 ka0 ˊjaan0/[2]	[ˋcak1 ka0 ˊjaan0]
	or [cak1 ka0 ˊjaan0]

Luksaneeyanawin (1983) proposes that Thai has a fixed accentual system governed by "Accent Placement Rules". Accent placement in Thai words is governed by 2 sets of rules depending on the types of words: monosyllabic and polysyllabic. For monosyllabic words, all content words are accented, and all grammatical words are unaccented.

For monomorphemic polysyllabic words, a double accented system is favored. Accent placements are determined by the number of the component syllables in the word as well as the structure of its component syllables. The primary accented syllable is always the final syllable. Secondary accent assignment is determined by the position and the structure of the other component syllables. That is whether it is a linker syllable (short syllable with an /a/ vowel). The linker syllable is normally unaccented (Luksaneeyanawin 1983, 1993, Surinpiboon 1985).

Accent Placement Rules in polysyllabic compounds are determined by the morphological derivation of the compounds (Luksaneeyanawin 1983). Polysyllabic repetitives, either the phonic reduplicatives or the semantic duplets, have a different set of rules based on types of these morphophonological processes (Luksaneeyanawin 1984)

3. Scope of the Study

Purpose

The purpose of this study is to investigate the relationships between the pronunciation of polysyllabic words by 9- to 24-month-old Thai children and the accentual system of Thai proposed by Luksaneeyanawin (1983).

Methodology

Data

The data used in this study were elicited by the distribution of questionnaires among parents of 10 Thai children longitudinally. From the age of 9 to 24 months old—at 3 months intervals—the parents were asked to report their children's pronunciation of Thai polysyllabic words.

Material

The "Questionnaire of Word Acquisition in Thai" (QWAT) was used as data elicitation material in this study. It was adapted from the language assessment "MacArthur Communicative Development Inventories" (CDI) developed by the Developmental Psychology Lab, San Diego State University in 1989. The QWAT is composed of 23 categories of vocabulary checklist which mostly follows the CDI's. These parents were asked to state whether their children understand and pronounce

certain items or not. In the case of pronunciation, the parents filled the form with the actual pronunciation of their children. An example of the questionnaire is given below:

Words	Understand	Pronounce
วิทยุ 'radio' /'wit3 tha0 'ju3/	X	ยุ /ju3/
จักรยาน 'bicycle' /'cak1 kra0 'jaan0/	X	จักยาน /cak1 jaan0/

It should be noted that the QWAT is an open questionnaire, allowing parents to add any new word their children can actually pronounce, which does not appear in the questionnaire. The QWAT is designed to be open because the number of words children acquire in the early period of language development varies. If the questionnaire was closed, or contained a certain number of items, we would not be able to elicit the actual number of words children acquire. Vocabulary items in QWAT consist of both monosyllabic and polysyllabic words, but for the purpose of the present study, only polysyllabic words are selected for analysis.

Hypotheses

1. In the period of one-word utterances, children are able to pronounce either complete or incomplete forms of polysyllabic target words. The realization of polysyllabic words in children's one-word utterances are monosyllabic, disyllabic, trisyllabic, and tetrasyllabic.

2. Monosyllabic and disyllabic one-word utterances of Thai children reflect the patterns of accent placement in the Thai accentual system. The monosyllabic one-word utterance is always the salient stressed syllable of the word primary accented syllable. The disyllabic one-word utterance is always the two salient stressed syllables of the word primary and secondary accented syllables.

3. Children's pronunciation of compounds and repetitives are governed by their specific characteristics and distribution.

4. Analysis

There are 3 steps for data analysis

4.1 Polysyllabic target words are classified into 4 types of words.

(1) Monomorphemic polysyllabic words : are words that cannot be separated further into smaller meaningful units, such as /cOO0 ra0 khee2/ 'crocodile', /ma3 la3 kOO0/ 'papaya', etc.

