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ABSTRACT

A normal Japanese boy (11-months-old) was observed while playing alone and while interacting with his mother to study the child's physical and vocal imitation and to determine the relationship between his use of physical (nonverbal) and vocal (verbal) communication. During 10 free-play sessions, four observers noted occurrences of such behavior as spontaneous physical contact with the mother, lack of response to the mother, and vocalization by the child while he played alone. It was found that the child vocalized more when he played with his mother than when he played alone and that vocal interaction between mother and child tended to become and was usually associated with physical interaction. (LH)

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A Study in Early Speech Development

- A Preliminary Approach for Systematic Observation -

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A STUDY IN EARLY SPEECH DEVELOPMENT

- A PRELIMINARY APPROACH FOR SYSTEMATIC OBSERVATION -

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The early period of speech and language development has been a fascinating subject of study by psychologists, linguists, and speech pathologists. This period is interesting because it presents some clues as to how a child learns to use verbal symbols as a means of communication. Before a child utters a word, he must experience enough in exploring the world around him. Then, and only then, he can associate meaning and the vocal utterance. Since his utterances are barely intelligible, much is left to the interpretation of adults about what he really means. This ambiguity has created a wide range of criteria used by investigators (Darley and Winitz, 1961). Some researchers would suggest that a child can make meaningful differentiation by intonation at the so-called holophrastic, or one-word stage of speech development (McNeil, 1970, Pp. 22-23; Menyk, 1972).

A substantial agreement of 91 percent between the two observers was reported by McCurry and Irwin in identifying phonetic responses to "a standard word." (McCurry and Irwin, 1953) Menyk reported an agreement of 81 percent between the two listeners when they attempted to classify the isolated utterances as declaratives, questions, and emphatics (1972, Pp. 21-23). No matter how

high the agreement may be, those studies would have offered us more information had they related their analysis to the actual observation records.

In studying early speech and language development, most researchers have used magnetic tape recordings and observation note or detailed commentary In longitudinal study on a child, often the parents make the observation records as ney have the closest inter-personal relationship and know their child well (Leopold, 1939, 1947, 1949; Okubo, 1971). In some methods, the observer is present in the home with the child and his mother while making recordings and noting the interaction of the two (Iwabuchi, 1968; Masui, 1967; Murai, 1970).

Some problems are involved in the above approaches. One is the tendency of the parents to anticipate the vocal utterance as "meaningful words." It is very normal for the parents or someone close to the child to expect to find meaningfulness and sometimes to read it into what the child says. The second problem is the reliability of the observation made in such a situation. Without systematic approach he may be unable to note all of the significant events that might be taking place. The third problem is about the limited information that the magnetic tape recording can offer. Usually the child communicates through non-verbal as well as verbal media. The younger the child, the more non-verbal methods he uses to express himself.

There has been an increased interest in conducting more systematic observation in the study of child behavior. There seems to be an agreement among researchers that it is desirable to use more than one observer along with the magnetic and the video tape recording. (Eguchi, et al. 1972; Bijou, et al. 1969;

Hutt and Hutt, 1970; Marui, et al. 1971; Shimada, 1974; Shimizu, et al. 1972; Ujimori, et al. 1972; Ushijima, et al. 1971; Ushiyama, et al. 1971, and 1972) In this study, we have attempted to find verifiable methods of recording pre-verbal and early verbal behavior which is quite susceptible to change from period to period, child to child, and observer to observer.

The purpose of this study is three-fold. The first object is to observe the relationship between physical and vocal means of communication in the yound child. The second purpose is to observe the occurrence of "imitation" at this stage. The third purpose is to evaluate the merits and limitations of a more systematic approach in observing the communication behavior of a very young child.

1. PROCEDURES

A. Subject :

In this study an eleven month old boy with normal prenatal and postnatal history was used. He is the second child of two boys in a family. Both of his parents, one of whom is this writer, were university instructors so that his grandmother looked after him up to his ninth month. Since then he stays at an all day nursery with other children of his age. There are four nursery school teachers for twelve children in his class which is the standard ratio of teachers to infants in an authorized day nursery in Japan. His older brother also stays in the three-year-old class in the same nursery. At the eleventh month, he started using vocal utterance, "mamma" for food, mother, and grandmother. His family members thought that might be his "first word." His nursery school teachers observed

the same behavior during the noon meal time. Then it was decided to start this observation. In order to assess his development, the Developmental Scale for Infants and Young Children (Tsumori and Inage, 1967) was used. The result showed that the subject was at 12 month level for (a) motor development, and (b) understanding and use of language. For the remaining three items, (c) social awareness, (d) ability to explore and manipulate objects around, and (e) eating habits, he was at the 15 month level.

B. Observation Setting :

A play room measuring 20 feet by 22 feet with a big one-way mirror to allow observation from the adjoining room was used. In this room, a toy car, picture books, several musical instruments (a drum, a small bell, a castanet, a tambourine), toy pegs, a stuffed animal, and a doll, play house things, and a big rocking horse were placed in the same manner at the beginning of each observation.

The child was introduced to this room with his mother for the preparatory observation for 30 minutes one week prior to the time when the actual series of observations was started. According to Murai's study (1961), the young child under one year of age produces more vocal utterances when his mother is present in the same room. In this study, it was decided to have both the mother and the child in the same room. The mother was to let the child play freely and not actively lead his play or vocal responses. Since the mother knew the design of the study, she tried to remain as naturally as possible but her behavior could have been affected by her knowledge. The observers afterwards commented that they did not feel the mother-child interaction to be especially restrained or un-natural.

They, felt however, that the mother in general could have taken more initiative in playing with and talking to her child.

C. Observers :

In this study, four people besides the mother participated in the observation process. Of the four, two worked simultaneously and recorded the behavior of infant and mother, using the behavior check list. They had been trained in noting a certain defined behavior categories in another on-going research project at this institute. (Shimada, et al. 1974) Therefore, they checked the occurrence of eight categories of behavior at a ten second intervals throughout the 30 minutes observation period. After one practice session, the observers' reliability reached 89 percent and for the subsequent 9 sessions, it averaged at 84 percent.

Two other observers made descriptive commentaries on what had taken place in the play room at ten second intervals. They were asked to especially note the appearance of "imitative" behavior. After the fourth session, the use of video tape recording became possible with the ten second interval signal. From that time on, only one made the descriptive observation records.

D. Observation Items :

In Figure 1, a check list category is shown. For the number of categories, Miller (1956) suggests "seven" while Hutt and Hutt (1971, p. 70) recommends "under 15." Thus, we have used eight categories defind later for the observers to note at each ten second interval.

