

ABSTRACT

BLOOM, KATHLEEN. Time-Sampling Caretaker and Infant Behavior in the First Five Weeks of Life. (1970)
Directed by: Dr. Eugene E. McDowell, III pp. 46

The behaviors of six male and six female infants and their caretakers in a private adoption agency were time-sampled and recorded by means of a checklist of 26 items. The infant-caretaker activities were observed on each of the first five weeks of the infant's life. The frequencies of the items of behavior were measured and the data were described with a trend analysis. Developmental changes were noted and it was found that there was differential treatment of the sexes by the caretakers. This occurred in a complex of activities centered around the feeding of solid food to the infants. Solid food was added to the male infants' diets at three weeks of age, whereas the majority of females were not fed solid food until the fourth week of life. Consequently, all behaviors which were involved in the feeding of solid food to the infants showed either the main effect of sex or sex-week interaction. These behaviors included: "Feeds", "Pats", "Looks at Face", "Holds", "In Crib", "In Arms", and "Eats". Therefore, it was concluded that the infants who were observed in this institution were treated differentially by the caretakers and that the time-sampling technique can be employed in a longitudinal design which assesses both caretaking and infant behaviors.

TIME-SAMPLING CARETAKER AND INFANT BEHAVIOR
IN THE FIRST FIVE WEEKS OF LIFE

by

Kathleen Bloom

A Thesis Submitted to
the Faculty of the Graduate School at
The University of North Carolina At Greensboro
In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Greensboro
May, 1970

Approved by

Eugene E. McOmell

Thesis Adviser

TIME-SAMPLING CARETAKER AND INFANT BEHAVIOR
IN THE FIRST FIVE WEEKS OF LIFE

by

Kathleen Bloom

A Thesis Submitted to
the Faculty of the Graduate School at
The University of North Carolina At Greensboro
In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Greensboro
May, 1970

Approved by

Eugene E. McDowell

Thesis Adviser

APPROVAL SHEET

This thesis has been approved by the following
committee of the Faculty of the Graduate School at The
University of North Carolina at Greensboro.

Thesis Adviser

Eugene E. McDowell

Oral Examination

Committee Members

Ernest A. Lumsden Jr.

Rebecca M. Smith

Kenneth Smith

May 4, 1970

Date of Examination

ACKNOWLEDGEMENTS

The writer wishes to express deep gratitude to Dr. Eugene E. McDowell for his invaluable advice and guidance throughout this study. Appreciation is extended to Drs. Ernest Lumsden, Kendon Smith, and Rebecca Smith, who served as thesis committee members, and to Miss Patricia Johnson, who was the second observer. Mr. Graham Burkheimer generously gave statistical advice.

The interest and cooperation of Mr. David Herbert, Mrs. Pamela Lester, Mrs. Caroline Femrite, and all of the nurses, nurses' aids, and the infants of the Children's Home Society of Greensboro, North Carolina, made this study possible.

TABLE OF CONTENTS

	Page
INTRODUCTION	1
METHOD	17
Subjects.	17
Environmental Setting	18
Method of Observation	18
Type of Observation	19
Observer-Effect	21
Observers and Reliability	23
RESULTS AND DISCUSSION	25
Caretaking Activity	26
Infant Behavior	32
Feeding Behavior.	32
SUMMARY.	41
BIBLIOGRAPHY	43
APPENDIX A	45
APPENDIX B	46
APPENDIX C	47

LIST OF TABLES

Table		Page
1	Frequency, Analysis of Variance, and Trend Analysis of Maternal and Infant Behavior	27
2	Inter-item Correlational Matrix Based Upon Total Scores Over Five Weeks.	28

LIST OF FIGURES

Figures		Page
1	Frequency Over Weeks of Observation "Holds"	30
2	Frequency Over Weeks of Observation "Looks at Face"	31
3	Frequency Over Weeks of Observation "In Crib"	33
4	Frequency Over Weeks of Observation "In Arms"	34
5	Frequency Over Weeks of Observation "Eats"	35
6	Frequency Over Weeks of Observation "Feeds"	38
7	Frequency Over Weeks of Observation "Cries"	40

INTRODUCTION

The importance of early experience has been stressed in studies of infant development. In these studies some investigators have viewed the infant as being entirely reactive, that is, as responding passively to the various impinging stimuli. More recently, however, the infant has been viewed as playing an active role in its environment. The infant not only reacts to the stimuli in its surround, but also acts as a stimulus within its environment. In this context both infant and caretaking behavior has been investigated.

Some of the parameters of mother-infant interaction have been experimentally investigated in infrahuman organisms (e. g., Harlow and Zimmerman, 1959). An experimental analysis of the behavior of human infants and caretakers entails many problems that would appear insurmountable. One of the few studies involving an experimental manipulation of human mother-infant interaction was done by Rheingold (1956). She manipulated the amount and quality of caretaking in a group of institutional infants. For the most part, however, studies of maternal and infant behaviors have been restricted to those which are descriptive rather than experimental. These descriptive studies have varied

in many dimensions, including: constraints which the observer places on the nature of the observational period, size of the time-unit of observation, subject variables, whether the procedure involves indirect or direct observations, and whether preselected categories are used in direct observation. These dimensions are in no way inclusive, nor are they mutually exclusive. The purpose of this introduction is to characterize investigations which vary over the dimension of directness of observation, but each of the studies which is discussed may also vary over other dimensions. This attempt at characterization will be restricted to studies of mother-infant interaction, and infancy will be limited to the first months of life.

Wright (1960) specified two criteria for directness of observation. First, the subject's behavior and environmental events are unplanned, and second, there is a minimum of time-lapse between observing and recording. These criteria exclude the use of tests, interviews, experimental manipulations, questionnaires, and retrospective case studies.