(2) Polysyllabic compounds : are words that are a combination of two or more free morphemes, such as /siN4 too0/ 'lion', /phaa2 chet3 tua0/ 'towel', etc.

(3) Polysyllabic complexes : are words that are a combination of at least one bound morpheme, such as /phuu2 chaaj0/ 'man', /chaaw0 naa0/ 'farmer', etc.

(4) Polysyllabic repetitives : consist of phonic reduplicatives and semantic duplets, such as /hoN1 hoN1/ 'dog's bark', /tO1 tɤ1/ 'to walk', etc.

4.2 Accentual patterns are assigned to all polysyllabic target words. For example,

/siN4 too0/ >>> /siN4 ˊtoo0/
/cak1 kra0 jaan0/ >>> /ˆcak1 kra0 ˊjaan0/

4.3 Children's one-word utterances are matched with polysyllabic target words, by considering which syllable/s of the target words children pronounce. The possible patterns of children's pronunciation are:

(1) Primary accented syllable

/siN4 ˊtoo0/ >>> [too0]
/ˆcak1 kra0 ˊjaan0/ >>> [jaan0]

(2) Secondary accented syllable

/ˆcak1 kra0 ˊjaan0/ >>> [cak1]

(3) Primary and secondary accented syllables

/ˆcak1 kra0 ˊjaan0/ >>> [cak1 jaan0]

(4) Primary and other unaccented syllables

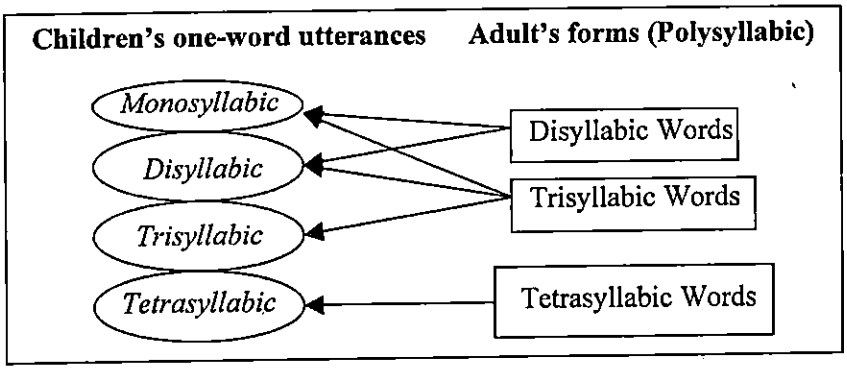
/ˆcak1 kra0 ˊjaan0/ >>> [kra0 jaan0]

After identifying children's pronunciation based on the accentual system of the adult language, the number of words of each types is tallied and a statistical analysis is made.

5. Results

As shown in Diagram A, Thai children's pronunciation of Thai polysyllabic words are monosyllabic, disyllabic, trisyllabic, and tetrasyllabic. From the point of view of the target adult forms, children's monosyllabic one-word utterances are the incomplete forms of the adult's disyllabic and trisyllabic words. For children's disyllabic one-word utterances, they are either the incomplete forms of the adult's trisyllabic and tetrasyllabic words or the complete forms of the adult's disyllabic words. Trisyllabic and tetrasyllabic one-word utterances are complete forms of trisyllabic and tetrasyllabic words in the adult language.

Diagram A: Thai children's pronunciation of one-word utterances corresponding to their target polysyllabic words in the adult language



Thai children's ability to pronounce the complete forms of polysyllabic words in the adult language indicates that they are able to perceive the unaccented syllable within

the first 2 years of their lives. This evidence directly supports the claim by Wijnen *et al.* (1994).

5.1 Monosyllabic one-word utterances

Regarding the relationship to the accentual system of Thai, children's monosyllabic and disyllabic one-word utterances are considered. All monosyllabic one-word utterances are the most salient primary accented syllable of the target polysyllabic words. It should be noted that the primary accent of polysyllabic words in Thai is always assigned to the last syllable, so children choose to pronounce only the last syllable of polysyllabic words as their monosyllabic one-word utterances. The distribution of monosyllabic one-word utterances is demonstrated in Table A.

