

CHAPTER 3

RESEARCH METHOD

This chapter consists of two parts. The first part deals with data collection and subjects. The second part involves the analysis used in this study. There are two sections in this part. The first section is a linguistic analysis in terms of phonetic analysis and pragmatic analysis. The second section involves the statistical analysis.

3.1 Data Collection and Subjects

3.1.1 Data Collection

The data from this research was part of an extensive collaborative research program on mother-infant interaction between the school of Psychology at the University of New South Wales led by Professor Dr. Denis Burnham and the Linguistic Research Unit at Chulalongkorn University led by Assistant Professor Dr. Sudaporn Luksaneeyanawin. The author was one of the assistants in data collection of this project and also one of the subjects of this research.

The research project sought for cooperation in data collection from the obstetricians at the Chareonkrung-pracharak and the Police hospital. The obstetricians informed their patients who would deliver their babies during December 1994- March 1995 about this project and encouraged them to join this project for one year. When the mothers decided to join the project, the researchers got in touch with them and asked them some information about their biography (including mother's name, surname, occupation, delivery day, the obstetrician's name, sex of the infant, address, telephone number, and the map of their house) and find out about their last appointments prior to the delivery day. On that day, the researchers were there to give letters to those mothers which explained about the project. If they agreed to participate, they must fill the consent form. When the researchers had all participants totaling 12 subjects in this project, 6 with female infants and 6 with male infants, the list of subjects was made in order prior to their delivery day as the following:

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Subject Code*	Mother's Name	Sex of Infant	Delivery Day
01	Mrs. Manaporn Vitthayavongruji	Girl	21 Dec 94
02	Mrs. Chompu Yongpradit	Girl	22 Dec 94
03	Mrs. Chayada Thanavisuth	Girl	26 Dec 94
04	Mrs. Siriporn Sridej	Girl	27 Dec 94
05	Mrs. Sureephun Senanuch	Boy	3 Jan 95
06	Mrs. Yuphin Junked	Girl	9 Jan 95
07	Mrs. Rattana Mungonphanao	Boy	19 Jan 95
08	Mrs. Autchara Singsumaree	Boy	25 Jan 95
09	Mrs. Suporn Nithiphathrakul	Boy	12 Feb 95
10	Mrs. Somjing Ponone	Boy	26 Feb 95
11	Mrs. Sainjarm Songkitsub	Boy	12 Mar 95
12	Mrs. Oranud Narmkanok	Girl	28 Mar 95

Then the researchers made the tentative schedule for data collecting of each mother at a different age of the baby (newborn, 3 months, 6 months, 9 months and 12 months) as below:

Subject Code	Newborn	3 months	6 months	9 months	12 months
IDS 01	21 Dec 94	21 Mar 95	21 Jun 95	21 Sep 95	21 Dec 95
IDS 02	22 Dec 94	22 Mar 95	22 Jun 95	22 Sep 95	22 Dec 95
IDS 03	26 Dec 94	26 Mar 95	26 Jun 95	26 Sep 95	26 Dec 95
IDS 04	27 Dec 94	27 Mar 95	27 Jun 95	27 Sep 95	27 Dec 95
IDS 05	3 Jan 95	3 Apr 95	3 Jul 95	3 Oct 95	3 Jan 96
IDS 06	9 Jan 95	9 Apr 95	9 Jul 95	9 Oct 95	9 Jan 96
IDS 07	19 Jan 95	19 Apr 95	19 Jul 95	19 Oct 95	19 Jan 96
IDS 08	25 Jan 95	25 Apr 95	25 Jul 95	25 Oct 95	25 Jan 96
IDS 09	12 Feb 95	12 May 95	12 Aug 95	12 Nov 95	12 Feb 96
IDS 10	27 Feb 95	27 May 95	27 Aug 95	27 Nov 95	27 Feb 96
IDS 11	12 Mar 95	12 Jun 95	12 Sep 95	12 Dec 95	12 Mar 96
IDS 12	28 Mar 95	28 Jun 95	28 Sep 95	28 Dec 95	28 Mar 96

The speech samples of IDS were recorded from 12 mothers of newborns and again from the same mothers when their children were 3, 6, 9, and 12 months according

*In future reference to the subjects, these code numbers are used to identify the subjects, the age of the children when the subjects spoke to them, and the utterance's number, for example, 01-N-730 refers to subjects number 1 (Mrs. Manaporn Vitthayavongruji), when she spoke to her newborn, and this sample utterance is the 730th utterance of this sample.

to the above schedule. In addition, recordings were taken of the same mothers speaking to the researchers in the consultative style. At the newborn stage, samples were recorded in the Chareonkrung-pracharak and the Police hospital by using a Sony Professional Walkman tape recorder. On the delivery day of each mother, the obstetrician helped the researchers by phoning to inform that the baby was born. On the next day, the researchers went to visit the mother and the child at the hospital. The researchers also brought the gifts to all infants for their participation in this project on that day. The researchers instructed the mothers how to use the tape recorder and asked them to do a 20 minutes recording when talking to their children during play time or changing diapers. The tapes were then collected before they left the hospital. Samples at 3,6,9, and 12 months were collected using the same procedure as that with newborns but recordings were conducted in the home of the subjects. Samples of ADS were collected from interviews with the mothers by the researchers for about 20 minutes at 12 months when the researchers were quite accustomed to the mothers now. The style of speech used was casual consultative style.

The data in this study was supported by an extensive research program. I chose six mothers of infants randomly, three with female infants and three with male infants participated in this study. They were IDS 01, IDS 02, IDS 04, IDS 05, IDS 07, and IDS 09. I did not include IDS 03 (the researcher) because I want to get rid of the bias in analyzing the data.

3.1.2 Subjects

The subjects are six mothers of infants, half of them consists of mothers of male infants and the other half consists of those of female infants. All mothers belong to the middle socio-economic class. They all at least, got a bachelor degree and speak only standard Thai at home.

