

## CHAPTER 6

### SUMMARY, DISCUSSION AND RECOMMENDATIONS

#### 6.1 Summary

Infant Directed Speech samples were collected longitudinally from six mothers speaking to their infants (three with female infants and three with male infants) when their infants were newborns, 3 months, 6 months, 9 months and 12 months of age. Adult Directed Speech samples of these mothers were also collected to be compared with those IDS samples. The data were then examined in two aspects: phonetic aspects and pragmatic aspects.

##### 6.1.1 Phonetic aspects

In terms of phonetic aspects, twenty utterances from each of the six mothers speaking to their infants at each of the five ages and to an adult were analyzed using Multi-speech (details in chapter 3.2.1.1). Thus there were 120 utterances per mother and a total of 720 utterances were used. Prosodic features of speech analyzed were: pitch, tempo (duration of utterances, duration of syllables and number of syllables per utterance) and loudness.

Results show that fundamental frequency is significantly higher and exhibited a large range in semitones (263.3 Hz vs. 247.99 Hz) and (15.16 st vs. 13.5 st) in IDS as opposed to ADS.

Across infants age groups, there is a large increase in mean  $F_0$  and  $F_0$  range from birth to 3 months, but smaller increase from 3 to 6 months which is the highest points. Then, it decreases at 9 months and is lowest at 12 months. The mean  $F_0$  and  $F_0$  range change significantly with infant age.

Concerning the variation of the pitch features found in Female-IDS and Male-IDS. The findings display that mothers speak to their male infants with higher mean pitch and pitch range than to their female infants.

With respect to rate and tempo analyses, mean utterance length, syllable length, and numbers of syllable per utterance are reported in Table 42 below.

Table 42 Mean Utterance Length (MLU), Syllable Length (MLS), and Numbers of Syllable per Utterance (MNS)

	NB	3MO	6MO	9MO	12MO	Mean IDS	ADS
MLU	1262	1115	950	1102	1104	1106	1506
MLS	359	351	333	341	328	343	220
MNS	4.36	3.75	3.08	3.87	4.33	3.88	7.63

In utterance duration analyses, ADS uses significant longer utterance length than IDS (1506 ms vs 1106 ms). Mothers use longest utterance to their newborns and shortest utterance duration to the 6MO.

Regarding to syllable duration, IDS contains significant longer syllable length than that of ADS (343 ms vs 220 ms). Across age groups, the longest syllable length is significant found at newborn and shortest at 12 month olds.

In terms of the number of syllables per utterance, ADS contains significantly more average syllables than IDS (7.63 vs 3.85). The average number of syllables per utterances is equal at 4 syllables per utterance in all ages except at 6-month-olds which the average is lower equal at 3 syllables.

For intensity measures, ADS uses lower intensity than IDS (71.28 dB vs 69.07 dB) which is opposite to the hypothesis. When looking at the age related change, the highest intensity of maternal speech is to newborns (mean= 75.35 dB) but the lowest is to nine-month-olds (mean= 68.13 dB). It is likely that the speech samples in newborn contain many extraneous noise which cause the low intensity. Speech with very low intensity cannot be registered by the acoustic analyzer. We have to increase the speech intensity by increasing the input volume until the machine registers the signal. Therefore, the intensity measures in newborn are higher than expected.

### 6.1.2 Pragmatic aspects

In the communicative speech acts analysis, the whole 20 minutes sample from each subject except speech directed to adult was investigated, a total of 13,639 utterances. There were 24 types of LAVs found- to inform, describe, explain, count, call, question, order, request, blame, warn, threaten, forbid, persuade, exclaim, sing, calm, comfort, praise, tease, complain, reflect in word, greet, give turn, and keep turn. These LAVs were then classified into five major types of SAVs. They were classified according to speech act criteria into assertives questions, directives, expressives and interaction-management.