Table A: Distribution of monosyllabic one-word utterances of 9- to 24-month-old Thai children

Age Groups / Syllable/s Pronounced	9 MO	12 MO	15 MO	18 MO	21 MO	24 MO
(1) Primary Accented Syllable						
Monomorphemic	0	2	32	112	164	157
Compounds	0	0	20	83	125	118
Complexes	0	0	8	27	42	43
Repetitives	0	0	2	5	5	5
Total	**0**	**2**	**62**	**227**	**336**	**323**
(2) Secondary Accented Syllable	0	0	0	0	0	0

From Table A, it is obvious that the secondary accented syllable is not pronounced as monosyllabic one-word utterances. This is because the degree of saliency of the secondary accent is less than that of the primary. In other words, the primary accented syllable has higher potentiality to be realized with stress than the secondary one. This makes the primary accented syllable easier for children to perceive than the secondary accented syllable. The result of monosyllabic one-word utterances is a good piece of evidence to indicate that children can clearly distinguish between primary and secondary accented syllables. This also implies that the most significant feature of accentual system, that is the most salient accented syllable, has been acquired.

Moreover, from the examination of the source of monosyllabic words, there is continuously development in the number of monomorphemic polysyllabic, compound, and complex words. However, number of children's monosyllabic repetitives does not demonstrate any development up until 24 months of age. In addition, comparing with other word types, polysyllabic repetitives do not tend to be realized as monosyllabic utterances. It can be implies that there might be some other factor that influence children's production of repetitives. This would be explained in more detail in the next section.

5.2 Disyllabic one-word utterances

Thai children's disyllabic one-word utterances consist of two accent-related patterns (Table B). The first pattern is the two salient stressed syllables of the word

primary and secondary accented syllables. The second pattern consists of the most salient stressed syllable of the word primary accented syllable and the non-salient unstressed syllable of the word unaccented syllable as demonstrates.

Patterns	*Target words*	*Meanings*	*Child's productions*
1	/ˋcak1 ka0 ˊjaan0/	'bicycle'	[cak1 jaan0]
2	/ˋprxxN0 sii4 ˊfan0/	'toothbrush'	[sii4 fan0]

Table B: Distribution of disyllabic one-word utterances of 9- to 24-month-old Thai children

Age Groups / Syllable/s Pronounced	9 MO	12 MO	15 MO	18 MO	21 MO	24 MO
(1) Primary and Secondary Accented Syllables						
Monomorphemic	0	0	3	21	39	71
Compounds	0	3	17	47	103	174
Complexes	0	1	4	20	38	79
Repititives	3	4	29	41	46	50
Total	**3**	**8**	**53**	**129**	**226**	**374**
(2) Primary and Other Unaccented Syllables						
Monomorphemic	0	0	0	0	0	0
Compounds	0	0	0	0	8	8
Complexes	0	0	0	0	0	0
Repetitives	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**8**	**8**

Table B shows the distribution of disyllabic one-word utterances among Thai children. Two findings are of interest. The first finding is focused on the special characteristic of words in the "Repetitives" category. According to Luksaneeyanawin (1983), all component syllables of repetitives normally receive accent. This regular pattern of accent assignment makes "repetitives" a tightly tied category and has high potentiality for all component syllables to be realized with stress in a normal speaking situation. Moreover, the significant pattern of syllable structures of the component syllables in repetitives—totally or partially the same structure—is also easily recognized by children. In Table A, the number of polysyllabic repetitives realized as monosyllabic one-word utterances is significantly less, while in Table B, almost all disyllable repetitives—which are double accented—are completely realized as disyllable one-word utterances. Moreover, the pronunciation of disyllabic repetitives is recognized since the very early period of lexical development (9 months), and seems to outnumber other categories until before the period of lexical acceleration (18 months).