Perhaps it is necessary to explain why we have constructed the following behavior check items. Clinically and from our own experience, we know that the

interaction between the child and the mother is very important in forming and developing his whole self. The so-called normal speech and language development is heavily based upon the desirable mother-child relationship. Thus, we constructed a check list, focusing the personal interaction of the two. In order to study the relationship between non-verbal and verbal means of communication, we divided the interaction into two categories, the physical and vocal. We do not mean to suggest, however, that all human interaction is to be categorized in this way.

In addition, we have focused our eyes upon "imitative" behavior which is considered to be of significance in symbol formation at the preverbal stage (Guillaume, 1971; Murata, 1970; Piaget, 1945; Werner and Kaplan, 1963). The study of "imitation" has been mainly on the verbal level (Brown & Bellugi , 1964; Brown & Fraser, 1964; Cazden, 1968; Ervin, 1964; Rodd & Braine, 1971; Nakanishi & Owada, 1973; Slobin, 1968) and a need seems to exist for integrating and relating the functions of non-verbal and verbal imitation. Guillaume (1971) and Piaget (1945) presents many observational notes about such a process. However, the observer is usually limited to the parents or the relatives of the infant and for most of the time, the observer is alone making such a record.

Definitions of the Behavior Categories are as follows :

(A) Physical Contact :

1. Spontaneous approach

This is when the child spontaneously turns his head towards the mother or approaches her. (Here, we did not include the direction of his eyes because it is too difficult to reliably observe it.)

2. Spontaneous contact

This is when the child actually touches his mother with his hands, or with objects in his hands.

3. Physical interaction

This refers to the physical interaction (a) caused by the child's initiative, or (b) in response to the mother's physical and/or verbal contact. His responses may include turning his head towards her, approaching her, reaching, grasping, or touching her, or imitating her behavior. (The definition of imitative behavior will be given later.)

(B) Vocal contact :

4. Spontaneous vocalization

This is the spotaneous vocalization in order to call his mother's attention. It is often accompanied with pointing behavior.

5. Vocal interaction

The vocal interaction initiated by (a) himself, or (b) in response to the mother's speaking to him. His responses can be vocalization, or imitative vocalization. (The imitative vocalization will be defined later.)

6. No response

This is when the child does not respond physically or vocally.

(C) Playing Alone :

7. Playing alone

This refers to such behavior as playing with his toys by himself.

8. Vocalization when playing alone

This is the vocalization made when he is playing alone.

Definitions of Certain Behaviors:

Imitative behavior

This is the immediate and spontaneous reproduction of what the child saw.

Imitative vocalization

This is the immediate and spontaneous reproduction of what the child heard.*

Delayed imitative behavior

This refers to the spontaneous reproduction of what the child saw previously. The latency period can vary from a few minutes to several weeks.

Delayed imitative vocalization

This is the spontaneous reproduction of what the child heard previously. The latency period can vary from several minutes to several weeks.

The observers were instructed to make a check mark once in the appropriate 10 second interval column whenever they noted the defined behavior. When there was more than one occurence of a particular behavior in a 10 second interval, they were to check the number of occurrences in each column.

E. Equipment :

For the purpose of behavior observation, an interval timer was devised by Seiko, Co., of Japan under the direction of Miss S. Shimada, a member of staff at our institute. This instrument can produce a signal sound of around 1 k Hz at a

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* taken after the definition by Nakanishi and Owada, 1973, p. 115.

time interval of 1, 5, 10, 15, 20, 30, or 60 seconds according to the switch selected. With the signal sound, the lighted arabic number appears simultaneously to tell the correct time account. This number can be seen in the darkened observation room. In using this instrument, we found it difficult to observe and read the time at the same time. Thus a tape was made into which one announced the appropriate time account with the time signal. In this way, it became easier for the observer to keep the accurate time account while observing across the magic mirror.

For the sound recording, there were four microphones (NEC 633 BL) at each side of the play room. All the sound signals were gathered and mixed before it was recorded into a SONY TC 530, stereophonic magnetic tape recorder at a 7-1/2 inches per second and also into a SHIBADEN SV 700 video tape recorder. As shown in Figure 2. the time signal sound was superimposed on the above recording and at the same time, it was played back through two speakers set up in the observation room. This meant that the observers can listen to the voices from the play room as well as the time signal without the use of ear phones.

For the video recording, there were two cameras located in the opposite corners of this play room. One camera was equipped with electronic zoom lens and was placed on a remote-controlled movable base. Another camera had wide lens and took a distant view of the northwest side of the play room. By using these cameras, it was possible to follow and take a close view of the child's behavior in the video tape.

F. Observation Period :

The observation was made for 30 minutes each week in the afternoon after

the child finished his nap. The series of the observations was started at his eleventh month when he seemed to start using what might be called his "first word." The total number of observation sessions was 11, but the first was used for practice. Between the eighth and ninth sessions, the child had measles and consequently, the observation was postponed for one week. The over-all behavior of the child after the measles changed and regressed somewhat. However, the summer vacation started after the tenth session and the observers could not participate for over a month. Thus, it was decided to end this preliminary observation at the end of his 13th month.

Observing the certain categories of behavior with reasonable reliability requires practice and continuity. It was thus decided to conduct the observation at one week intervals. In addition, it was thought that a certain amount of change could be observed at the very stage where the child started using what might be called his "first word."

G. Analyses of Data :

1) Behavior Check List Results

By comparing the check results of two observers (a, b) only the exact agreement for time interval and category of behavior was marked and calculated (A). Any observational checks which differed from (A) and were obtained for only one of the two observers were marked as (a_1) and (b_1) respectively. For each column (category of behavior), only the total of exact agreed scores represented the result of the child's behavior on that day. The interobserver reliability for each day was calculated by using the following formula :

$$\frac{A}{A + a_1 + b_1} \times 100 = \qquad \%$$

As it was reported previously, the interobserver reliability for 9* sessions was averaged and was 84 percent. This method of obtaining interobserver reliability is reported by O'Leary and Becker (1967).

2) Written Observation Records

The observer was asked to write down only overt behavior without interpreting what he saw. If the activities continued for more than ten seconds, he continued writing to the next ten second interval space. Usually, he could write down not more than one event in that space. In order to check the limitation of the simultaneous observation records, we made the following evaluation by using the video tape recording at a later date. One observer and the writer (mother) independently wrote down the sequence of the events by playing back the video tape recording. Two conditions were used in this task. Those conditions were (1) without time limitation, and (2) a ten second intervals. Under condition (1), without time limitation, the observer could take as much time as needed to write down the course of events taking place in the play room. Under condition (2) which was identical for the original observer who made the simultaneous observation note at ten second intervals, he was not allowed to play back or stop as he wrote.