- a) Expressives are 9 types of LAVs: to tease, calm, praise, sing, exclaim, comfort, complain, reflect in word, and greet.
- b) Assertives contain 5 types of LAVs: to describe, inform, call, count, and explain
- c) Directives consist of 7 types of LAVs: to order, blame, forbid, persuade, request, warn, and threaten.
- d) Questions can be classified into 4 types of questions by their sentence forms: Yes-no questions, Repetitive questions, Question word or WH-questions, and alternative or disjunctive questions.
- e) Interaction-management are 2 types of LAVs: to keep turn, and give turn

Expressives type of SAVs are found most at all ages except at 12 months (24.2%). At 6 months, mothers use most expressives (52.2%). For assertive and directive, they are found most at 12 months (31.25% vs 27.9%). Mothers use higher percentage of questions when the infants are in newborns (20.4%) and decrease when they get older.

These types of SAVs are then classified into two major classes- non-interactive class and interactive class.

1. Interactive class of speech act verbs are interactive expressives (to tease, calm, praise, sing, exclaim, comfort, complain, reflect in word, and greet), interactive assertives (call), interactive directives (to order, blame, forbid, persuade, request, warn, and threaten), interactive questions (question), and interaction-management (give turn and keep turn) 79.1%.

2. Non-interactive class of speech act verbs are non-interactive assertives (describe, inform, count, and explain) 20.9%.

Results show that interactive speech acts are found most at 3 and 6 months (85.2% vs 84.8%) and found least at 12 months (70%).

It can be concluded here that there seems to be three age intervals which show unique modification to the pattern of prosodic and pragmatic characteristics.

The first age group is the newborns which refer to the infants in their first week in the hospital. In newborns as opposed to other age groups, mothers use longer utterance duration, longer syllable duration, and more numbers of syllable per utterance. The newborns is very passive. They are unable to control motor smoothly and voluntarily. Therefore, mothers use slow rate of speaking so that newborns can comprehend the maternal speech. In addition, a high proportion of questions is used to the newborns to engage and hold attention of them because their perceptual skills including sight and hearing are also limited too.

In the 3 -to 6-months-old periods, the mother's speech style changes because the children themselves can respond and interact to their mothers. As can be seen, at these ages infants can engage in selective listening, they can distinguish and attend to utterances addressed to them. In addition, the 6 months-old infants can discriminate various emotional facial display and also can imitate others such as facial imitation and nonspeech imitation. Then, the mothers respond to their infants with increase mean  $F_0$  and pitch modulation. In addition, compared to newborns, mothers express more affection and emotion to their infants from 3 to 6 months. There are a greater number of expressives especially the linguistic action verb- to tease are found most at these two age groups.

By the time infants reach 9 and 12 months of age, there is a successive decrease of  $F_0$  to the 6MO (278 Hz) to 9MO (265 Hz) and the 12MO (247 Hz). In addition, mothers use a lot of assertive types and directive types for didactic and

control behavior purpose. Infants of these two age groups start to move about by crawling and walking. They start to initiate the communication with others by themselves with nonverbal behavior. The mothers' role has become more directive and instructional to control and to teach about the world around them.

## 6.2 Discussion

This is the first work in Thai Infant Directed Speech which has done longitudinally examining both phonetic and pragmatic characteristics of IDS systematically in the early year of life and compared to adult directed speech. The findings of acoustic analyses in Thai support the universal theory of prosodic features in motherese. Especially, results for pitch analyses: mean pitch and pitch range are similar to that reported in other languages as shown in Table 43 below. Although these languages represent considerable diversity in prosodic structure, they display the higher pitch and expanded pitch range in IDS compared to ADS. For example, American English, British English, Australian English, and German are all stress languages, while French uses syllable timing and duration to indicate stress. Italian makes greater use of variability in word order and emphasis is marked more frequently by fronting the focuses word. In contrast, Japanese is a pitch accented language using particles instead of prosodic marking to emphasize words. Mandarin and Thai are both tone language which a change in pitch contour changes the meaning of the word.

However, these languages reveal different degree to which mothers use in pitch modulation to their infants. American English mothers in the work of Fernald et al. (1989) shows greater extent of intonation exaggeration in speech to infants (308 Hz) and higher pitch modulation (19.2 st) (Garnica, 1977), while Thai mothers use the lowest mean pitch in IDS (236 Hz) in the work of Khaonoo (1996) and Mandarin mothers use more subdued in pitch modulation to their IDS (5.1 st) (Greiser and Khul, 1988).