The second interesting finding concerns the second pattern of disyllabic one-word utterances—the primary and the other unaccented syllables. From Table B, only the pronunciation of polysyllabic compounds contains an unaccented syllable. According to the results discussed so far, there is no any single case of an unaccented syllable realized

in children's one-word utterances. This is because of the low degree of saliency of the unaccented syllable to be realized with stress in a normal speaking situation. However, in the case of polysyllabic compounds, we think that it is because of the characteristic of polysyllabic compounds themselves that reflects children realization of the unaccented syllable. Consider the following data,

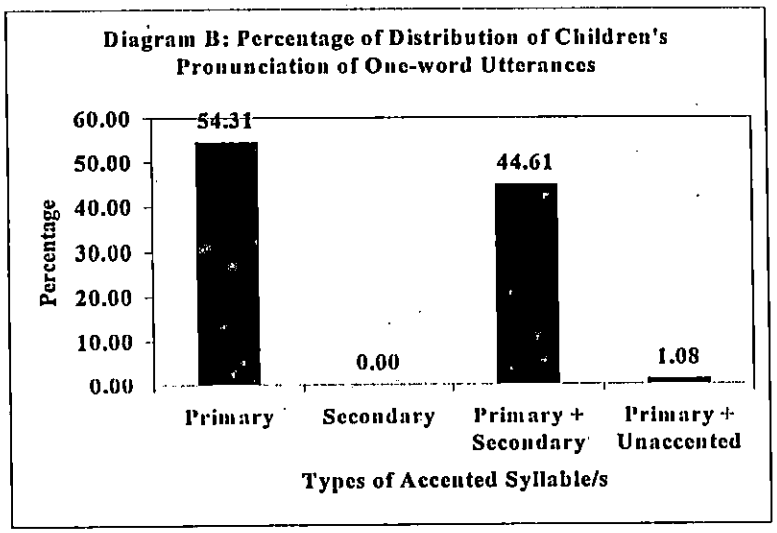
Adult's forms		**Children's pronunciation**
(a) /ˆthaN4 kha0 ˊja1/ 'bucket' + 'rubbish' = 'bin'	>>>	[kha0 ja1]
(b) /ˆmii4 pxn0 ˊdaa2/ 'bear' + 'panda' = 'panda'	>>>	[pxn0 daa2]
(c) /ˆjaa0 sa1 ˊphom4/ 'medicine' + 'to wash' + 'hair' = 'shampoo'	>>>	[sa1 phom4]
(d) /ˆprxxN0 sii4 ˊfan0/ 'brush' + 'to brush' + 'teeth' = 'toothbrush'	>>>	[sii4 fan0]
(e) /ˆphaa2 chet3 ˊtua0/ 'towel' 'cloth' + 'to wipe' + 'body' = 'towel'	>>>	[chet3 tua0]

As described in section 4, polysyllabic compounds are combinations of two or more free morphemes. This means that all component elements of polysyllabic compounds have their own meaning and can occur separately in normal speech as monomorphemic words, as shown in examples (a)-(e). According to this characteristic of polysyllabic compounds, we can also say that each component element of polysyllabic compounds has its own distribution as a monomorphemic word—which is accented—as well. Therefore, it is not impossible that children might be familiar with /kha0 ja1/ as a monomorphemic word more than /thaN4 kha0 ja1/ which is a polysyllabic compound and ignore the pronunciation of the latter. Moreover, it might be possible that the frequency of occurrence in infant-directed speech of the monomorphemic word is higher than that of the polysyllabic compound.