3.2 Analysis

There were two analyses in the present study which were the primary data analysis and the linguistic analysis. The primary data analysis was the transcription of utterances. Here utterances defined by using auditory pauses as a marker to delimit them. Then the linguistic analysis was investigated by using utterances from the primary analysis in two aspects: the phonetic analysis and the pragmatic analysis.

3.2.1 Linguistic Analysis: Unit of Speech

There have been many efforts to more precisely define units of language or units of speech. Utterance has always been referred to as sentence, proposition, phonemic clause (Boomer, 1965), tone group (Halliday, 1967), tone unit (Chafe, 1977). The sentence is a syntactic unit, a string of words put together by the

grammatical rules of language. Whereas the proposition is a logical unit which part of the meaning describes some state of affairs in the form of a declarative sentence. The phonemic clause, tone group, and tone unit are phonetic units. I would like to discuss here the term "utterance" which is a physical unit and considered as my unit of analysis.

The term "utterance" was proposed by Harris. He stated that an utterance is "any stretch of talk by one person, before and after there is silence on the part of that person." (Harris, 1951:14). According to this definition, an utterance may be of any length such as single word, single phrase, single sentence, a sequence of sentences, sentence fragments, and so on.

Lyons (1968:52) proposed that "the utterances are instances of parole, which linguist takes as evidence for the construction of the underlying common structure: the langue." He also pointed out that the utterance of a particular language are what speakers actually produce and it will have meaning only if its occurrence is not completely determined by its context. This is like the Palmer's definition (1976:8), he defined an utterance as "an event in time- it is produced by someone and at some particular time."

Concerning the definition of the utterance used in studies of maternal speech, most studies defined utterance acoustically as segments of speech separated by more than 300 ms of silence (Fernald & Simon, 1984; Greiser & Kuhl, 1988; Kitamura (in progress); and Stern et al., 1982).

For my analysis, I followed Luksaneeyanawin (1994) in defining an utterance as a unit of speech delimited by auditory pauses, i.e., a pause defined unit. The unit forms a unified whole in meaning in a definite context of communication. This definition proposes that every utterance no matter linguistic form it is has a unified meaning as related to the context it occurs. An utterance as a form is a part but the utterance meaning is a unified whole. This definition uses both semantic and phonetic aspects. In terms of semantic aspect, it is similar to Lyon's definition above.

A totaling 120 minutes (20 minutes x 6 age groups) for each mothers of each of the six mothers were collected (20 minutes each of newborn IDS, 3 months-old IDS, 6 months-old IDS, 9 months-old IDS, 12 months-old IDS, and ADS).

For phonetic analysis, a subsample of the total samples, 20 speech utterances which occur in the second discourse topic* of 3MO IDS, 6MO IDS, 9 MO IDS, 12MO IDS, and ADS were used. Except the 20 utterances of the NB IDS, the researcher had to choose the utterances which were perceived as a good sound quality from most of the recordings because the sound quality of the

*This was to avoid using the first part of the recording, because the mothers might be excited or not accustomed to the tape recorder when they started doing the recording.

recording was quite poor at this age. Thus a total of 720 utterances ($20 \times 6 \times 6 = 720$) were analyzed.

For speech acts analysis, the whole 20 minutes sample from each subject all age groups was investigated. The speech samples of ADS were not investigated in terms of speech acts because from the author's pilot study (1996) it was found that ADS contained only a small number of LAVs. They were to inform, respond and question. Mothers seemed to have a fix consultative style of speech.

3.2.1.1 The Phonetic Analysis

a) Pilot Study of Prosody in IDS and ADS

A total of 720 utterances were digitized and analyzed acoustically using WinCECIL (Computerized Extraction of Components of Intonation in Language) for fundamental frequency, duration, and intensity. The utterance interrupted by infant crying or other noises such as toys banging, hiccups was eliminated. That is to say, twenty utterances from each of the six mothers speaking to their infants at each of the five infant ages (20×6 mothers $\times 6$ age groups) and to adult. The measurement of fundamental frequency, duration, and intensity were made for each syllable in each utterance. The total number of syllables in the 720 utterances analyzed was 3211 syllables. The acoustic measurements were done by the following steps.

(1) Four frames were set for display. The first frame shows acoustic waveform. The second and third frames show initial independent fundamental frequency estimated, and smoothed tone contour derived from F_0 chosen respectively. The last frame displays loudness contour. (See Figure 2 below).

(2) The calculation range parameters for fundamental frequency were set at 80-500 Hz to cover the range of the sample. A woman's voice usually has a very wide range of fundamental frequency which may go up to about 400 Hz (Ladefoged, 1975), in this study a wider range than the normal range was used.

(3) Then, the tape of speech samples were digitized into acoustic analyzer one utterance each time until 720 utterances were analyzed. Each utterance was cut and put into a file named .utt extension for an acoustic analysis as below.

3.1 For duration measure of each syllable, two cursors were placed on the acoustic waveform (frame 1) to indicate the beginning and end of each syllable. Time emerged between each cursor was computed automatically. This calculated results was shown at the right bottom of each frame. Then the duration values were written down for statistical analysis.

3.2 In terms of fundamental frequency measure, the beginning and the end point of the F_0 of the syllable were marked. The highest and the lowest F_0 were recorded if there is only one direction, for example, a fall or a rise. If the syllable contained a complex movement of F_0 , for example, a rise-fall or a fall-rise, these complex movements will be divided into two slopes to be measured. The highest and the lowest of F_0 of each slope will be recorded (See frame 3). Then the descriptive statistical analysis was conducted to look at the distribution of F_0 in different groups.

3.3 Finally, the intensity was calculated by measuring the peak point of the vowel in each syllable. The beginning and the end of each vowel was located by the cursors. We could get the duration of each vowel. The vowel duration was divided by two. The intensity was measured at that time point. The intensity value in dB of each syllable was written down. The descriptive statistical analysis was also conducted on these intensity values.