Many investigators have attempted, but have not achieved direct measures of mother-infant interaction. Frequently, indirect rather than direct observational techniques are used when the investigator desires information about a behavior of the infant which requires a

difficult or inconvenient observation schedule. For example, Lakin (1957) investigated personality traits of mothers and compared these traits to the infants' behavior, i.e., whether or not the infants were "colicky". In attempting to achieve a direct measure of "colicky" behavior, Lakin requested that a physician rate the child. However, one of the items on the rating scale was "child sleeps poorly, in a restless manner". It is reasonable to assume that the physician did not score this item from his own direct observations, but utilized the mother's report of the child's sleeping behavior. Therefore, this must be regarded as an indirect source of data.

Some research investigators have approached the relationship between infant and maternal behavior as an afterthought of direct observations of the developing infant. Robertson (1962) hypothesized that deficient mothering threatens infant development and that both mother and infant variables can be assessed in the first year of life. Infant development was measured in this study by standard psychometric scales. Four years later, the author examined both the infant records and transcripts of so-called direct observations of maternal behavior. These observations were allegedly made in the Well-Baby

Clinic, but a sample of the descriptive statements includes: "This mother maintains a satisfactory marriage and has good social relationships" (p. 255). It is difficult to understand how these data could have been collected by direct observation when the mother alone visited the clinic.

Another example of indirect observation includes retrospective studies where the investigator notes various infant or child behaviors and postdictively proposes a particular group of parental variables to have influenced responses of the child. The methodology of this approach has been discussed by Bell (1958). Bell defended the utility of questionnaires and he defended the retrospective analysis as a means of generating hypotheses while circumventing the cumbersome longitudinal approach. Bell also noted, however, the difficulties involved with indirect and/or retrospective data collection. For example, there is a tendency of parents to respond to what is perceived to be the socially acceptable behavior. This response tendency is especially true for parents of deviant children and those of higher educational levels. The latter factor is often attributed to knowledge of the current child-rearing theories. Other problems of the retrospective approach include: identification of the parents' response sets, and influences resulting from the parents'

knowledge that for some reason his child is being observed. Differentiating attitudes of the parents toward the various children in the same family and changes in attitudes due to this seem to be problems unique to the retrospective design. Bell pointed to possible solutions to these problems and suggested that supplementary observations of parents interacting with their children and with other adults may help to clarify the relation between the parents' retrospective report and the children's actual behavior.

Schaefer and Bayley (1963) have heeded Bell's suggestion in a non-retrospective analysis of maternal behaviors, child behaviors, and their intercorrelations. Maternal behaviors were measured from observations of the mother in the child's testing situation and from later interviews. The mother's behaviors were rated, correlated, and then organized over the dimensions of love versus hostility and autonomy versus control. Molar (social, emotional, and task-oriented) behaviors of the children were rated by judges from notes made by the examiner immediately after a test situation.

Many investigators have relied on the combination of direct and indirect observations. For the most part, they have employed questionnaires and interviews in

assessing maternal variables and have employed direct observations of infant behavior and mother-infant interaction. The work of Caldwell et al. (1963) and Schaffer and Emerson (1964) provide two additional examples.

Caldwell et al. investigated the relationship between monomatric and polymatric child-rearing practices, and personality variables of the mother, the infant, and the developmental status of the infant during the first year of life. The authors indirectly measured maternal behavior by means of rated pre- and postnatal interviews. Mother-infant interaction was directly observed in the home and later rated according to non-operationally defined categories. The time-lapse between observing and rating the mother-infant behavior, however, limited the directness of the data.

Wright (1960) noted that ratings "are essentially direct in that they are not screened by interference techniques or by passage of enough time to make them fade out considerably. Each rating amounts to a statement that summarizes cumulative direct observations. . . . Yet what the observer records is more an assessment of personality than a description of behavior or its conditions" (p. 114). In this way the work of Robertson (1962), who rated data which was collected four years

prior to the study, cannot be considered as an analysis of direct observations. However, one can consider the data of Caldwell as being derived from direct observation, if one regards ratings which occur immediately after an observation as conforming to the criteria of directness.

Schaffer and Emerson (1964) provide an example of research which uses the rating method as well as supplementing the indirect approach of the interview with a direct observation. The attachment of the young infant to its mother was studied in the context of the concepts of "separation" and "fear of strangers". The authors used interviews from which they attempted to remove the typical distortions noted by Bell (1958) and discussed above. This was done by having all interviews in the family's home, by using unstructured interviews, and by adopting an accepting attitude toward the information given by the parent. Because Schaffer and Emerson realized that the indirect interview can never be entirely free of distortion, they directly observed the infant in a situation where the target behaviors of attachment were operationally defined and measured. This provided the authors with an assessment of the distortion within the interview.

It is necessary to note that Schaffer and Emerson did attempt to achieve the desired characteristics of the direct approach with an indirect method. This attempt points to the tendency of most investigators to regard direct methods as superior to non-direct techniques. Moss (1965) mentioned the paradox that, although mother-infant interaction has been considered one of the important variables of early experience, only recently have investigators utilized direct measures in studying this phenomenon. In discussing the limitations of indirect observations, Moss stated that these approaches have proved to be highly fallible. Moss noted that mothers are the most common informants in such studies, and they are likely to not remember, or to distort their reports according to cultural expectancies. For these reasons investigations of mother-infant interaction require the precision of data derived from direct observations.

There are three ways of recording data derived from direct observations: (1) the narrative report, (2) the time-sampling method, and (3) the continuous record. These three methods have been described by Wright (1960) as having the characteristics of "openness" or "closedness". The narrative report is open in

that the phenomena to be observed are not specified in advance. Time-sampling and continuous recording (or event-sampling as it is sometimes called) measure only those events which are clearly specified prior to data collection.