In examples (c), (d), and (e), the realizations of polysyllabic compounds look like 'verb phrase' in the adult language, i.e. a type of syntactic unit which has a verb as head. Such pronunciation indicates that component elements of polysyllabic compounds can be realized in a variety of ways in normal speech. Let's take /prxxN0 sii4 fan0/ 'toothbrush' for example. /prxxN0 sii4 fan0/ is a polysyllabic compound consisting of 3 component elements which are all free morphemes: /prxxN0/ 'a brush, to brush', /sii4/ 'to brush', and /fan0/ 'teeth'. Each of these three elements can occur in normal speech as a monosyllabic word. In addition, the two latter elements /sii4/ and /fan0/ are also able to be combined as a 'verb phrase' functioning pragmatically as a directive in infant-directed speech—'brush your teeth!'. Therefore, we claim that the possibility of distribution in normal speech of component elements of polysyllabic compounds is another crucial factor which determines the pronunciation of children's one-word utterances.

5.3 Distribution of Accented Syllable/s in Children's One-word Utterances

From reports in detail in 5.1 and 5.2, it is obvious that the primary and secondary accents assigned to polysyllabic words in Thai reflect children's pronunciation of one-word utterances. Diagram B shows the percentage of distribution of each type of children's one-word utterances.



The use of the primary accented syllable as one-word is most common, followed by primary and secondary accented syllables, and primary and other unaccented syllables categories respectively. However, the first 2 patterns far outnumber the third. This result suggests that the accentual system which is said to be language specific (Hochberg 1988, Wijnen *et al.*1994, Luksaneeyanawin 1983), or cross-linguistically different, influences children's pronunciation of one-word utterances. The primary accent that is the most salient stressed syllable is the most influential in Thai one-word utterance data. It occurs either in monosyllabic (54.31%) or disyllabic (44.61) words. The secondary accented syllable does not show higher significance over the primary accented syllable, as shown in the percentage of monosyllabic one-word utterances which derive from only the primary accented syllable and only the secondary accented syllable: 54.31%, and 0%, respectively.

5.4 Thai Children's Pronunciation of One-word Utterances: Developmental Perspective

Table C summarizes number of words of the two major types of children's one-word utterances overtime. They are (1) the monosyllabic one-word utterance which is the primary accented syllable of the adult's polysyllabic word, and (2) the disyllabic one-word utterance which is the primary and secondary accented syllables of the adult's polysyllabic word.

Table C: Number of Words of Two Major Types of Children's One-word Utterances

Children's One-word Utterances	Age groups 9 MO	12 MO	15 MO	18 MO	21 MO	24 MO
Monosyllabic (n=950) (Primary accented syllable)	0	2	62	227	336	323
Disyllabic (n=793) (Primary and secondary accented syllables)	3	8	53	129	226	374
Total (n=1,743)	3	10	115	356	562	697

Table C shows that total number of monosyllabic words outnumbers disyllabic words—950 : 793—. However, the distribution of number in each category demonstrates that at about the onset of development—9 and 12 months of age—children's realizations of adult's polysyllabic words are overwhelmingly disyllabic. These disyllabic words are mostly polysyllabic reduplicatives. From 15 months of age, the number of monosyllabic words seems to increase greatly and outnumbers disyllabic words before descends again at 24 months. In terms of development, the number of disyllabic words increases continuously, while the number of monosyllabic words tends to descend at 24 months of age.

In order to make the table clearer, we conduct Diagram C to illustrate percentage of the two categories in terms of developmental proportion as shown.

Diagram C: Proportions of Percentage of Two Major Types of Children's One-word Utterances in Terms of Development