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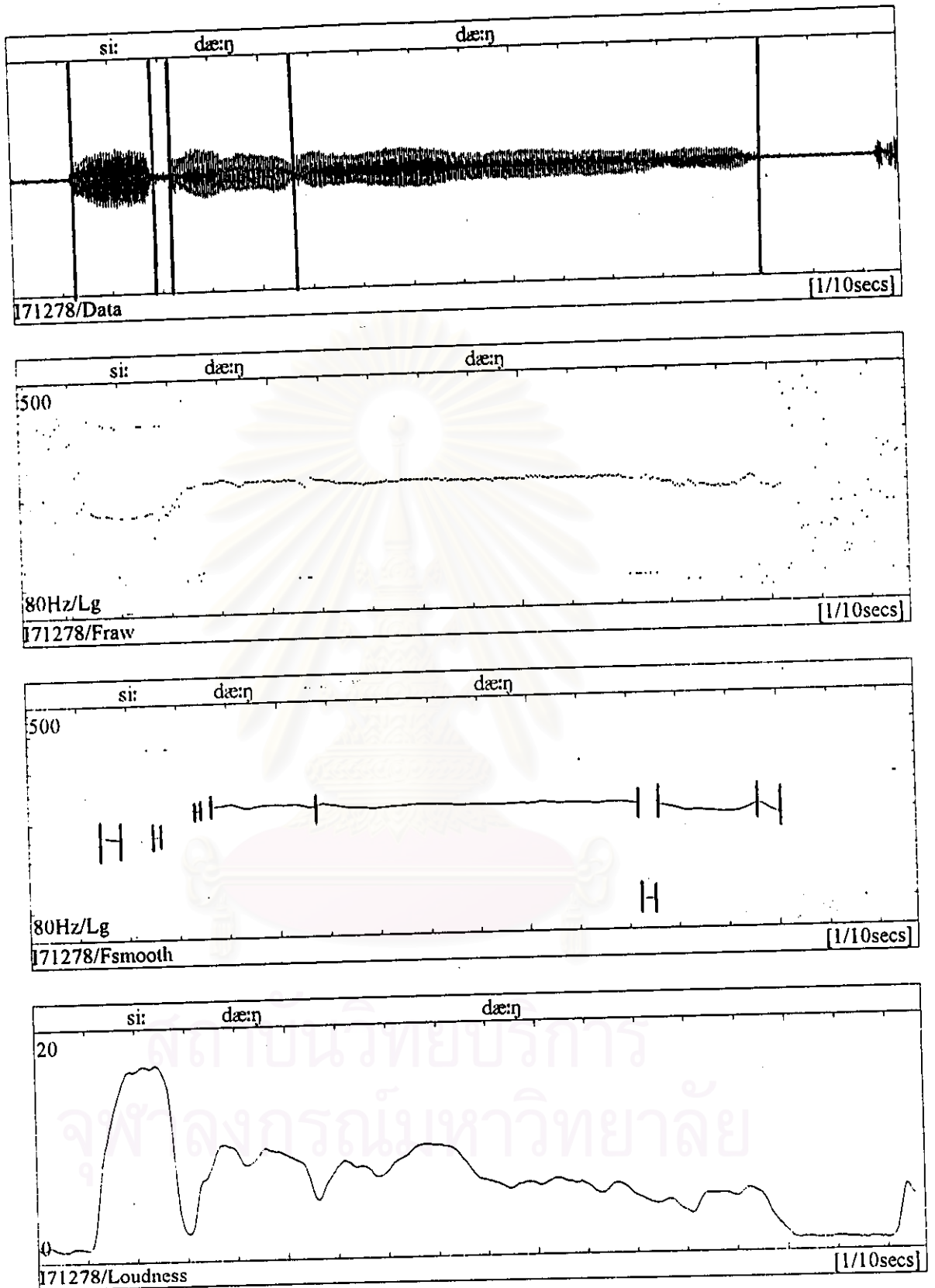


Figure 2 Sample of WinCECIL (IDS 07-12-7)

4. The numbers of syllable of utterance were taken by looking at the distribution of syllables in each utterance and then written down.

Table 5 The Example of the Record of WinCECIL

Utterance	Duration (ms)	Fundamental frequency (Hz)		Intensity (dB)	Numbers of syllable per utterance
		Low	High		
IDS 07-12-7 สีแดงแดง สี /si:/	161	177.6 175 179.2	180.4 175 179.4	-15.6	3
แดง /dæ:ŋ/	242	218.3 110.9 220.5	218.3 110.9 225.1	-20.2	
แดง /dæ:ŋ/	941	213.8 100.6 209.8 194.2	225.1 100.6 210.7 209.8	-24.4	

b) The Acoustic Analysis of Phonetic Characteristics in IDS and ADS

The speech samples were analyzed acoustically using Multi-Speech (MS) Model 3700. It is a software, windows-based program, operating under Window 95 produced by Kay Elemetrics Corp. MS was used for the measurement of fundamental frequency, duration, and intensity. A set of analyses specified by the researcher to do different types of acoustic analyses automatically and simultaneously by using a macro program. A macro is a list of commands allowing the program to repeat a series of analysis operations. Before setting up the macro, a step by step procedure which the researcher would do manually had to be written up clearly with the multi-speech commands. The manual analyses had to be done first to make sure that the program had the right setting in terms of pitch range, intensity range, and to make sure that the set of commands was working properly. The data of one subject of one age group was used to test the protocol. After that a macro analysis was written and implemented. What was needed to be done before the data was fed into the macro was fixing the pitch period errors found from the pitch markers due to disturbance noise or the vocal cord adjustment of the speakers while they were speaking. Details of the macro program can be found in the instruction manual of Multi-Speech Model 3700 (Kay, 1996) and the

Appendix D. Then the measurement of fundamental frequency, duration, and intensity were made for each utterance by the following steps.