David and Appell (1959) provide an example of the collection of narrative data. These authors investigated caretaking behavior in an institution housing infants under one year of age. The institution was designed to separate well infants from their homes for the purpose of isolation from tuberculosis. A detailed narrative report was made of each child's behavior and the environmental events. All data, including the time duration of events, were derived from direct observations. Information was compiled by reviewing the extensive narrative reports and ordering these observations along variables such as multiplicity of caretakers, amount of social contact and of isolation, and interactions between the nurses and infants. With this method, David and Appell compared these infants who received routine institutional care with a group of infants who were given a more individualized form of care.

Although the David and Appell study was well done, it is still subject to the distortions of the narrative

method. Firstly, it is virtually impossible for the observer to write down all that occurs and therefore, critical items of behavior may be unnoticed due to the limitations and the mechanics of notetaking. Secondly, the "openness" of the observations facilitate observer bias in excluding behaviors which did occur or in including behaviors which did not occur. Data collected using the narrative method eventually find themselves at the hands of the "editors" in selecting those aspects of behavior which are of interest and which motivated their collection. Thus a major distinction between the narrative method and sampling procedures is that the former selects the behavioral categories after the observation while the latter require prior selection. Although data are data, it appears more rigorous and sophisticated to select one's hypothesis and proposed variables during the planning stage of the study. Therefore, in the case of studies using "closed" techniques, the predetermined checklist of events allows the investigator to be more discriminative in recognizing and recording target behaviors during the observational period.

In discussing closed techniques of direct observation Wright (1960) makes the distinction between time-

sampling and event-sampling. The former records selected events as they occur within precise time units. The latter selects and records events continuously as they occur. Both of these methods select the events to be observed in advance, but the time-sampling technique also selects discrete time units of observation.

Levine, Fishman, and Kagan (1967) used the event-sampling method and prepared a coded list of the maternal and infant behaviors which were to be observed. The authors found sex differences in maternal treatment and expression of excitement by the infant at four months of age. Gewirtz and Gewirtz (1968) used a similar technique to study infant caretaking in the kibbutzim of Israel. The observers in this study followed the infant's activities throughout the day and recorded the preselected events on a checklist. A timer was heard only by the observer and it signalled half-minute units of continuous recording.

The Gewirtz and Gewirtz (1968) study exemplifies the characteristics of the event-sampling design. The work of Rheingold (1960) equally exemplifies the method of time-sampling mother-infant interaction. She devised a checklist of 42 items which included the activities of the caretakers, the infant, and the location of the

infant. Each subject was observed for eight hours and the behaviors were sampled once every fifteen seconds for ten minutes of each quarter-hour. Maternal care of three-month-old infants in the home was compared with that in an institution.

Moss (1967) studied mother-infant behaviors at three weeks and at three months of age. He sampled the target responses once each minute for eight hours, and his data indicated that these maternal variables were not stable and that sex differences appear as early as three weeks of age. In this paper Moss also described his method for continuously recording mother-infant behavior by means of a 20-channel event recorder. The continuously recorded data were not reported at the time when the introduction to this paper was being prepared; one can therefore, only speculate how continuous data might be analyzed. It is within this context and the context of methodology that time-sampling and event-sampling procedures can be compared.

Firstly, it appears that time and event sampling might be considered on a continuum of increasing size of the time unit of observation. The time unit that Rheingold employed consisted of a one-second observation. Moss sampled behavior for a minute, and Gewirtz and Gewirtz

sampled behavior throughout the day when the subject was awake. The latter represented a continuous sample, but it must be noted that no sample is unbounded by time limitations. Moss (1967) reported that his continuous record consisted of three-hour observation periods.

The size of the time unit should be determined by the nature of the categories of behavior that one chooses to observe. It was reasonable for Rheingold to sample maternal care for one second every fifteen seconds when the items of her checklist included responses such as "looks at face" and "cries". These discriminations can be made within a brief moment, as was demonstrated. On the other hand, if one were investigating, for example, the frequency of the mother asking questions of her child as opposed to giving instructions, one would need to choose appropriately longer time units in order to facilitate these discriminations.

The relative frequency of the responses to be measured is a second factor which should be taken into account in determining the size of the time unit. Moss (1965) cited this restriction as a limitation of the time-sampling method stating that "it frequently does not differentiate certain events because of their tempo" (p. 483). It is important to note that his limitation can be easily

overcome by choosing the appropriate time units. As in other scientific research, the investigator must make preliminary pilot studies to determine the probable tempo of the responses to be measured, and then select the time unit which is appropriate. All responses must be considered in relation to each other for it would be difficult, though not impossible, to make observations on more than one sampling time schedule.

Not only is the size of the observation on a continuum, but also the size of the interval between observations. Event-sampling has little or no interval between samples provided that the mechanics of continuous recording have been perfected. This has led some investigators to point to another alleged limitation of the time-sampling technique. Moss (1965), for example, has argued that the time-sampling design is unable to capture the sequencing of events, thereby obscuring the interactions between the mother and the infant.

It is true that those who have used the time-sampling technique have seldom recorded behavioral sequences. However, an attempt was made above to note that all records of behavior are in some way samples; no one can observe and record "everything". The time-sampling method may record sequences of responses, just as the

event-sampling method may choose a behavioral pattern as its target response. One needs only to determine in pilot observations what sequence one wants to record and what is the relative size in time of that sequence. It would appear quite possible to record, for example, a sequence of the infant vocalizing in response to the mother's smile and the mother responding to that vocalization with her own vocalization. One is likely to find that this category of behavioral sequence occurs within a relatively short time unit; therefore, the schedule of observations should be determined accordingly. Rheingold (1961) has noted the importance of studying the interaction of mother and infant as a behavioral item to be recorded, and she has emphasized the methodological sophistication of the time-sampling technique in specifying these events in advance.