When the written records were made, we compared the results by first dividing the written records into what we defined as "a minimum behavior unit." This

* At the eighth session, one of the two observers was absent.

concept is taken after Marui's study (1971) and for our purpose we defined it as a minimum division of the flow of activity. For example, "he stood up" was one unit, and "he approached towards mother while holding the toy in his hand" was also considered as one unit because the two activities occurred simultaneously.

3) Video Tape Recording

The method in which we used the video tape recordings was already described in the previous section. We replayed the video tapes several times in order to get data in obtaining information on "imitation." This will be reported in the section for Results.

4) Magnetic Tape Recording

Since this was a special observation where the mother knew the design of the study and since the observation period was limited to the eleventh to thirteenth month of the child, we did not attempt to analyze detailed phonetic changes. We used the tapes in order to judge the occurrence of "vocal interaction" and "vocal imitation." The results will be later reported. The intraobserver's reliability in noting the frequency of vocal utterance * was 9 % for the Observer A and 90 % for the Observer B (the mother) for randomly selected ten minutes sample tape recording. The intraobserver's reliability in noting the types of utterance for the Observer A was 51 % and for the Observer B was 56 %. The interobserver's reliability in noting the frequency was 74 % and was 40 % for noting the types.

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* Vocal utterance was defined as a minimum division of the utterance marked by a pause and change of inflection.

For each record, the number of minimum behavior unit was calculated and the notes were compared at each ten second interval. Under condition (1) with no time limitation, Observer A noted 129 units while the Observer B (the writer who is the mother) noted 330. The difference in number was too great so that we did not obtain the interobserver's reliability. Under the condition (2) Observer A noted 107 units and Observer B 106. The interobserver's reliability was calculated as in the following: The units in agreement (A) were obtained while units noted by only one of the two observers were also separately counted as (a_1) and (b_2) respectively. By applying the scores according to the formula,

$$\frac{A}{A + a_1 + b_1} \times 100 = \qquad \%$$

we obtained 69 %. The interobserver reliability between Observer A and Observer C who was another observer on the observation day was 50 %. In applying this "minimum behavior unit" we found that all the observers saw the same flow of activities but reported it differently at times. Most of the disagreement was caused by (1) events being over looked (2) events taking place just at the time the first ten second interval was over. In that transition, some observers noted the activities in the first column and continued to the next while the other observers noted them as if there were two different events in each ten second interval.

In order to assess intraobserver reliability in applying the minimum behavior unit we re-evaluated the same data on a different day. It was then found that the intraobserver reliability for data which did not have too many detailed events was

90 % whereas 78 % was obtained for the data with many detailed events.

3. RESULTS

1. The Relationship between Physical and Vocal Interaction :

Figure 3 shows the changes that had taken place in the series of ten observations. Up to the eighth session, the frequency of physical interaction is greater than that of the vocal interaction. Then, at the eight session, the vocal interaction became more frequent than physical. It was anticipated that this changed relationship will continue. However, after the eighth session, the child had been affected by measles which lasted nearly a week. After that period, the behavior of the child somewhat regressed and the number of observation sessions following was not enough to really show if that relationship shown in the eighth session would appear again. This result is only suggestive of the change by which a child around his first birthday becomes more vocal and interacts with his mother by vocal utterances rather than just by reaching, touching, pointing, and using other physical means in free play.

In Figure 5, the overlapping area (shaded) indicates where two observers noted both physical and vocal interaction in the same ten second interval. The column on the left (white) shows physical interaction in comparison with the vocal interaction shown on the right (black). The findings showed that with the very young child, the interaction with the mother is almost always (a) physical, and/or (b) physical and vocal. It is very rare to find the instances where the vocal utterances alone can elicit the interaction between the two.

2. Vocal Utterances in (a) Vocal Interaction and (b) Playing Alone:

By just listening to the tapes alone, it is extremely difficult to decide whether the child is speaking to his mother or to himself. Even after observation of the situation with visual cues and simultaneous use of the auditory information, the results of the judgment was not too rrliable. These are summarized in Table 2 and 3. Figure 4 shows the occurrences of vocalization under two conditions; namely (a) vocal interaction with mother and (b) playing alone. It is clear in this figure, that the child vocalizes more when he is judged to be interacting with his mother than when playing alone. It should be remembered that this was a free play situation and the mother was very careful not to initiate vocal interaction with the child unless it seemed very unnatural not to do so. Usually the vocal interaction was initiated by the child and the mother responded. When he was looking at his toys and was satisfied in playing, the mother did not talk to him.

3. Imitative Behavior :

Table 4 shows the result of observed imitative behavior. As it indicates, it was not decided until the fourth session to note the behavior separately under physical and vocal imitation. Thus, we played back the video tape recordings of the fourth to tenth sessions and calculated separately the occurrence of physical imitation and of vocal. We had anticipated that vocal imitation would increase and physical imitation decrease. This assumption was not supported by the present findings. In a free situation where there is no designed modeling stimulus, the child may not show this imitative behavior at all. In the seventh session, there was one occurrence of physical imitation and four instances of vocal

imitation. However, since there was no agreement between the two observers, no occurrences were recorded in the table. Perhaps it was too short a period to note a change of imitative behavior in terms of frequency. On the other hand, we have observed some instances of qualitative change in the imitative behavior in the course of observation.

Figure 6 shows an example of physical and vocal imitation which at first was elicited by the mother's stimulus both physical and vocal. This was the instance when the child handed a toy kettle to the mother. The mother took the kettle and acted as if she was pouring tea into cups with the sound of "/ dʒa: /" which in Japan is used when pouring water, tea, and other liquid. This pouring gesture was the physical stimulus and the above utterance was the vocal stimulus. This was repeated at the fourth (June 11th) and the sixth observation (June 25th). At the seventh observation (July 2nd), only the vocal stimulus of the mother brought about the same responses. At the ninth observation (July 23rd), when the child saw the object, he spontaneously responded with the same physical and vocal pattern which had been defined as the "imitative behavior" by the observers. This last instance of imitative behavior might be called as "delayed imitation" or learned behavior.