(1) The researcher set up the display range of pitch contour at 80-500 Hz and that of energy contour at 25-85 dB to cover the range of the sample. For fundamental frequency range, a woman's voice usually has a very wide range of fundamental frequency which may go up to about 400 Hz (Ladefoged, 1975), in this study a wider range than the normal range was used. For intensity range, the degrees of intensity in normal speech are between 25 and 85 dB correspond to a soft whisper and a loud shout (O'Connor, 1973).

(2) 720 selected utterances were digitized using MS program one utterance at a time. The portion of tape to be recorded was located. Each utterance was cut and put into a file for acoustic analysis.

(3) The beginning and the end point of each utterance were set in its digitized form determined by using the acoustic properties supplemented by the auditory judgment as show in Figure 3, screen A.

(4) A screen has shown the information about the window containing the signal (waveform) data with voice period marks under it. The researcher checked these impulse marks (add, delete, or move them) because sometimes the pitch analysis has shown many missing voice marks, additional marks or improper voiced period mark. This is the result of the interference noise in the input signal.

(5) Then the researcher copied the signal data with corrected impulse marks to B, C, and D screen as shown in Figure 3. The macros run and the program automatically calculate values of fundamental frequency, duration and intensity. The program asked the researcher to save these results of each utterance.

(6) After the total 720 utterances were analyzed, the values of them were conducted for the standard analysis (mean, median, mode, standard deviation, minimum, maximum and range) and the analysis of variance (ANOVA) by using package program SPSS (Statistical Package for the Social Sciences) version 7.5 (See details in section 3.2.2 below).

A total of 720 utterances was analyzed using the following measures:

- *Pitch measures.* The descriptions of pitch of mothers' speech directed to their infants 3 male and 3 female at 6 age groups and adult were investigated.

(a) Mean-F \emptyset and pitch range across six ages: newborn, 3 months, 6 months, 9 months, 12 months and ADS.

1. Mean fundamental frequency: calculated in hertz (Hz) by the computer.
2. F \emptyset - maximum: the highest fundamental frequency for each utterance.
3. F \emptyset - minimum: the lowest fundamental frequency for each utterance.

The maximum and minimum F \emptyset of each utterance were measured manually by the researcher using the cursor to mark at the highest pitch peak and the lowest pitch peak. Since the F \emptyset value from my pilot study, the automatic measurement of F \emptyset -maximum and minimum yield errors, they showed the same values across six ages. In this study, within each utterance only two parts were measured manually, the point with maximum F \emptyset and the point with minimum F \emptyset .

4. F \emptyset - range: the difference between the maximum F \emptyset and minimum F \emptyset was converted to semitones. The value of the semitone equals $12\log_2 (F\emptyset\text{-maximum}/F\emptyset\text{-minimum})$.

The semitone scale converts absolute frequency value maximum F \emptyset / minimum F \emptyset into a ratio value. This is because the perception of a change in pitch at different frequencies has shown to be more closely related to a proportional change rather than to an absolute change in frequency (Ward, 1970 cited in Greiser & Kuhl, 1988:16). Many of the research on Motherese in different language use semitone scale for their measurement, using the scale in the present study would allow comparison across languages.

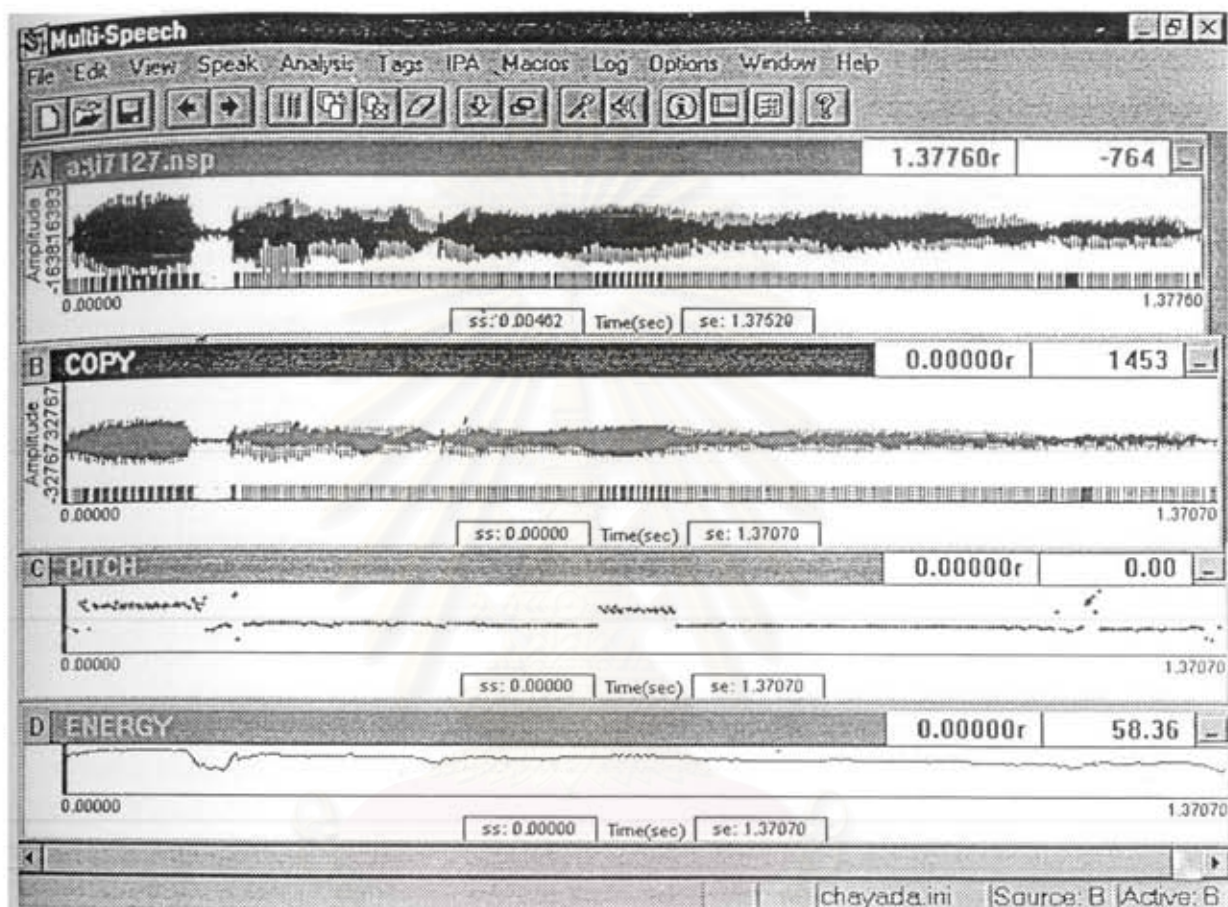


Figure 3 Sample of Multi-Speech (IDS 07-12-7)