It is fruitful to regard time sampling and event sampling on a continuum and to realize the investigator's responsibility in choosing a time unit which can best facilitate sampling the response to be recorded. The importance of selecting the target behaviors prior to the observation period has been discussed above. In remembering that all data are merely samples of "reality", one must also evaluate whether the size and number of samples have been chosen appropriately.

The purpose of the research reported herein was to attempt to utilize the time-sampling technique in a longitudinal design and to measure changes in infant and maternal behavior during the first five weeks of life.

Two initial questions were asked in this research: (1) Will observations in terms of a given time unit yield a device which is sensitive in detecting changes over time, in the behavior and interactions of the caretaker and the young infant? (2) Will this technique also detect sex differences?

Incidentally, also, the present study questions the following statement: "Infants in institutions are more likely to be cared for in terms of some arbitrary schedule with little opportunity for them to shape caretakers in accordance with their own behavioral vicissitudes" (Moss, 1967, p. 30). Moss made this conjecture on the basis of the sex differences he found in the infants' behaviors and the differential caretaking of the male and female infants by their own mothers. Is there also differential treatment of institutionalized infants by their caretakers?

METHOD

Subjects

Twelve infants (six males and six females) from a nursery of an adoption agency were chosen on the basis of normal health at birth and present physical condition. This was determined by hospital reports and the judgment of the attending doctors and nurses at the nursery. When there was an open position in the weekly observation schedule the infant who was closest to 7.0 days of age was selected from the nursery population.

Typically, the infant came to the nursery from the hospital when he was five or six days old. Observations were begun on or after the seventh day of age, thus giving the infant a day or more to adjust to the new environment.

The infant was observed after his first week of life and on the same day of the week for each of the four weeks following. The mean ages in days at each weekly observation for males and females respectively were: 7.16, 7.50; 13.50, 13.83; 20.50, 21.83; 27.50; 27.83; and 34.50, 34.83.

Environmental Setting

The nursery of the Children's Home Society at Greensboro, North Carolina, provided an ideal opportunity to study young infants. Usually the nursery houses its capacity of about twenty infants ranging in age from approximately five days to five to six weeks old. There were four large rooms which contain from four to six cribs, and two small rooms with two cribs each. The latter rooms were typically used for the isolation of infants when this was necessary.

Caretaking activities were performed by a total of five registered nurses, one licensed practical nurse, eight nurses' aids, and occasional volunteers. This staff was divided into three eight-hour shifts, with at least one registered nurse residing at the nursery throughout the 24-hour day. The nursery was designed to give the infant as much maternal care as possible. This was exemplified by the former director, Miss Harriet Tynes (1967):

The object of our nursery is to provide the best physical care for babies who do not have homes and to protect the babies' emotional development by giving them warm, personal mothering while they are with us.

Method of Observation

Two infants per day were studied during two three-hour periods (9 a.m. to 12 p.m., and 1 p.m. to 4 p.m.).

They were observed using a time-sampling technique on the same day of the week, once each week for five weeks.

Each hour was divided into six ten-minute periods, and each infant was observed during alternating ten-minute periods (a total of 30 minutes per hour). During a ten-minute period 40 observations were made (one every 15 seconds). For each observation the observer looked at the infant-environment for one second, and during the following 14 seconds recorded what she had seen and heard during that observation. This method permitted four observations per minute and assured a total of 720 observations for each week of each infant's first five weeks of life.

Type of Observation

The categories of behavior chosen for observation were based on those developed by Rheingold (1959), with modification determined by preliminary studies of the one- to five-week-old infant (see Appendix A). They included 12 items of maternal behavior, 3 items which described the physical location of the infant, and 10 categories of infant behavior. In addition, the infant's weight was recorded each week.

These categories were arranged in a checklist, and for the most part they are self-explanatory. For example,

"Looks at face" was scored each time the visual regard of the caretaker was directed toward the infant's face. "Caretaking" was recorded each time activities were observed in the infant's room which were in direct relation to the infant's immediate care. This included an event such as carrying a diaper to the infant's crib, but did not include a routine housekeeping task of folding and stacking diapers. "Affection" was defined as any physical contact with the infant which was not a necessary aspect of caretaking. "Holds" was scored when the caretaker held the infant in her arms (in conjunction with the scoring of "In arms") and also when the caretaker held the infant in a propped position within the crib. In the latter case, "In crib" was also scored. "Talks" was recorded when the caretaker talked to any one other than the infant being observed. "Feeds" indicated that the caretaker placed food into the infant's mouth, whether it was a bottle of milk or a spoonful of solid food. "Eats" was scored only when solid food was being fed to the infant. "Looks at toy" referred to the infant directing visual regard to mobiles which hung above his crib. Finally, "Asleep" was operationally defined by the infant's eyes being closed since no physiological measurements were made of this behavior.

The items included in the checklist sufficiently covered all of the caretaking and infant behavioral events of the normal one- to five-week-old infant in this particular environmental setting. It can be noted also that typically many events were recorded in a single observation, because most of these items are not mutually exclusive.

Observer-Effect

The effect of the observer's presence was minimized in at least three ways. First, the fact that the observer had done some preliminary investigations at the nursery during the six months prior to this study allowed the caretakers an opportunity to become accustomed to the observer's presence in the nursery.