Table 6 shows other examples of vocal imitation. Item (1) and item (2) had same phonetic pattern /mama/. However, (1) appeared while eating cookies at the preliminary observation (May 7th), at the first session (May 14), and with eating gestures at the eighth session (July 16). For item (2) he spontaneously faced his mother and said /mama/ at the second (5/21), fourth (6/11), and the

eighth (7/16). No food stimulus was present on that day. For item (1) when the mother said /mama/, both the mother and food were present. Thus, it can be considered the item (2) may be a delayed imitative behavior. Or it can be considered as a beginning of a "word," representing the mother. Item (3) shows that a ball which in Japanese pronounced as /boɾɯ/ was imitated in two different ways, as /bon bon/ and /ba/. On one occasion he pointed to tambourine and said /ba/, after calling the ball as /ba/ many times. This is an instance of a difference which would not have been noticed if one only listened to the tape recording. Items (11) and (12) are the examples of imitation in which the stimulus was not given by the mother but by the sound of the airplane, or the horn of the automobile. Here, he shows that he can imitate the environmental sounds even though there was no visible airplane nor automobile in the play room.

There were several examples of physical imitation or acquiring a certain skill in which the child used vocal utterence as a means of asking the mother to show him again how to do the task. Figure 7 shows one example in which he learned to correctly manipulate the castanet. At first, the mother showed him how, which was immediately followed five times by his unsuccessful attempts. Then he uttered a sound as if he were asking mother to do it again. The mother showed him the same pattern, which was followed by an unsuccessful imitation. He called his mother and again the mother showed the model. On his eighth trial, he succeeded in correctly imitating. He did it again and happily lifted his arms to show his mother about his performance. However, the pattern of successful imitation was not stable enough so that his twelfth try was unsuccessful. He

repeated the same pattern previously shown by calling his mother to show him the model and he himself tried it over and over again. At the twentieth attempt, after 11 minutes from the first presentation of the mother's stimulus, he finally was successful and repeated the correct imitative pattern three times. He again imitated it twice at the same time pointing the castanet and uttering a sound. Then he stopped that imitative behavior and went to play with other toys. From the first presentation of the mother's model to his successful acquisition of a skill, he spent 14 minutes and repeated 24 times. In the acquisition of a new skill including that of speech many attempts at correct (successful) imitation must take place. This observation was at least suggestive of such a process. This is in agreement with other reports (Kato, 1971; Murai, 1970; Nakazima, 1966).

With regard to the observation and description of the imitative behavior, we calculated the inter- and intra-observer reliabilities in the same manner previously reported. We took only the exact agreed scores and eliminated instances where two observers did not agree (interobserver reliability.) For intraobserver reliability, we took only the exact agreed instances (A) and counted all the different judgments on two occasions as (b_1) and (b_2) respectively. The reliability, thus, was obtained by applying into the following formula :

$$\frac{A}{A + b_1 + b_2} \times 100 = \qquad \%$$

Table 5 summarizes the result. Three observers participated in this task. On the whole, two observers agreed for about 50 % of the time that the particular

instances of behavior, both physical and vocal, qualified as imitation. When we tried to checking physical imitation separately from the vocal imitation, the inter-observer reliability was slightly higher for the physical instances. An even lower score was obtained for the intraobserver reliability. This relatively low agreement on the judgment of imitative behavior was mainly caused by the differences of interpretation of "imitation" even though we had agreed on a definition as clearly worded as possible.

4. DISCUSSION

This study was based upon only one subject and therefore the information from observing the child is limited because of that fact. However, the present study used more than one observer besides the mother to obtaining verifiable methods of recording pre-verbal and early verbal behavior which is quite susceptible to change from period to period, child to child, and observer to observer.

In studying the behavior and performance of the child we used the dichotomy of "physical" and "vocal" simply because it was one way of approach. We refrain from using the term "non-verbal" because some of the behaviors studied in this observation as "imitation" included both physical and vocal (possibly verbal) aspects. The eight behavior categories were used in this study since we found it was an useful index when studying the communication behavior of children with behavioral and language problems. (Wakaba, et al., 1974 to appear). However, in studying the interaction of a normal child with the mother, such categories as "spontaneous approach," "spontaneous contact" were not too useful. The

mother almost always responded to the child and the conditions were therefore classified as "physical" and/or "vocal interaction." Of the eight categories, the two ; physical interaction and the verbal interaction seemed to show a contrasting relationship. The frequencies of the physical interaction exceeded those of verbal until the seventh session when the vocal interaction became the more frequent. We had anticipated this trend. Unfortunately, the child's illness after the seventh observation changed the picture and we could not be sure if this relationship would have held for the remaining sessions had he not been ill.

As was expected, the results clearly showed that the child interacted with the mother in play mainly through physical means (such as turning his head towards, approaching, reaching out to, touching, holding on the the mother, and so on) along with the vocal utterances. It was only very rarely that vocal interaction alone took place between the two. In the observation studies of the two normal and two mentally retarded children whose mental ages were about four years, it was found that both types of children in play used more physical means to communicate with each other than vocal (Ogawara and Yamaki, 1973) Our finding agrees with their report. Masui (1967) studied the speech of mothers who had infants of 0 to 3 month. When the infant uttered sounds, the mother responded vocally with affirmative, melodic, and clear speech pattern. When the mother did not vocally respond (23 % of the time) she nodded, smiled, looked at the infant's face. The author wished that there were some systematic ways to note that response. In the present study, we found the similar pattern, though our analysis was based upon the responses of the child.

The setting and the conditions of the observation are important variable. Murai's study (1963) previously reported agrees with the above statement. Aikawa and others (1970) reported that the verbal responses of children were qualitatively and quantatively different when playing with playmates of his age and when playing with and answering questions directed by adults. Too often a study on the children's speech and language development is made without controlling these variables.

Observation using a playroom equipped with a magic mirror to observers unnoticed by the children has some merit for the above reason. However, we have to consider that the playroom situation is different from the environment where the child is at home. Careful provisions must be made in order to have the child feel comfortable in the setting. Having the mother along with the child in such an observation is desirable. Perhaps, it is better not to let her know about the purpose of the observation. She might be told that the observation is being made on how the child plays so that she will not try to speak and demand verbal utterances from the child.

The present study was limited in the sense that the mother who was with the child knew the purpose of the observation. In listening back to the recorded tape and playing back the video tape, we used that fact to see if the mother judged differently from the other observers. Although the intraobserver reliability in noting the types of phonetic utterance was higher for the mother than the observer, both had similar difficulty in judging the context of vocal utterances without situational clues. This finding is supported by Murata (1960) in which the mother

had difficulties in understanding the meaning of the child's vocal utterance when asked to listen back to the tape recording.