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(b) Mean-F \emptyset and pitch range of female and male infants.

An analysis was conducted comparing two groups of mothers: one speaking to their female infants and the second group speaking to their male infants on the following measures:

1. A proportion of mean fundamental frequency
2. A proportion of F \emptyset -range

I used the same method as Kitamura (in progress). Since there are individual differences in fundamental frequency between mothers speaking to other adults, it was necessary to make individual adjustment for each mother. A proportion of mean F \emptyset and F \emptyset range came from dividing each IDS utterance for mean fundamental frequency and F \emptyset range by each mothers average adult levels of these measures. If the proportion score is equal to one, it shows that the mean F \emptyset and F \emptyset range are equal to those of ADS. If it is lower or higher than one, the mean F \emptyset and F \emptyset range are less than or more than those of ADS.

- Tempo measures.

1. Average utterance length was measured by placing a cursor on the visual display to indicate the beginning and end of each utterance. Time occurred between each cursor was computed automatically in second (sec) We then converted utterance length in second into millisecond (ms).

2. Average syllable length came from utterance length which is measured in seconds and then divided by the number of syllables per utterance. The average syllable duration indicate the slow and fast rate of speaking.

3. Numbers of syllable per utterance were also investigated to see the mean utterance length (MLU).

- Intensity measures

The intensity of the speech was analyzed as the reference to the degree of loudness. We digitized the speech sample into the acoustic analyzer. The input volume had been adjusted until the machine can register the signal. For example, speech which very low intensity cannot be registered by the acoustic analyzer. The speech intensity of the soft voice had to be adjusted by increasing the input volume until the machine registers the signal. Then, the mean intensity was calculated automatically in decibel (dB) by the computer.

3.2.1.2 Analysis of Pragmatic Characteristics

We investigated the 13639 speech utterances of six subjects, classifying them into the different verbs of utterances or linguistic action verb (LAV). The linguistic actions of these utterance were analyzed into different speech acts using the criteria adapting from Searle (1969) and Vanderveken (1990) as laid out below.

(1) Transcribe the tape into a written script putting a space between utterances. Utterance is defined by auditory pauses.

(2) Analyze the linguistic action of the utterance by looking at its syntactic forms using the criteria proposed by Vanderveken (1990) (See pp.28). Decision is made using the linguistic context which includes the phonetic, semantic and pragmatic (speaker intention). Then we make a decision what linguistic action the mother is doing so that if we want to do a reported speech what linguistic action verb in Thai we will use in the reported script. There are 360 LAVs in Thai proposed as Thai verbs of utterance by Pansottee (1991). The criteria used in the indentifying of LAVs has been set up prior to this research by the team led by Luksaneeyanawin the head of the project and 3 other students Rukkharangsarit, Sittigasorn, and myself have examined the first script together to make sure we agree at each other linguistic criteria used in doing the LAV analysis. Then I do the analysis of 6 mothers reported in this thesis. The speech of other 6 mothers have been analyzed by other members of the team.

For example, a) 02-3-52 อร่อยมั้ยะคะ

/ʔa0rɔj1 maj4 kha3/
delicious QM Final Ptc.
(Is it delicious?)

b) 04-N-330 ตัวเท่าลูกแมวแล้วยังไม่กินให้โตเร็วเร็วอีกเธอลูก

/tua0 tha:w2 lu:k2 mæ:w0 læ:w3 jaŋ0 maj2 kin0 haj2 to:0 rew0 rew0
Class. equal kitten already not eat give grow up quick quick
ʔik1 rɔ:4 lu:k2/

QM child

(You are very small like kitten, why don't you drink milk to make you grow up quickly)

The utterance *a* and *b* above are interrogative, i.e. they have the same syntactic form. However, only utterance *a* is used to ask for the opinion of the infant whether the thing is delicious. Whereas the utterance *b* is used to tease or

make fun of the infant in a playful way. Therefore, we judge the linguistic action of utterance *a* is to question and the linguistic action *b* is to tease.

(3) Classify these linguistic action verbs into speech act verbs using the criteria proposed by Searle (1969) and Vanderveken (1990) (See details in 2.3.2.2, 2.3.2.3).

There are five major types of speech act verbs- assertives, questions, directives, expressives and interaction-management. Two speech act verbs are not found. They are commissive* and declarative. This may be due to the complexity and the formality of these two types of SAVs.

1. Assertives are to represent as actual state of affairs or commit the speaker to something being the case, to the truth of the expressed proposition (P). Assertives are proposed by these rules (details in chapter 2.3)

Table 6 Types of rules for Assertives (Adapted from Searle, 1969; and Vanderveken, 1990)**

Types of rules for Assertives	
1. Illocutionary point and direction of fit (Vanderveken, 1990)	1.1 S represents an actual state of affairs. 1.2 The direction of fit is words-to-world.
2. Propositional content (Searle, 1969; Vanderveken, 1990)	2. The P content is any proposition p.
3. Preparatory (Searle, 1969; Vanderveken, 1990)	3.1 S has evidence (reason, etc.) for the truth of p. 3.2 It is not obvious to both S and H that H knows (does not need to be reminded of, etc.) p.
4. Sincerity (Searle, 1969; Vanderveken, 1990)	4. S believes p.
5. Essential (Searle, 1969) or mode of achievement (Vanderveken, 1990)	5. S undertakes to the effect that p represents an actual state of affairs.