Second, it was noted that these nurses and nurses' aids were particularly interested and cooperative in this study. But when they expressed their desire to in no way disturb the observation, it was speculated that their deliberate cooperation (perhaps not allowing the infant to cry, or not doing routine tasks while the infant was being observed) would in itself bias the observation. In attempting to eliminate this possible effect at the outset of the study, the observer issued a mimeographed statement to the staff (see Appendix B) which informed them of the objective of the study. Since these nurses

and nurses' aids showed generous cooperation with the observer's work, it was assumed that this statement would be effective in providing the observer an opportunity to witness typical behavior of the caretakers.

Third, observing two infants for alternating ten-minute periods also minimized observer-effect. The infants were in the same room of the nursery, and, therefore, it was less obvious just which infant was being observed at a particular moment. It might be added that although the nursery is small and adequately staffed, the caretaker's day is a busy one. The quality of care given at the nursery appeared to allow the nurses little time to be concerned with whether a particular infant was being observed; rather, their objectives appeared to be geared only to the needs of the infants in general.

In addition, the observer remained outside the infant's line of vision and out of the way of the nurses' activities. The observer positioned herself so that she could see the infant's face and that of the caretaker when the latter was administering to the infant. All but the most necessary conversation was avoided so that the observer would not be increasing the amount of auditory stimulation in the nursery.

Observers and Reliability

The study was begun by the author and after the first weeks a second observer joined the project. In the following weeks the latter observer was trained and the reliability of these two observers was determined. Each infant was observed by the same person for the entire five-week period. The first observer collected data for eight subjects and the second observer collected data for four subjects.

Reliability was determined during the initial weeks of the study by the two observers who simultaneously and independently recorded items of behavior according to the method described above. All of the ages of the study were spanned in determining the reliability of observations made at five different hours of the given daily schedule. Eight infants were observed for a total of 1200 independent observations.

The reliability was reported as the percent of agreement for each category of behavior. Disagreement was scored when the responses were not the same for any particular time period. Agreement was scored when identical responses were recorded by both observers in the same observational time-interval. No-response periods were not included in the calculation of agreement in order to

avoid artificial inflation of reliability in the categories of behavior which occurred infrequently. The median percent of agreement was 81.00 (range 50.00-100.00). The percentages for the individual categories are listed in Appendix C.

RESULTS AND DISCUSSION

This study was designed to test the time-sampling technique as an instrument for measuring caretaker and infant behaviors during the first five weeks of life. It was hypothesized that this technique would detect developmental differences in these behaviors. In addition, this study was an attempt to determine whether there was differential treatment of the male and female infants by the caretakers as well as sex differences in the behavior of the infants.

In order to determine whether there were developmental changes and sex differences in the observed items of behavior all data were examined by means of the trend analysis described by Edwards (1964). An analysis of variance for repeated measures on the same subjects was utilized in a 2 (sex) X 5 (weeks) design. The significance of the main effects of sex and weeks was determined as well as their interaction. A trend analysis was performed for linear, quadratic, cubic, and quartic relationships. This analysis revealed the slope and curvature of the all-over trend, as well as that of the interaction of sex and weeks. The analysis of variance was

performed for each item of behavior and the trend analysis was performed for each item which differed significantly over weeks. Table 1 includes the mean frequency score for male and female infants on every item at each of the five weeks of observation in addition to the results of the analysis of variance and the trend analysis.

In this study the trend analysis is used not as a tool for prediction, but merely as a means for describing the data. The limitation to a descriptive use of this analysis is warranted in two related ways. First, a separate analysis of variance is performed on each of the 26 items of behavior. One could expect some of these categories to be significant by chance. Second, this chance factor is increased by the fact that these categories are not considered to be independent. This is exemplified in Table 2 which presents the intercorrelational coefficients of all items of behavior. Thirty-nine of the 325 values were significant at less than the 0.05 level. Therefore, the trend analysis numerically describes that which can be visually represented by graphs.

Caretaking Activity

It can be seen in Table 1 that the number of caretakers in the infant's room increased in a linear trend