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Table 43 Cross-Language Comparison on the Prosody Characteristics of IDS and ADS

	Mean F <sub>0</sub> /utterance (Hertz)			Mean F <sub>0</sub> range/utteeance (semitones)			Mean utterance duration (second)			Mean syllable duration (millisecond)			Mean numbers of syllable per utterance		
	IDS	ADS	DIF*	IDS	ADS	DIF	IDS	ADS	DIF	IDS	ADS	DIF	IDS	ADS	DIF
<b>English</b>															
<b>American English</b>															
(1) Garnica (1977)	267	198	69	19.2	10.5	8.7	-	-	-	-	-	-	-	-	-
(2) Stern et al. (1983)	-	-	-	9.6	8	1.6	0.6	1.2	0.6	-	-	-	3.83	8.16	4.33
(3) Fernald et al. (1989)	308	206	102	11.3	8.7	2.6	1.3	2.3	1	-	-	-	-	-	-
<b>British English</b>															
(1) Fernald et al. (1989)	262	222	40	11.4	10.7	0.7	1.1	1.9	0.8	-	-	-	-	-	-
<b>Australian English</b>															
(1) Kitamura (1992)	273	222	51	-	-	-	-	-	-	-	-	-	-	-	-
(2) Kitamura (in progress)	285	217	68	13.7	12.9	0.8	1.8	2.3	0.5	-	-	-	-	-	-
<b>German</b>															
(1) Fernald & Simon (1984)	257	203	54	11	3.5	7.5	1.1	2.2	1.1	-	-	-	-	-	-
(2) Fernald et al. (1989)	241	207	34	12.4	9.8	2.6	1.5	2.6	1.1	-	-	-	-	-	-
<b>French</b>															
(1) Fernald et al. (1989)	288	242	46	11.8	9.6	2.2	1.3	1.7	0.4	-	-	-	-	-	-
<b>Italian</b>															
(1) Fernald et al. (1989)	266	223	43	12.8	9.5	3.3	1.6	2	0.4	-	-	-	-	-	-
<b>Japanese</b>															
(1) Fernald et al. (1989)	277	207	70	8.1	9.0	-0.9	1.3	2.6	1.3	-	-	-	-	-	-
<b>Mandarin</b>															
(1) Greiser & Khul (1988)	247	199	48	5.1	3.5	1.6	1.1	1.7	0.6	-	-	-	-	-	-
<b>Thai</b>															
(1) Khaonoo (1996)	236	-	-	-	-	-	-	-	-	240	-	-	5	-	-
(2) Thanavisuth (1997)	263	248	15	15.2	13.5	1.7	1.1	1.5	0.4	343	220	123	3.85	7.63	3.78

\*DIF means the differences between IDS and ADS

When comparing the average pitch of IDS and ADS in Thai, it does not show much difference comparing to other languages. It is likely that Thai is a tonal language which a change in pitch contour also changes the meaning of the word. This tone constraint can possibly thwart the use of pitch as a prosodic feature of motherese. For average range, it seemed that ADS (13.5 st) in Thai have the highest pitch modulation than other languages (3.5-12.9 st), while the pitch modulation of IDS is the second highest (15.2 st) comparable to other languages (5.1-19.2 st). Although the researchers analyze the same language as Garnica (1977) and Stern et al. (1983), they show a greater difference from each other. As can be seen, the F<sub>0</sub> range in IDS and ADS is 19.2 st vs 10.5 st, but only 9.6 st vs 8 st in the work of Stern et al. The possibility could be that the researchers use different subject samples (maternal speech to infants varying from 2 days to 5 years old), different methods in collecting data, and the methods of acoustic analysis varied across studies. However, the work of Kitamura (in progress) can be compared with the present work because we use the same method in collecting data, the same tool in analyzing data, and the same age intervals of infants. It seems that Australian mothers use higher pitch when speaking to their children than Thai mothers. In contrast, for pitch range, Thai mothers use higher overall pitch range than Australian mothers when speaking to their children.