When studying children's behavior in relation to other people, the use of the video tape recording is helpful in supplying information that cannot be obtained from the magnetic tape recording or by the simultaneous written records. Under such conditions we found that the observer can write on the average of three events per minutes. In studying vocal to verbal behavior of infants, Bullowa and others (1964) used the motion picture and the simultaneous detailed commentary dictated by the observer. The information obtained by such a method would probably be useful if the infants do not note the presence of the observers. The method of dictating seems to be an effective one, though we did not use in this study.

The process of making written records by playing back the video tapes and the analysis of behavior into units seems to be practical methods if one is trying to see the changes in behavior. The consistency in our applying the criterior as 'units of behavior' was substantial. However, we found that judging the instances of vocal (or verbal) interaction was more difficult than those of physical. Probably, speech behavior requires the interpretation of the observer no matter how he tries to be objective. Further studies needed to evolve a more reliable method of observation in studying verbal interaction.

In our study, we have observed various types of "imitative behavior" which were suggested by Piaget (1945). Some of the examples of imitative behavior were quite suggestive for the study of the process of language (symbolic) acquisition. In studying the process of imitative behavior, perhaps more clearly designed

experimental observation and at similar intervals as used in this study would be useful. Murai (1970) reports on an experimental study in which the experimenter attempted to daily teach the association of a certain vocal utterance with objects (toys) to an infant in an institution where the verbal stimulation was extremely limited in comparison to a child at home. His detailed reports show a considerable time was necessary in establishing a rapport between the experimenter and the child before the child started imitating (14 sessions for physical and 64 sessions for vocal). In our observation, only a few sessions were necessary for the child to make a similar association. This difference may suggest how important it is to have a good rapport before any learning can take place. The mother-and-child relationship is the closest and the basic human relationship the child can have in his development (Kojima, 1968 & 1972).

Of course, there is a definite limitation on observing the overt behavior of a child. We are not sure of what takes place in the child before he utters his "first word." We did see that the child in this study communicated with his mother, using both physical and vocal means. On many occasions, he imitated his mother both physically and vocally. Some desire to communicate and some attempt to identify himself through imitating his mother or people close to him may be among the pre-requisites for learning language and speech. Probably a normal mother-child relationship in infancy is important.

Information concerning the onset of speech is needed especially when we assist children with delayed language development. Nishimura (1970a, 1970b) reported his attempts to classify the behavior of mentally retarded children into five levels.

He judged some of their behavior to be purposeful and some not. However, we found it quite difficult to agree even when we observed simple behavior such as "imitation." In his study, no figure on reliability is reported. But a study of that kind needs to offer some verifiable method to other researchers in order that they, too, can try to find the best ways of assessing and assisting children whose language is delayed.

SUMMARY:

An attempt was made to systematically study various aspects of early speech and language development when the child appeared to be using the "first word." Ten consecutive observations were made using four observers for 30 minutes to record the behavior of the child in a playroom where his mother was also present. Of the four observers, two worked simultaneously in noting the occurrences of certain defined vocal and physical behaviors at ten-second interval. The third wrote down the events occuring at the same time interval. The fourth observer made the video tape recording of the child and the mother along with the magnetic tape recording. The ten- second time interval signal was superimposed the magnetic tape as well as to the audio section of the video tape for the purpose of later analysis.

It was anticipated that when a child started using more and more "words" he would interact more vocally with the mother than physically. The observation result suggested this trend until the unexpected illness towards the end of the observation series changed the child's behavior. It was further observed that

when the child interacted with the mother in play, he used mainly physical means (such as turning his head, approaching, reaching out to, touching, holding on to the mother) along with vocal utterances. Vocal interaction alone was very rare.

The child was judged to initiate much more vocal utterances when interacting with the mother than when playing alone. However, to distinguish interaction from playing alone is a difficult task. A considerable amount of disagreement was found between and within the observers including the mother.

In the consequtive eleven weeks (for a week, the child was ill), there were some examples of so-called "delayed imitation." Some vocal imitations appeared frequently and later without the stimulus while others disappeared. The former group might develop into what is called his "first word." In judging the imitative behaviors, the observers' agreement was not high. A certain amount of individual difference existed between the observers in interpreting the imitative behavior even though the definition was made as clear as possible.

It was recognized that a longitudinal study at one month intervals is useful for obtaining information about the trend of speech and language development. Observation at shorter intervals could be effective in learning more about detailed processes, such as those of symbolic formation, phonetic imitation, and discrimination, along with some experimental design. Perhaps there is an over-all need for more a systematic approach towards studies in speech and language development.

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Name of Observer_____ Date of Observation_____

		Physical			Vocal		No Response	Playing Alone		Notes
		Spontaneous Approach	Spontaneous Contact	Physical Interaction	Spontaneous Approach	Vocal Interaction		Playing Behavior	Vocalization	
1	1									
	2									
	3									
	4									
	5									
	6									
2	1									
	2									
	3									
	4									
	5									
	6									
3	1									
	2									
	3									
	4									
	5									
	6									