TABLE 1
FREQUENCY, ANALYSIS OF VARIANCE, AND TREND ANALYSIS
OF MATERNAL AND INFANT BEHAVIOR

Item	Total Frequency at Each Week										F-Scores			Components			
	1		2		3		4		5		Sex	Weeks	SxW	Linear	Quadratic	Cubic	Quartic
	M ^a	F ^b	M	F	M	F	M	F	M	F							
Caretaking	38.50	30.33	18.50	19.50	56.50	26.00	36.33	41.83	42.33	46.16	1.54	2.19	1.21				
N of Caretakers	90.66	101.83	180.66	142.83	209.33	162.00	195.16	186.33	253.33	245.00	0.25	12.19**	0.54	O ^c 44.79** I ^d 0.01	6.27 1.46	3.60 0.50	0.01 0.01
Looks at Face	7.30	6.30	1.80	7.50	24.50	6.00	18.60	25.30	26.30	25.30	0.23	9.14**	2.74*	O 32.93** I 0	0.51 0.82	2.64 0.01	0.47 10.12**
Talks	40.16	30.00	60.66	34.16	44.66	41.00	60.50	53.00	74.83	71.33	0.62	3.73*	0.19	O 12.74** I 0.46	0.88 0.06	0.65 0.43	0.66 0.63
Talks to Infant	5.33	5.16	2.50	7.83	8.66	2.83	6.33	12.83	8.66	12.66	1.08	2.30	2.10				
Pats	9.16	2.33	0	2.16	2.50	0.33	2.16	0.16	0.33	1.66	5.00*	2.50	1.71				
Shows Affection	0.66	0	0.33	1.66	0.83	0.33	0.66	2.50	0.33	3.00	1.28	1.33	2.04				
Holds	6.10	2.30	0.66	2.80	25.80	4.10	12.80	15.50	23.10	28.10	1.14	9.48**	3.06*	O 31.68** I 0.86	1.44 3.09	0.12 0.16	4.69** 8.14**
Diapers	5.00	6.66	4.00	4.16	8.33	6.16	5.00	8.16	9.16	4.33	0.10	0.53	0.86				
Feeds	11.00	3.80	7.20	3.30	21.80	6.80	16.00	17.20	21.00	20.00	5.37*	3.68*	0.91	O 12.81** I 0.07	0.19 0.44	0.81 0.03	0.92 2.46
Adjusts Position	3.66	3.00	2.83	2.83	6.66	3.33	5.00	4.50	3.33	5.33	0.22	1.47	1.54				
Other	2.83	2.50	2.20	2.66	3.66	2.50	3.83	4.00	0.83	2.16	0.03	1.02	0.29				
In Crib	717.00	718.33	719.33	719.33	666.00	716.00	705.00	646.66	698.33	630.50	0.80	3.76*	2.67*	O 14.11** I 3.80	0.26 2.05	0.38 0.49	0.26 4.61*
In Arms	2.50	1.33	0.16	0.66	24.66	4.00	15.00	14.33	26.53	27.16	2.12	11.51**	2.04	O 40.41** I 0.01	1.38 2.76	0.11 0.64	4.15* 5.36*
Seated	0	0	0	0	29.33	0	0	59.00	0	62.33	2.06	1.29	1.00				
Asleep	532.50	559.30	543.60	347.50	420.30	343.00	448.30	402.60	399.50	399.50	2.28	4.13**	1.88	O 9.80** I 0.23	4.70* 3.62	1.13 2.69	0.88 1.00
Hiccough	11.50	10.83	12.16	5.66	8.50	20.83	4.00	6.00	4.16	0.33	0.05	2.30	1.26				
Vocalizes	1.33	1.66	0.16	1.00	0	0.50	0	4.16	0.83	3.66	1.00	1.73	4.06**				
Cries	6.50	16.50	15.30	47.50	27.60	20.10	34.00	21.60	34.80	29.00	0.15	3.72*	34.64**	O 7.39** I 7.33**	1.60 0.01	4.02 7.04*	1.88 2.70
Finger in Mouth	18.00	3.83	5.50	19.50	21.16	10.33	9.33	13.66	12.83	3.83	0.59	0.04	1.93				
Bottle in Mouth	70.00	60.66	61.33	92.50	90.00	86.66	68.16	65.66	67.16	62.83	0.03	0.79	0.52				
Looks at Toy	0	2.33	0	0	0	0.50	0	49.00	14.50	32.00	1.86	2.68*	1.74	O 7.70** I 7.70**	0.69 0.69	1.11 1.11	1.16 1.16
Pacifier in Mouth	41.00	40.50	34.66	39.00	20.50	32.00	43.66	0	16.83	5.16	0.16	0.75	0.62				
Fusses	23.50	21.16	25.00	27.33	36.50	26.66	28.16	29.33	38.50	13.50	0.70	0.34	0.89				
Eats	0	0	0	0	24.00	3.30	8.50	10.70	19.80	17.80	2.08	8.08**	2.54	O 25.85** I 0.01	0.01 2.56	0.01 0.12	6.46* 7.50**
Weight	122.00	116.70	127.70	123.00	139.20	136.30	153.70	143.50	163.80	151.00	0.53	245.32**	4.27**	O 972.32** I 1.17	10.34** 4.41*	6.97* 0.30	0.81 2.05

a Mean for Males.

b Mean for Females.

TABLE 2
INTER-ITEM CORRELATIONAL MATRIX BASED UPON TOTAL SCORE OVER FIVE WEEKS

	Caretaking	N of Caretakers	Looks at Face	Talks	Talks to Infant	Pats	Shows Affection	Holds	Diapers	Feeds	Adjusts Position	Other	In Crib	In Arms	Seated	Asleep	Hiccough	Vocalizes	Cries	Finger in Mouth	Bottle in Mouth	Looks at Toy	Pacifier in Mouth	Fusses	Eats
N of Caretakers	.23																								
Looks at Face	.72*	.42																							
Talks	.11	.60*	.00																						
Talks to Infant	.54	.00	.64*	-.46																					
Pats	-.09	.03	-.39	.40	-.68*																				
Shows Affection	.22	.31	.15	-.20	.60	-.25																			
Holds	.68*	.33	.73*	.09	.48	-.42	.09																		
Diapers	.56	-.14	.51	-.22	.31	-.41	-.20	.32																	
Feeds	.84*	.22	.76*	.01	.45	-.09	.11	.84*	.44																
Adjusts Position	.25	.45	.43	-.29	.21	-.09	.33	.09	.34	.27															
Other	.46	-.25	.38	-.20	.55	-.23	-.03	.40	.14	.37	-.18														
In Crib	-.23	-.67*	-.53	-.45	-.28	.25	-.11	-.23	.00	.00	-.19	-.19													
In Arms	.65*	.18	.69*	-.03	.43	-.42	-.09	.95*	.47	.84*	.09	.40	-.11												
Seated	.06	.58*	.33	.43	.16	-.15	.11	-.06	-.08	-.25	.14	.07	-.95*	-.17											
Asleep	-.19	-.16	-.38	.30	-.66*	.25	-.61*	.04	.04	-.06	-.35	-.43	.35	.14	-.39										
Hiccough	-.09	.21	-.03	-.38	.19	-.35	.51	.05	.13	.05	.50	-.44	.26	.09	-.27	-.15									
Vocalizes	-.31	.44	.17	.00	.16	-.15	.28	-.30	-.14	-.31	.36	-.36	.48	-.31	.57*	-.47	.34								
Cries	-.38	-.38	-.63*	-.01	.45	.31	-.34	-.56	-.17	-.50	-.22	.21	.28	-.48	-.14*	-.02	-.18	-.26							
Finger in Mouth	.37	.26	.06	.78*	-.18	.39	-.04	.24	-.20	.23	-.45	.21	-.20	.06	.56	.15	-.59	-.43	.02						
Bottle in Mouth	.10	-.37	-.18	.16	-.25	.19	-.28	.07	.00	.07	-.45	.34	.29	-.03	-.28	.17	-.48	-.77*	.43	.56					
Looks at Toy	-.02	.37	.11	-.18	.48	-.23	.92*	-.12	-.25	-.09	.38	-.25	-.18	-.27	.24	-.62*	.56	.60*	-.37	-.20	-.50				
Pacifier	.06	.18	.40	-.31	.25	-.08	-.07	-.06	.27	.11	.59*	.13	-.28	.09	.27	-.49	.22	.62*	.00	-.59*	-.61*	.11			
Fusses	.29	.52	.48	-.17	.33	-.25	.43	.40	.28	.49	.69*	-.24	-.04	.42	-.08	-.28	.80*	.41	-.43	-.39	-.54	.47	.49		
Eats	.67*	.30	.80*	-.11	.37	-.30	-.04	.91*	.47	.90*	.16	.26	-.14	.88*	-.13	.06	.02	-.24	-.57*	.24	.12	-.18	.02	.45	
Weight	.37	.03	.15	.13	.12	-.02	.02	.07	.42	.20	.09	-.05	-.01	.11	-.04	.27	.20	-.19	-.26	.25	-.14	-.02	-.19	-.12	.16