Regarding duration, in this study we investigate both utterance duration and syllable duration. Utterance duration reveals the similar results as other works. For syllable duration, no work has been done to compare between IDS and ADS. The numbers of syllable per utterance analyses resemble the work of Stern et al. (1983).

The intensity values does not include in this table because until now no other study has done on this aspect. The findings on intensity measures oppose to the hypothesis. The mean intensity in IDS should be lower than ADS but it does not follow this. That is to say, the intensity value is 71.28 dB for IDS and 69.07 dB for ADS. This is because there is a problem in the measurement methodology. The results reveals the opposite way to the auditory judgment. Indeed, we notice very soft degree of loudness in IDS than ADS. The speech of IDS has very low intensity. So, it cannot be registered by acoustic analyzer. We have to increase the speech intensity by increasing the input volume until the machine registers the signal. Therefore, the intensity results are not valid. This is a problem which needs to be solved by improving the acoustic analyzer so that a wide range of intensity from very low to very high can be registered without increasing the input volume.

As we know, mothers may modify their speech to accommodate the needs, and limitations of their infants. Stern et al. (1983: 12) proposed that the sequential changes in maternal language behavior are also closely related to developmental shifts in the infant's perceptual and cognitive capacities and preferences. This is also found in this study.

Average pitch of mothers' speech directed infants at different age resemble in some respects to those found in Kitamura (in progress). That is mothers use the highest level of pitch and pitch range with 6-month-olds infant. While the lowest

level of pitch and pitch range in this study is found in maternal speech to 12-month-olds, Kitamura found those features in speech directed to newborn. These findings support the work of Stern et al. (1983) which shows a higher mean on all measures of fundamental frequency highest at 4 months than other age groups. The explanation for this is that the 6-month-old infant is very social. He can smile and vocalize, and respond differentially. He is also interested in toys and objects and has eye-hand coordination development. At this period, the infant has an intense face-to-face play interaction. Therefore, mothers use pitch features to gain and hold attention of their infants. While mothers decrease their uses of exaggerated pitch at 12 months because this period infants begin to utter their first word. For Thai infants at this age, they also need to learn the system of five distinct tones. At this time maternal speech need to produce the accurate of tone in order for infants to perceive the differences between words. That is to say, the pitch is changed from prosodically used to phonemically used.

The pragmatic features also correlate with pitch features. At 6 months, mothers use the expressive speech act verbs most and it is found least at 12 months. While maternal speech directed to 9 and 12-month-old infant contain higher assertive and directive types of SAVs. It is likely that at 9-month-olds the infant learn to sit unaided, free to examine and manipulate objects with his hands and can follow maternal pointing and glancing. At 12 months the infants not only use words in communicating with mother but also like to explore the thing in their world. At these periods the face-to-face contact decreases. Mothers' roles change from engaging attention and communicating affect to facilitating language acquisition. The maternal speech at these two ages contain a high proportion of naming. Since, mothers recognize that the infants at these two ages are interested in more objects. They are more able to follow conversational cues. Thus, mothers make increasing reference to objects, events, and people outside infants' environment. Furthermore, a highly directive type tends to be used at these two ages to control child's attention and behavior.

For newborns, mothers tend to use slower rate of articulation to provide a longer period for slower processing and limited repertoire. It seems that the newborn is not active. His motor and cognitive behavior are quite limited. In addition, mothers used a considerable number of questions at this age. Questions are used as a kind of conversation-eliciting device that mothers used to pass conversational turn to the child and encourage the infants' verbal participation (Snow, 1977a).

It seems that phonetic and pragmatic aspects are differently adjusted to convey specific message to their infants depend on the age of the infants. That is to say, maternal speech is modified systematically so that it is comprehensible at the assumed level of the child.

The findings seems to support Fernald (1984) and Fernald & Mazzie (1991). They suggest that the attentional and affective qualities of IDS becomes meaningful to the infant and change to a predominantly linguistic function with increasing age.

Moreover, in this study I also found other features of IDS. For example, mothers use longer pause when addressed to their infants. The sentences used are short and simple. There are more immediate repetition and more repetition of the same words or phrase over a period of time. Topics of talk restricts to the child world. That is to say, mothers talk about objects that are immediately present in the environment.