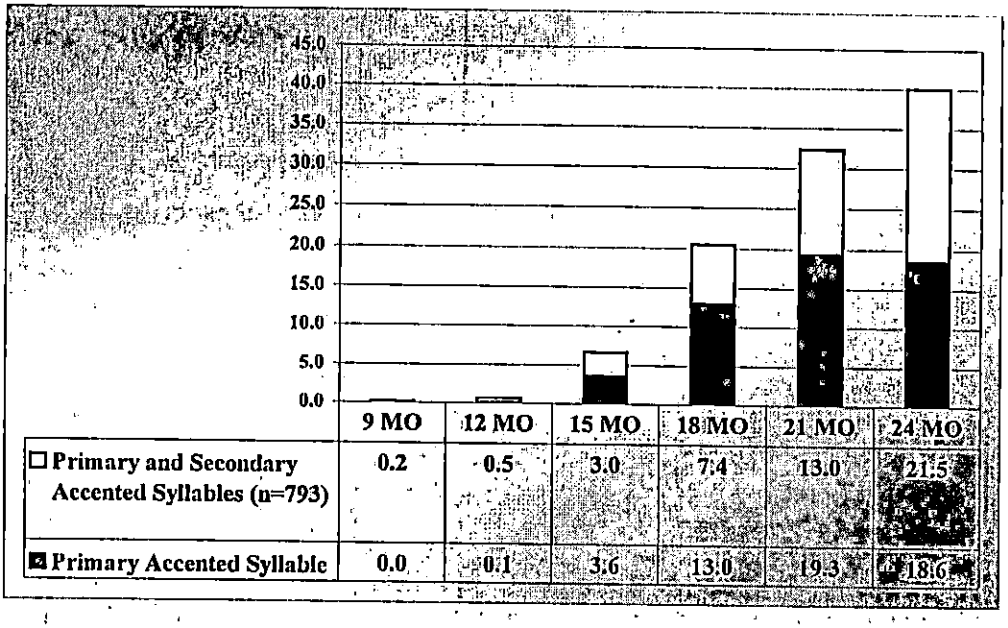


Diagram C demonstrates two dimensions of fact about the development of one-word utterances. The height of the diagram shows development of number of one-word utterances—which is the realization of polysyllabic words. Within each age group, the proportion between monosyllabic and disyllabic one-word utterances is illustrated. It is found that the development of proportion of monosyllabic and disyllabic one-word utterances is different. In monosyllabic utterances—which are the realization of the primary accented syllable of polysyllabic words—the development reaches its peak at 21 months of age, and tends to decrease gradually when children grow up. On the other hand, children's disyllabic one-word utterances—which are the realization of the primary and secondary accented syllables of polysyllabic words—are firstly produced at the very early period of development: 9 months of age. The proportion of disyllabic one-word utterances tends to increase overtime and outnumbers monosyllabic one-word utterances at 24 months of age. This indicates the fact that children have developed their production ability and are able to produce higher number of multi-syllable utterances.

In addition, these characteristics of development are related to characteristic of accent to be realized with stress in adult language. In other words, children show the possibilities to pronounce polysyllabic words in two alternative ways: they are either only the primary accented syllable or the primary and secondary accented syllables, as the adult do. This is the evidence to demonstrate that children's pronunciation develops toward that of the adult as demonstrates:

Phonological Level	**Phonetic Level**	
	Adults	***Children***
/ˆcak1 kra0 ˊjaan0/ >>>	[cak1 kra0 ˊjaan0] [ˆcak1 kra0 ˊjaan0]	[jaan0] [cak1 jaan0]

6. Summary and Discussion

We have investigated the relationship between Thai children's pronunciation of one-word utterances and the Thai accentual system. The results suggest that the universal hypothesis of the "unstressed syllable deletion process" is not the most appropriate predictor for children's pronunciation of disyllabic words. Rather, it is the language specific characteristics of 1) accentual system, 2) similar patterns of the component syllables of polysyllabic words, and 3) their distribution in spoken language that govern children's pronunciation in one-word utterances stage. This finding supports the claim made by Hockberg 1988, and Wijnen 1994.

Children's pronunciation consists of monosyllabic, disyllabic, trisyllabic, and tetrasyllabic one-word utterances. The monosyllabic one-word utterance is always the most salient stressed syllable of the word primary accented syllable. The disyllabic one-word utterance is always the two salient stressed syllables of the word primary and secondary accented syllables. The trisyllabic and tetrasyllabic one-word utterances are the complete pronunciation of the target polysyllabic words. From these findings, it can be implied that primary and secondary accented syllables influence children's perception. However, this does not mean that children cannot perceive the unaccented syllable because they can also pronounce the complete forms of the target trisyllabic and tetrasyllabic words which consist of both accented and unaccented syllables.