*P < .05

which was significant. Since the number of caretakers increased over time, it is not surprising that the amount of talking in the infant's room increased in the same way. The amount of talking directly to the infant, however, did not increase over weeks. The other caretaking activities which showed significant increases over time were: "Looks at Face", "Holds", and "Feeds". There was a significant over-all linear trend for each of these categories, as well as, a quartic curvilinear over-all trend within the category "Holds". This over-all trend is depicted in the curve of the total scores in Figure 1.

It appears from the results in Table 1 that the caretakers in this institution differentiated between sexes in their treatment of the infants. This occurred in the categories of "Feeds" and "Pats". Male infants were fed and patted more than female infants. With regard to sex-week interactions within caretaking activities, a significant F -value resulted in the categories of "Holds" and "Looks at Face". In both categories the scores of the male infants across weeks show a quartic curvature. This is demonstrated in Table 1 by the significant quartic component of the interaction. Figures 1 and 2 graphically depict this effect.

Over the first five weeks of life the infant spent significantly less time in his crib and significantly more

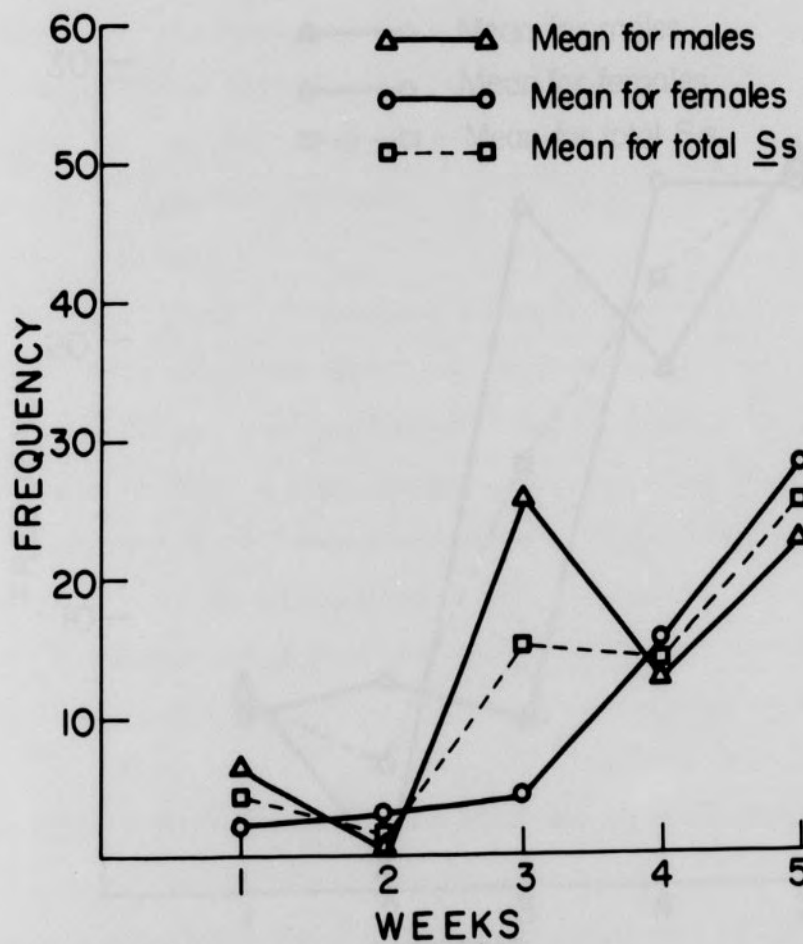


Fig. 1. Frequency over weeks of observation "Holds".