Figure 1. Checklist used in the present study

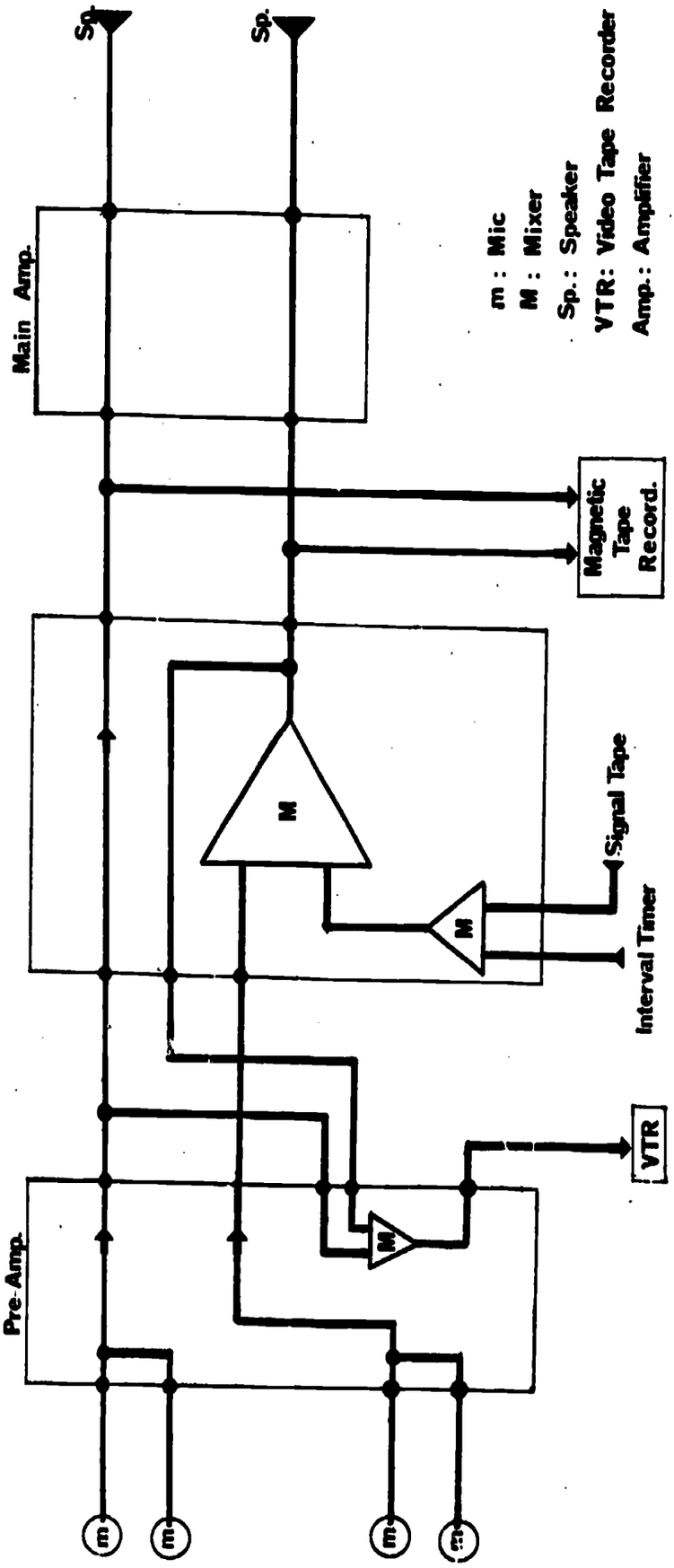

Figure 2. A Block Diagram for Auditory Recording

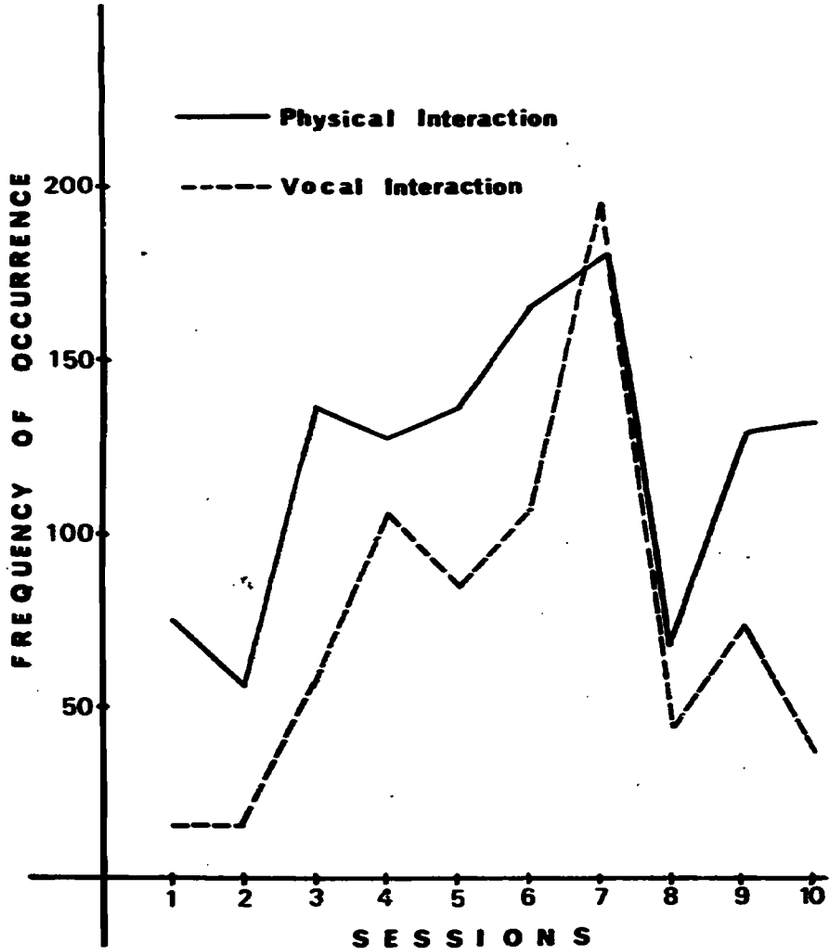

Figure 3. Occurrence of physical & vocal interaction