There are 5 types of LAVs which could be categorized in assertive. That is to inform, describe, explain, count, and call

*See Wanitchanon, S. 1998. The Speech Act of Promising in Thai Children: A Metapragmatic Study. Master's Thesis, Department of Linguistics, Graduate School, Chulalongkorn University.

**Searle (1969) proposed the propositional content, preparatory, sincerity, and essential rules. Vanderveken (1990) used these rules and also included illocutionary point, direction of fit, and mode of achievement in his analysis.

1.1 To inform is to give somebody knowledge of something. It is hearer directed in that it is to assert with the preparatory condition that the hearer does not already know P., for example;

IDS 02-N-94 เย็นพ่อมาเล่นกับน้องป๊อป

/jen0 pho:2 ma:0 len2 kap1 no:ŋ3 pɔp3/

afternoon father come play with sister Pop (girl's
(young) nickname)

(Father will play with young Pop this afternoon.)

1.2 To describe is to say what somebody or something is like. To describe something is to make an assertion or a series of assertions about it. Somebody or something is to be described deemed relevant in the context of conversation.

01-N-98 แน่ลืมตาแล้ว

/næ:2 lɯ:m0 ta:0 læ:w3/

interjection open eye Ptc.

(Well, you open your eyes.)

1.3 To explain is to make something plain or clear by giving reason; for example,

02-3-34 กินยาแล้วจะได้

/kin0 ja:0 læ:w3 caʔ0 daj2/

eat medicine already PreV. can

(If you take this medicine,...)

02-3-35 ฟันแข็งแรง

/fan0 kæŋ4 ræ:ŋ0/

teeth strong

(your teeth will be strong.)

1.4 To count is to say or name numbers in order.

01-6-17 หนึ่ง

/nɯŋ1/

(one)

1.5 To call is to say something loudly to attract somebody's attention.

02-3-256 น้องป๊อช

/ทอ:ง3	พอ3	kha:4/
sister	Pop (girl's	Final Ptc.
(young)	nickname)	

2. Questions are used to ask information or elicit the information from the hearer. They are proposed by these rules.

Table 7 Types of Rules for Questions (Adapted from Searle, 1969; and Vanderveken, 1990)

Types of rules for Questions	
1. Illocutionary point and direction of fit	1.1 S makes an attempt to get the hearer to do something. 1.2 The direction of fit is world-to-words.
2. Propositional content	2. The P content is any proposition or propositional function.
3. Preparatory	3.1 S does not know 'the answer', i.e., S does not know if the proposition is true. 3.2 In the case of the propositional function, S does not know the information needed to complete proposition truly. 3.3 It is not obvious to both S and H that H will provide the information at that time without being asked.
4. Sincerity	4. S wants this information.
5. Essential or mode of achievement	5. S attempts to elicit this information from H.

Questions can be classified into 4 types by their sentence forms; for example,

2.1 Question-word questions or WH-questions are used to request information. They contain incomplete proposition. The speaker knows that he will get the information by asking this type of question. Indeed, in IDS, the speakers or mothers have already known the answer and would act as the speaker who ask and answer her own question for the baby who is an unspeakable hearer. Sometimes this type of question called display questions or tutorial questions. They are used to prompt for labels which reflect the didactic intent.

IDS-02-12-216 นี้ไรละ

/ni:2 raj0 la1/
 this what Ptc.
 (What is this?)

2.2 Yes-no questions are used to request the hearer to validate the truth value of the complete proposition because the speaker does not know whether the proposition is true. There are two types of yes-no questions; such as,

a). Yes-no questions with Question Marker (QM)

IDS 01-N-30 กินรีเปล่าละ

/kin0 ruw3 pla:w1 kha3/
 eat QM Final Ptc.
 (Do you want to eat?)

b). Yes-no questions with rising intonation

IDS 02-3-338 น้องป๊อบชอบ

/nɔ:pɔ3 pɔp3 cho:p2/
 sister Pop (girl's like
 (young) nickname)
 (Does Pop like this?)

2.3 Alternative or Disjunctive Questions consist of a disjunction of two (or more) complete proposition, one of the disjuncts is true. The speaker want the hearer to identify which is the true proposition for him.

IDS 04-9-156 เอ๊ะอันนี้เป็นวิทยุหรือโทรศัพท์

/ʔe3 ʔan0 ni:3 pen0 wi3tha3yu3 rɔ:4 tho:0ra3sap1/
 interjection Class. this be radio or telephone
 (Is this one radio or a telephone?)

2.4 Repetitive Questions are those which repeat or paraphrase the mother previous question.

IDS 05-12-128 น้องแคนจะไปไหน

/nɔ:pɔ3 khæ:n0 ca1 paj0 naj4 kha3/
 brother boy's PreV. go where Final Ptc.
 (young) nickname
 (Where are you going?)

-129 อื้อ

/hw:3/

(repeat the previous question)

3. Directives are to make an attempt to get the hearer to do something and to control over others' behavior. That is to say, this speech act wants to change the hearer's intentions and consequent actions. Directives are proposed by these rules.

Table 8 Types of Rules for Directives (Adapted from Searle, 1969; and Vanderveken, 1990)

Types of rules for Directives	
1. Illocutionary point and direction of fit	1.1 S makes an attempt to get the hearer to do something. 1.2 The direction of fit is world-to-words.
2. Propositional content	2. The P content is future act A of H.
3. Preparatory	3.1 H is able to do A. S believes H is able to do A. 3.2 It is not obvious to both S and H that H will do A in the normal course of events of his own accord.
4. Sincerity	4. S wants H to do A.
5. Essential or mode of achievement	5. S attempts to get H to do A in virtue of the authority of S over H.