In addition to the accentual system, we find that the characteristics of each type of polysyllabic words are factors determining children's pronunciation at the one-word utterance stage. In this study, the characteristics of two types of polysyllabic words are found to play important roles in children's pronunciation: polysyllabic repetitives, and polysyllabic compounds. A polysyllabic repetitive consists of at least two component syllables which are totally or partially identical in terms of syllable structure and are all accented. Not only does the accent make the repetitive easily recognizable, but the same syllable structure makes it easier to pronounce. This is why repetitives are among the first categories of words children acquire (Table B).

The second type of polysyllabic words is compounds. A polysyllabic compound consists of two or more component elements which are free morphemes—independent lexical items. Such characteristic allows each component element of the polysyllabic compound to be widely distributed in normal speech as an independent monomorphemic word. In other words, it can be realized as either a monomorphemic word with an accentual pattern or a part of a polysyllabic compound with another accentual pattern. Moreover, the component elements of the polysyllabic compound can also occur in a syntactic unit, such as 'verb phrase' which functions as directive in infant-directed speech. This distribution variety increases possibility for children to pronounce the unaccented syllable of compounds.

Finally, the developmental proportions of one-word utterances, in Diagram C, demonstrate children's development of production ability towards the adult language.

Notes

1. The present study is supported by a grant from MARCS Auditory Laboratories, Sydney and Centre for Research in Speech and Language Processing (CRSLP), Chulalongkorn University, Thailand.

2. The phonological representation of Thai used in this study is given in Appendix A.

References

Bates, E., Dale, P.S., and Thal D. 1995. Individual Differences and Their Implications for Theories of Language Development. In Fletcher, P., and MacWhinney, B. (eds.). *The Handbook of Child Language*. Blackwell, 96-151.

Benedict, H. 1979. Early Lexical Development: Comprehension and Production. *Journal of Child Language*, 6: 183-200.

Clark, Eve V. 1993. *The Lexicon in Acquisition*. Cambridge University Press.

Developmental Psychological Lab. 1989. *The MacArthur Communicative Development Inventories: Words and Gestures*. San Diego CA: San Diego State University.

Ingram, D. 1986. Phonolgical Development: Production. In Fletcher, P. and Garman, M. *Language Acquisition: Studies in First Language Development*. Cambridge University Press, 223-239.

Ingram, D. 1989. *First Language Acquisition: Method, Description, and Explanation*. Cambridge University Press.

Hochberg, Judith G. 1988. Learning Spanish Stress: Developmental and Theoretical Perspectives. *Language*, 64 (4): 683-706.

Luksaneeyanawin, Sudaporn. 1983. *Intonation in Thai. Ph.D. Dissertation.* University of Edinburgh.

_____. 1984. Some Semantic Functions of Reduplicatives in Thai. In P. Tuaychareon *et al.*, (eds). *Selected Papers from the International Symposium on Language and Linguistics*. Chiangmai University, Thailand, 125-144.

_____. 1993. Speech Computing and Speech Technology in Thailand. In *Proceedings of the Symposium on Natural Language Processing in Thailand, 17-20 March 1993*. Chulalongkorn University, 276-321.

Surinpiboon, Sukanlaya. 1985. *The Accentual System of Polysyllabic Words in Thai.* M.A. Thesis, Department of Linguistics, Chulalongkorn University. (In Thai).

Vihman, Marilyn May. 1996. *Phonological Development: The Origins of Language in the Child.* Blackwell Publishers.

Wijnen, Frank, Krikhaar, Evelien, and Os, Els Den. 1994. The (Non) Realization of Unstressed Elements in Children's Utterances: Evidence for a Rhythmic Constraint. In Perera, K., Collis, G., and Richards, B. *Growing points in child language*. Cambridge University Press, 59-83.