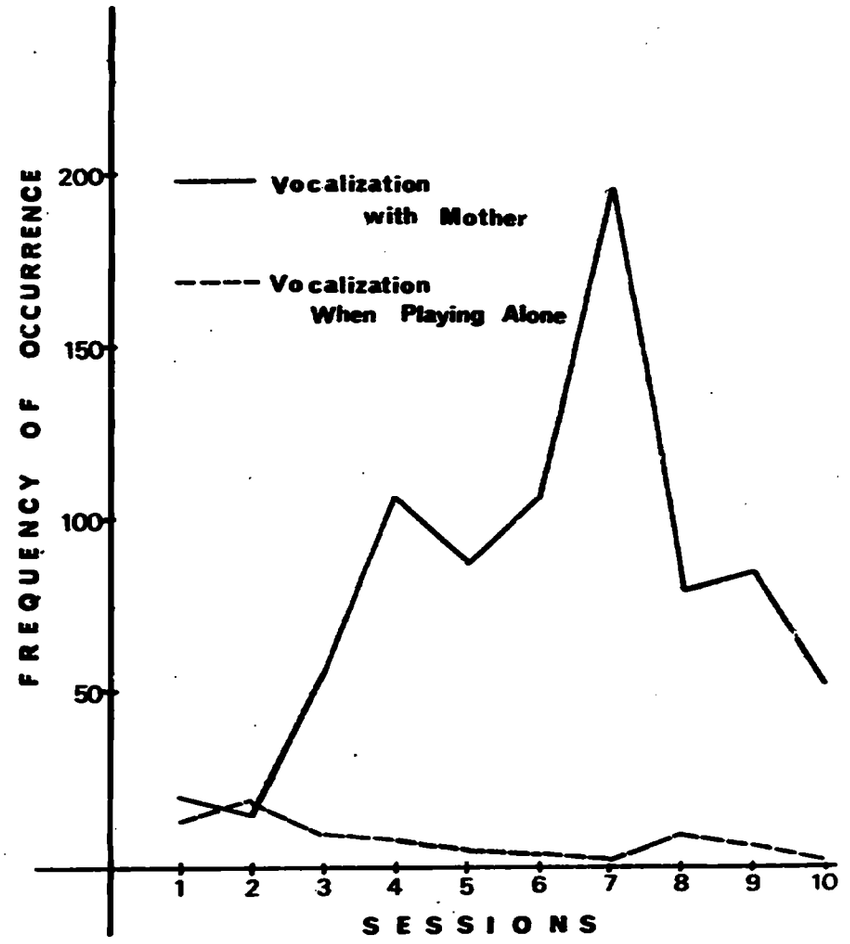

Figure 4. Vocal utterance in vocal interaction & playing alone

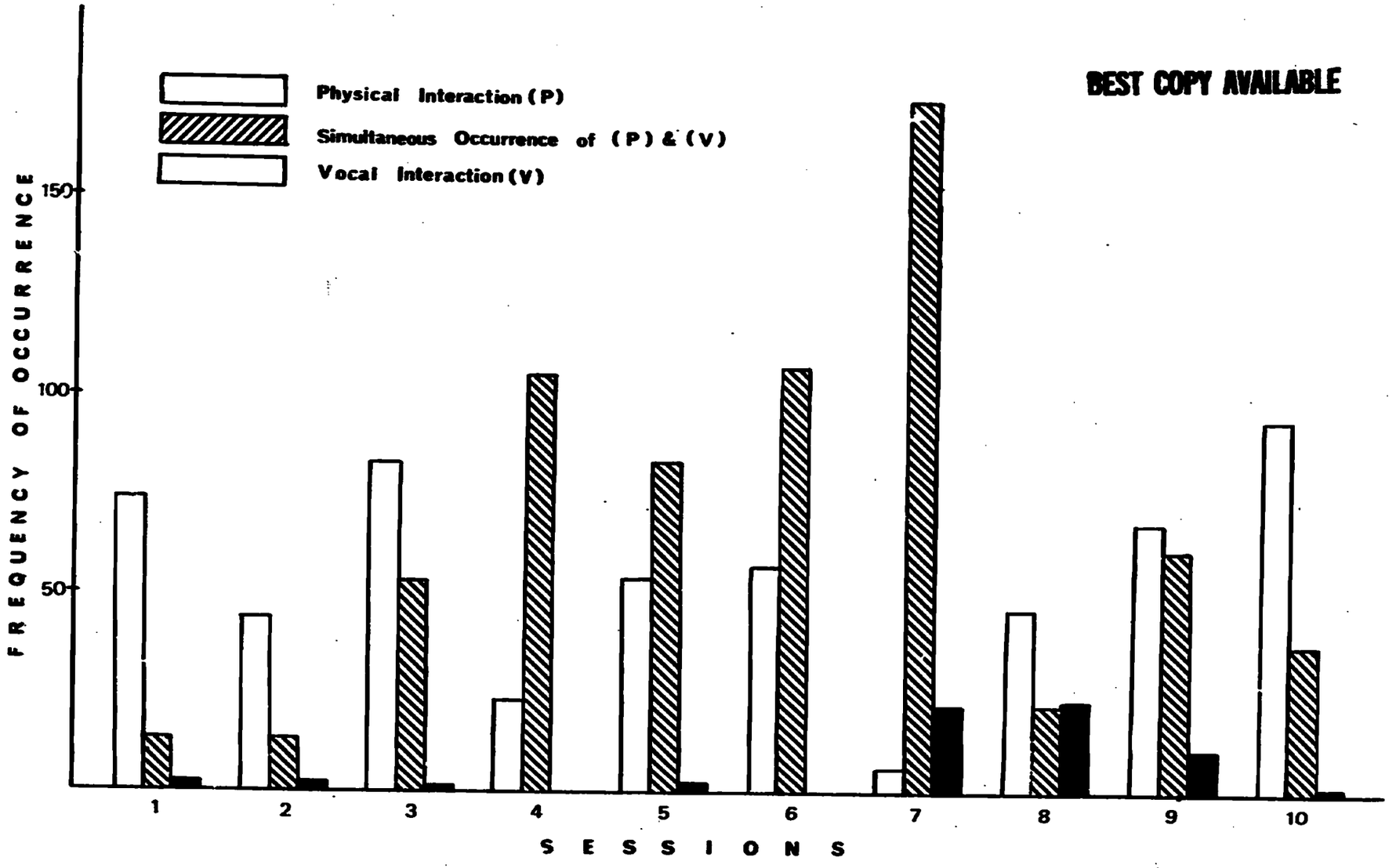

Figure 5. Simultaneous occurrence of physical and vocal interactions compared with physical or vocal interaction alone