3.1 To order is to tell somebody that they must do something.

IDS 07-12-202 โหนลุกขึ้นซิลูก

/naj4 luk3 kwn2 si3 lu:k2/

stand up Ptc. child

(Stand up, child)

3.2 To request is to ask somebody politely to do something.

IDS 02-N-85 อยู่บ้านกับแม่สองคนอย่ากวนแม่ลูกนะ

/ju:1 ba:n2 kap1 mæ:2 so:ŋ4 khon0 ja:1 kuan0 mæ:0 na?3

stay home with mother two Class. not disturb mother Ptc.

lu:k0 na?3/

child Ptc.

(Please don't disturb me when only you and I stay home together.)

3.3 To blame is to consider or say that somebody is responsible for something done badly or wrongly or not done.

IDS 02-9-323 ทำไมไม่นอนล่ะลูก
 /tham0maj0 maj2 nɔ:n0 la1 lu:k2/
 why not sleep Ptc. child
 (Why don't you sleep, child?)

3.4 To warn is to give somebody notice of something consequence because the event is not in hearer's interest.

IDS 09-9-455 เตียวพังนะลูก
 /di:aw4 phaŋ0 naʔ0 lu:k2/
 soon broken Ptc. child
 (Be careful, it will be broken)

3.5 To threaten is to make an expression of one's intention to punish or harm somebody if he does not obey.

IDS 04-12-76 เตียวหม่ามาตีหนูเลขนะลูก
 /dia:w4 ma:1ma:3 ti:0 nu:4 lɾ:j0 na:3 lu:k2/
 soon mother hit mouse Ptc. Ptc. child
 young
 little one
 (Mother will hit you.)

3.6 To forbid is to order the hearer not to do something.

IDS 07-N-32 อย่าเพิ่งหลับสิ
 /ja:1 pɾ:ŋ2 lap1 si/
 don't PreV. sleep Ptc.
 (Don't sleep.)

3.7 To persuade is to cause somebody to do something by arguing or reasoning with them.

IDS 07-6-242 มาเล่นกับแม่อีกกว่า
 /ma:0 len2 kap1 mæ:2 di:0 kwa:1/
 come play with mother better
 (Let's play with mother.)

4. Expressives are to express an attitude of the speaker about the state of affairs and make an attempt to change the hearer feeling. Expressive is proposed by these rules.

Table 9 Types of Rules for Expressives (Adapted from Searle, 1969; and Vanderveken, 1990)

Types of rules for Expressives	
1. Illocutionary point and direction of fit	1.1 S expresses a propositional attitude of S about the state of affairs represented by the propositional content. 1.2 The direction of fit is null or empty.
2. Propositional content	2. The P content is any proposition or propositional function.
3. Preparatory	3. S wants to express his/her emotion to H.
4. Sincerity	4. S wants to show S's feelings to H.
5. Essential or mode of achievement	5. S attempts to express S's feelings in speech.

4.1 To exclaim is to cry out suddenly and loudly from pain, anger, surprise, etc.

IDS 01-N-81 ้วย

/wa:j3/

(interjection express shock)

4.2 To sing is to make the musical sounds with the voice.

IDS 09-9-4 เอ

/ʔe:1/

(the alphabet A)

-5 บี

/bi:1/

(the alphabet B)

-6 ซี

/si:0/

(the alphabet C)

(sing a song ABC)

4.3 To calm is to cause somebody by become quiet, less excited, or untroubled.

IDS 01-N-86 โ้

/ŋo:4/

(the word used to calm)

4.4 To comfort is to help somebody, to console, to relax or to lull somebody to sleep.

IDS 04-N-118 ๓๓

/ŋe:1 ʔe:3/

(a word used to lull a child to sleep)

4.5 To praise is to express approval or admiration for somebody or something.

IDS 07-6-76 แชมป์เก่งนะลูกนะ

/chæmp3 keŋ1 naʔ3 lu:k2 naʔ3/

boy's good Ptc. child Ptc.

nickname

(Champ, you are a good boy.)

4.6 To tease is to make fun of somebody in a playful way. It has an attempt to make the hearer happy.

IDS 07-3-22 ฮันแน่

/han2 næ:2/

(a word used to make fun of somebody)

4.7 To complain is to say that one is dissatisfied, unhappy.

IDS 01-N-158 จะนอนอีกแล้วหรือเฮอะ

/caʔ0 no:n0 ʔik1 læ:w3 lɾ:4 hr0/

PreV. sleep again QM

(Are you going to sleep again?)

4.8 To reflect in word is to talk to oneself or to think out loud.

IDS 01-N-173 ทาอะไรเช็ดตาให้ดี

/ha:4 ʔa0raj0 chet3 ta:0 haj2 di:0/

find what clean eye give

(What can I use to clean your eye?)

4.9 To greet is to give a conventional sign or word of welcome or pleasure when meeting somebody or receiving a guest.

IDS 07-3-6 ฮัลโล

/han0lo:4/

(Hello)

5. Interaction-management is the information that the participants exchange in order to collaborate with each other in organizing the temporal progress of the interaction. Interaction-management is proposed by these rules.

Table 10 Types of Rules for Interaction-management (Adapted from Searle, 1969; Laver and Hutcheson, 1972; and Vanderverken, 1990)

Types of rules for Interaction-management	
1. Illocutionary point or direction of fit	1.1 S makes an attempt to manage the conversation with H. 1.2 The direction of fit is world-to-words.
2. Propositional content	2. The P content is a connection of S and H in a conversation.
3. Preparatory	3. S believes S and H is going to converse.
4. Sincerity	4. S wants to have a conversation with H.
5. Essential or mode of achievement	5. S attempts to make H to make a conversation with S.

5.1 To give turn is the process that the speaker allow the addressee to speak next.

IDS 01-3-218 ว่าไง

/wa:2ŋaj0/

(a word used to give turn to the hearer)

5.2 To keep turn is the process that the speaker does not want to stop speaking or give turn to the hearer, he want to keep on speaking.