In addition, there are other simplified registers which share the characteristics of IDS such as speech to foreigner, speech to lover, speech to retardate, speech to pet, and teacher talk. For example, teacher talk language contains a high proportion of questions to prompt students to talk. Wesche (1994) reported that questions are used more often in classroom situation as topic-initiating, marking new topics, comprehension checks, and confirmation checks.

In short, it seems that the children do not learn language only from environment, or only grammatical rules. However, language is acquired within the context of social interaction between the caregiver and the child. In communication context, the caregiver assumes that the child is attempting to communicate meaningfully. As Snow et al. (1979) proposed that mothers treat selected behaviors of the children as meaningful communication turns such as smiling, burping, sneezing, coughing, vocalization, etc. The mothers' responsiveness also forges an attachment bond between the children and the mothers that fosters communication (Ainsworth, Bell and Slayton, 1974).

In this research, it is found that IDS in Thai shares patterns and features with other languages. It is likely that maternal speech plays a major role in child's language development not only in terms of linguistic skills but also in terms of the communicative skills.

### 6.3 Recommendations

Many works on language input are still needed to be done to expand our knowledge about its influence on language acquisition.

1. The pitch analyses should be conducted on a syllable-level. This may reveal some interesting evidence, though it can be very difficult and time consuming. In analyzing the tones in IDS, the phonetic and pragmatic contexts are needed to be controlled. The tones can occurred in many different phonetic environments, for example, different positions in the tone groups, different stress positions, etc. They can also occur in different pragmatic contexts, such as, in utterances used as questions, or directives, or expressives, etc. These differences may influence the utterance intonation which can have a direct effect to the tones studied.

2. Other prosodic features should be investigated; for example, pause (Broen, 1972), pitch contour (Stern et al., 1982; Fernald and Simon, 1984; Fernald, 1989), rhythm, focus marking (Fernald and Mazzie, 1991), vowel formant frequency, etc.



3. Other features of maternal speech should also be examined such as phonetic features, lexical features, complexity features and redundancy features.

4. A cross-language comparison of the communicative speech acts should be done.

5. The interaction between mothers and their infants should be both audio and videotaped because we would know exactly what mothers normally do with infants and in what way the infants respond. In doing both audio and videotapes, maternal responses or infant-elicited social behavior (Stern, 1977) other than speech can be observed such as gaze, facial expression, facial presentation and head movement. These responds are very valuable for the understanding of mother-child interaction.

6. We should study other language input that are present in the children language environment such as father speech (Gleason, 1975; Barton and Tomasello, 1994), siblings speech (Barton and Tomasello, 1994), caregivers speech (Gleason, 1975), peers speech and teacher speech (Cherry, 1975; Geekie and Raban, 1994).

7. We should compare motherese with other special speech register which may have something in common such as foreigner directed speech (FDS) (Ferguson, 1975; Chodchoey, 1987), pet directed speech (PDS) (Hirsh-Pasek and Treiman, 1983; Burnham, Francis, Kitamura, Vollmer-Conna, Averkiou, Nguyen, Olley, and Paterson, 1997), lover directed speech (LDS) (Ruke-Dravina, cited in Brown, 1977: 3), retardate directed speech (RDS) (Pratt, Baustead, and Raines, 1976; Conti-Ramsden, 1994), and household plant directed speech (HPDS).

8. The work on the relationship between aspects of input and child's language acquisition should be done (Newport, Gleitman, and Gleitman, 1977; Furrow, Nelson, and Benedict, 1979; Clarke-Stewart, and Havey, 1981; Gleitman, Newport, and Gleitman, 1984). The relationship between IDS and language acquisition concerns about the extent to which maternal speech modifications facilitate language development. These works have examined the relationship between individual differences in the relative frequency of the use of particular speech modifications and variation in different mothers as related to their children's language growth. However, the findings of these works are still controversial. For example, Newport et al. (1977) found no relationship between the syntactic simplicity of maternal speech and any measure of language progress, but Furrow et al. (1979) found the relationship between maternal MLU and children's language growth.

9. An examination of the acoustic characteristics of motherese should be done in other tonal languages to test the hypothesis of the universal acoustic features of motherese.