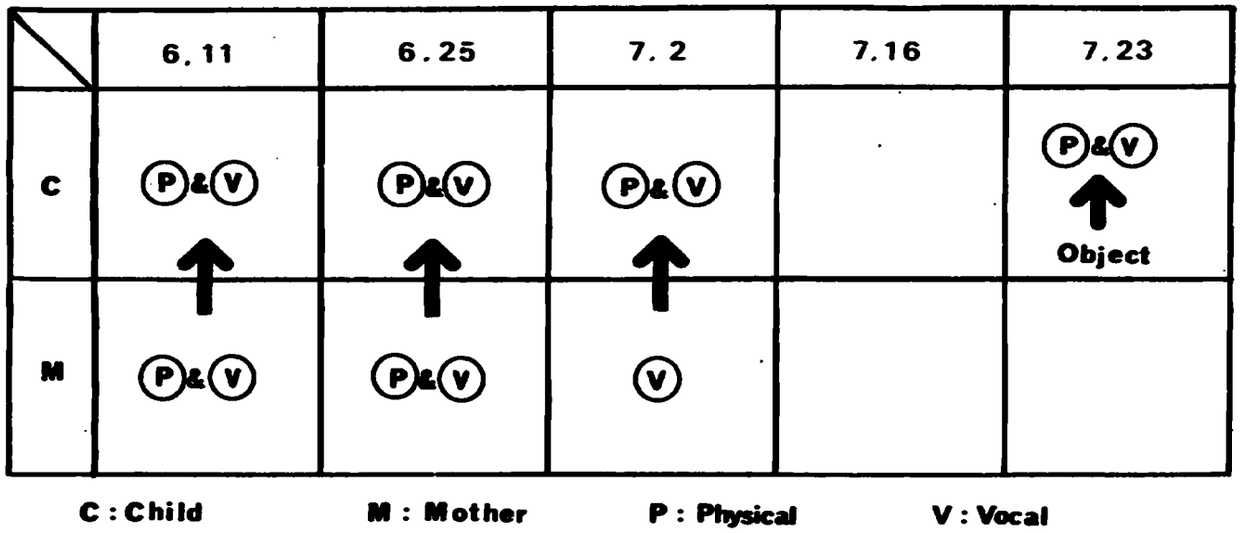

Figure 6. An example of immediate and delayed imitation

Time (min.)	MOTHER	CHILD	
0	S →	$\underline{R_1}$ $\underline{R_2}$ $\underline{R_3}$ $\underline{R_4}$	
1			
2		$\underline{R_5}$	
3	S →	$\underline{R_6}$	
4	S →	$\underline{R_7}$ $\underline{R_8}$	Call M.
5		$\underline{R_9}$	
6		$\underline{R_{10}}$ $\underline{R_{11}}$ $\underline{R_{12}}$	
7	S →	$\underline{R_{13}}$ $\underline{R_{14}}$	1. Call with irritating voice 2. Point C. to M.
8	S →	$\underline{R_{15}}$	Point C. to M.
9	S →	$\underline{R_{16}}$	
10	S →	$\underline{R_{17}}$ $\underline{R_{18}}$	Call M.
11		$\underline{R_{19}}$ $\underline{R_{20}}$	
12			
13		$\underline{R_{21}}$ $\underline{R_{22}}$	Point C. to M.
14		$\underline{R_{23}}$ $\underline{R_{24}}$	

R_n: Number of Attempt
$\underline{R}$: Unsuccessful Imitation
R : Successful Imitation
S : Tapping the Castanet

M.: Mother
C.: Castanet

Figure 7. An example of establishing physical imitation

Table 1. Result of exact agreed observation scores by two observers, using the check list

Observation Session	Physical			Vocal		No Response	Playing Alone		Total	Interobserver Reliability
	Spontaneous Approach	Spontaneous Contact	Physical Interaction	Spontaneous Approach	Vocal Interaction		Playing Behavior	Vocalization		
1	6	4	74	6	15	4	51	12	172	89 %
2	2	5	57	2	15	1	98	19	199	81 %
3	1	4	136	2	52	1	38	8	242	92 %
4	3	3	128	2	105	0	45	7	293	88 %
5	4	10	135	4	85	0	34	4	276	84 %
6	0	5	164	0	107	0	12	3	291	83 %
7	0	0	180	0	196	0	0	0	376	83 %
8	14	27	68	34	45	0	53	9	250	___
9	1	8	129	12	72	0	20	6	248	75 %
10	3	17	131	13	38	0	40	0	246	87 %

NOTE: At the eighth session, one observer was absent.

Table 2. Reliability on judging physical interaction and playing alone

Agreement	Physical interaction	Playing alone
A vs. O_1	74 %	56 %
A vs. O_2	36 %	86 %

NOTE: (A) result of judgment by two observers on actual observation.

(O_1) result of judgment by Observer 1 on video tape on later day.

(O_2) result of judgment by Observer 2 (mother) on video tape on later day.

Table 3. Reliability on judging vocal interaction

Condition	Observer 1	Observer 2
C_1 vs. C_2	33 %	31 %
C_1 vs. C_3	39 %	55 %

NOTE: (C_1) represents the result of judgment by two observers on actual observation.

(C_2) represents the result of judgment based on magnetic tape recording (auditory clue only)

(C_3) represents the result of judgment based on video tape recording (auditory and visual clues)

Observer 2 in this case also represents the mother.

Table 4. Occurrence of imitative behavior agreed by two observers

	Observation sessions									
	1	2	3	4	5*	6	7	8	9	10*
Physical	5	8	18	5	12	18	0	4	10	1
Vocal				5	3	7	0	2	3	12

NOTE: (*) exeptional case - result of one observer

Table 5. Reliability on judgment of imitation

	Intraobserver		Interobserver		
	O_1	O_2	O_1vs.O_2	O_1vs.O_3 (sample 1)	O_1vs.O_3 (sample 2)
Physical	88 %	67 %	67 %	58 %	77 %
Vocal	100 %	58 %		58 %	60 %

NOTE: Three observers participated in this task as (O_1), (O_2), and (O_3). Observer 2 was the mother.

Table 6. Examples of vocal imitation

Object	Situational Context	Stimulus Sound	Response (Utterance)	Observation Sessions 1	2	3	4	5	6	7	8	9	10
1) cookies	eating	/mam:a/	/mama/	R1									
_____	eating gesture by mother	/mam:a/	/mama/						R2				
2) _____	to mother	_____	/mama/		S1		S1		S4				
3) ball	when throwing	/pon/	/pon pon/	R1								R1	R2
	in play	/bo:ɾu/	/bon bon/					R2					
	pointing	_____	/ba ba/							S1			
4) tambourine	pointing	_____	/ba ba/					R1					
5) rocking horse	while riding	/ouma/	/uma/										R2
	pointing	_____	/uma/										R1
	looking	/ouma-san/	/ouwa/										R1
	pointing	_____	/ouma/										R1

NOTE: (N) No response, (R) Response to stimulus, (S) Spontaneous utterance, and the number represents the frequency of occurrence.

Table 6. Examples of vocal imitation (continued)

Object	Situational Context	Stimulus Sound	Response (Utterance)	Observation Session 1	2	3	4	5	6	7	8	9	10
6) toy kettle	pouring gesture	/dʒa:/	/dʒa:/				R4		R3				
	pouring gesture	_____	/dʒa:/							R1			
	_____	_____	/dʒa:/									S3	
7) picture book	pointing	/nenne/	/nenne/			R2							
8) picture book	pointing	/ni:tʃan/	/ni:dən/								R1		
9) _____	airplane sound	/bu: n/	/bu: n/						R1				
		_____	/bu: n/									S1	S3
10) _____	car sound	_____	/bu: /						R1				S2
11) _____	to mother "peek-a-boo"	/ba: /	/ba: /			R5	R2						
		_____	/ba: /			S2	S1						
12) mirror	to himself in mirror	/ita,ita/	/ta,ta/						R3				

NOTE: (N) No response, (R) Response to stimulus, (S) Spontaneous utterance and the number represents the frequency of occurrence.