IDS 09-N-426 เถา

/ʔɻ:0/

(a word used to keep turn)

-427 ง่วงยังคงลูก

/ŋuŋ2 jaŋ0 ka3 lu:k2/

sleep QM final pct. child

(Do you want to go to sleep now?)

(4) When we look at all of the linguistic action verbs which are classified into speech act verbs, we found that these speech act verbs could be classified into two major classes- interactive class and non-interactive class by their common characteristics as shown below:

1. Interactive-class of speech act verbs are those which the speaker makes an attempt to encourage the hearer to do something or to interact with the speaker. They are interactive assertive (to call), interactive questions, interactive directives (to order, to request, to blame, to warn, to threaten, to forbid, to persuade, interactive expressives (to exclaim, to sing, to calm, to comfort, to praise, to tease, to complain, to reflect in word, to greet), and interactive interaction-management (to give turn, to keep turn)

2. Non-interactive class of speech act verbs are those which the speaker does not make an attempt to encourage the hearer to do something or to interact with the speaker. They are non-interactive assertives (to inform, to describe, to explain, to count).

3.2.2 Statistical Analysis

The statistic analysis in this study is divided into two parts. The first part is the descriptive statistics which describes the distribution of the variability, and the central tendency of a variation. The second part is the inferential statistics which test the descriptive statistics. The tool for both parts analyzed is SPSS version 7.5. So, the raw data and the results of this study are presented in the SPSS format.

The basis for deciding whether or not to reject the null hypothesis is the probability that a statistical result is as extreme as the one observed. This probability will occur if the null hypothesis is true. If the observed significant level is small, usually less than 0.05, the null hypothesis is rejected. This basic decision is used for every significant level of any variable.

There are two major types of variables- linguistic variables and social variables. Linguistic variables are the phonetic characteristics (fundamental frequency, syllable duration, utterance duration, numbers of syllable per utterance, and intensity), and the pragmatic characteristics or the speech acts. Social

variables are the age of the infants (newborn, 3 months, 6 months, 9 months, and 12 months), IDS and ADS, and the sex the of infants (male and female).

The definition of variable in this study is as illustrated in table below.

Table 11 Subject Variables

Subject Variables	Code
Subject 01	1
Subject 02	2
Subject 04	3
Subject 05	4
Subject 07	5
Subject 09	6

Table 12 Age Variables

Age Variables	Code
Newborn	1
3 Months	2
6 Months	3
9 Months	4
12 Months	5
ADS	6

Table 13 Sex Variables

Sex Variables	Code
Female	1
Male	2

Table 14 Type Variables

Type Variables	Code
IDS	1
ADS	2

The descriptive statistics used in this study are the maximum value, the minimum value, the range, the median, the mode, the mean, the standard deviation, and the skewness. All of these values are used to describe the distribution of every linguistic and social variable mentioned above. For example, table 19 (See details in Chapter 4) displays the statistic distribution of fundamental frequency across age groups. Moreover, in comparison between variables (IDS and ADS), the skewness can be used to differentiate asymmetry of a distribution.

Inferential statistics are only used for the phonetic analyses here. Two types of analyses are used, One Way ANOVA to compare IDS and ADS, and General Factorial Design to test age and sex differences within IDS.

First, One Way ANOVA test was used to compare IDS (collapsed over all five ages) and ADS for every phonetic variable.

Second, General Factorial Design was used to concluded how age and sex of infants effected the phonetic dependent variables, i.e. fundamental frequency, frequency range, utterance duration, syllable duration, numbers of syllable per utterance, and intensity. In addition, the interaction between age and sex of infants was also included in this design.

Following these main analyses, Duncan and Dunnett T3, post-hoc test were used to test all pairwise comparisons between ages (See Figure 4). For example, such an analysis may show that 12 months and ADS were not statistically significant differed from each other but differed significantly from newborns, 3 months, 6 months, 9 months, which were all statistically equivalent.

Duncan test is making pairwise comparisons using a stepwise order of comparisons identical to the order used by the Student-Newman-Keuls test, but sets a protection level for the error rate for the collection of tests, rather than an error rate for individual tests. This was appropriate when a homogeneity of variance test showed that variance were homogeneous.

Dunnett's T3 is pair wise comparison test based on the Studentized maximum modulus. This test was appropriate when a variance were heterogenous.

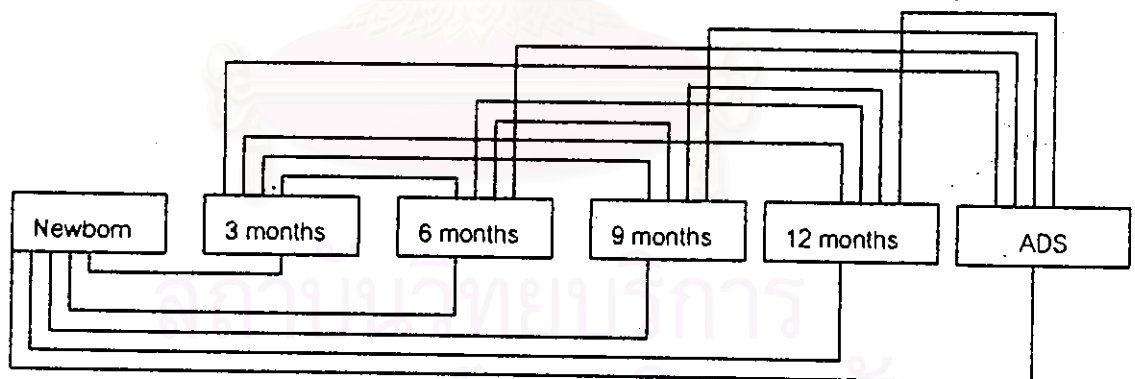


Figure 4 The Comparison of Match Pairs of Age Variable