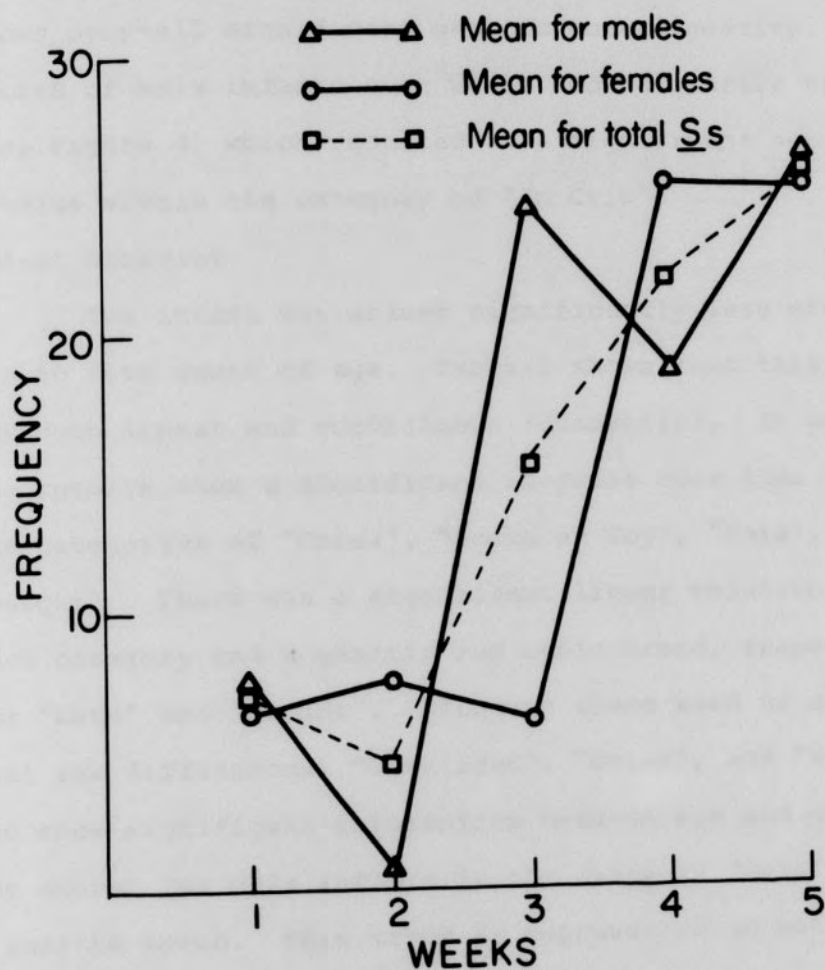


Fig. 2. Frequency over weeks of observation
"Looks at Face".

time in the caretaker's arms. This is reflected in Figures 3 and 4, respectively. Both of these events show over-all significant linearity, and the latter, "In Arms", also shows over-all significant quartic curvilinearity. The scores of male infants over weeks show a quartic trend (See Figure 4) which resulted in a significant sex-week F -value within the category of "In Crib".

Infant Behavior

The infant was asleep significantly less often from one to five weeks of age. Table 1 shows that this trend was both linear and curvilinear (quadratic). In addition, the results show a significant increase over time within the categories of "Cries", "Looks at Toy", "Eats", and "Weight". There was a significant linear relationship in each category and a quartic and cubic trend, respectively, for "Eats" and "Weight". Although there were no significant sex differences, "Vocalized", "Cries", and "Weight" did show significant interaction between sex and age. The scores for male infants in the category "Eats" showed a quartic trend. This trend is represented in both Table 1 and Figure 5.

Feeding Behavior

From these results and from general observations of the infants and caretakers in this institution, it can be

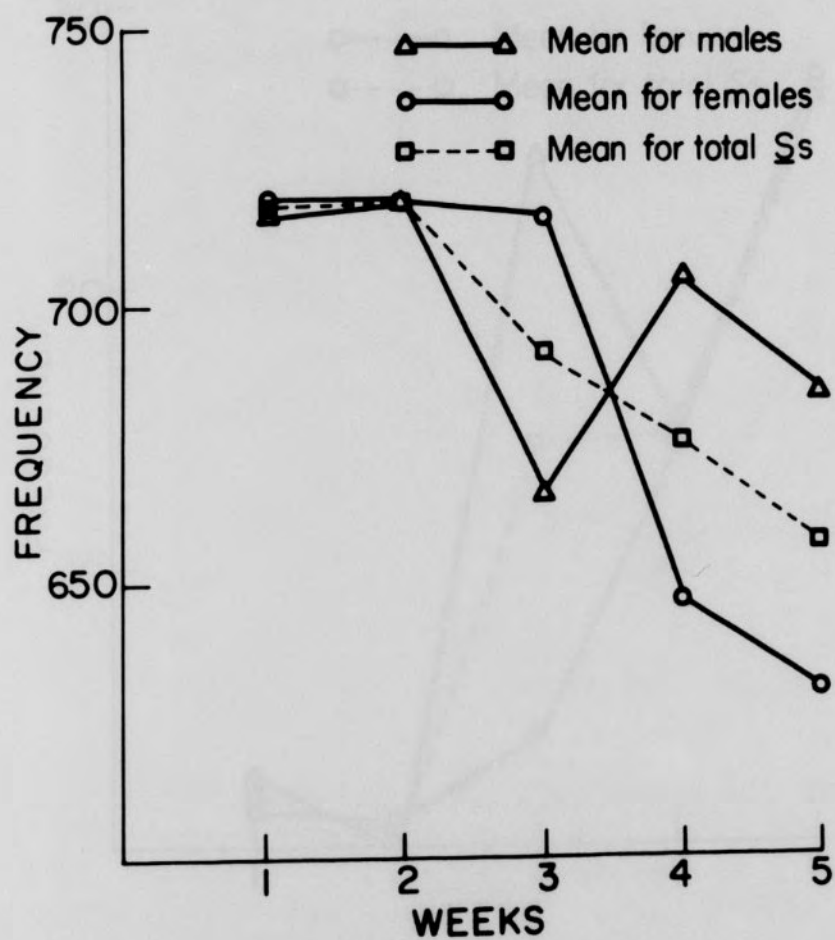


Fig. 3. Frequency over weeks of observation "In Crib".

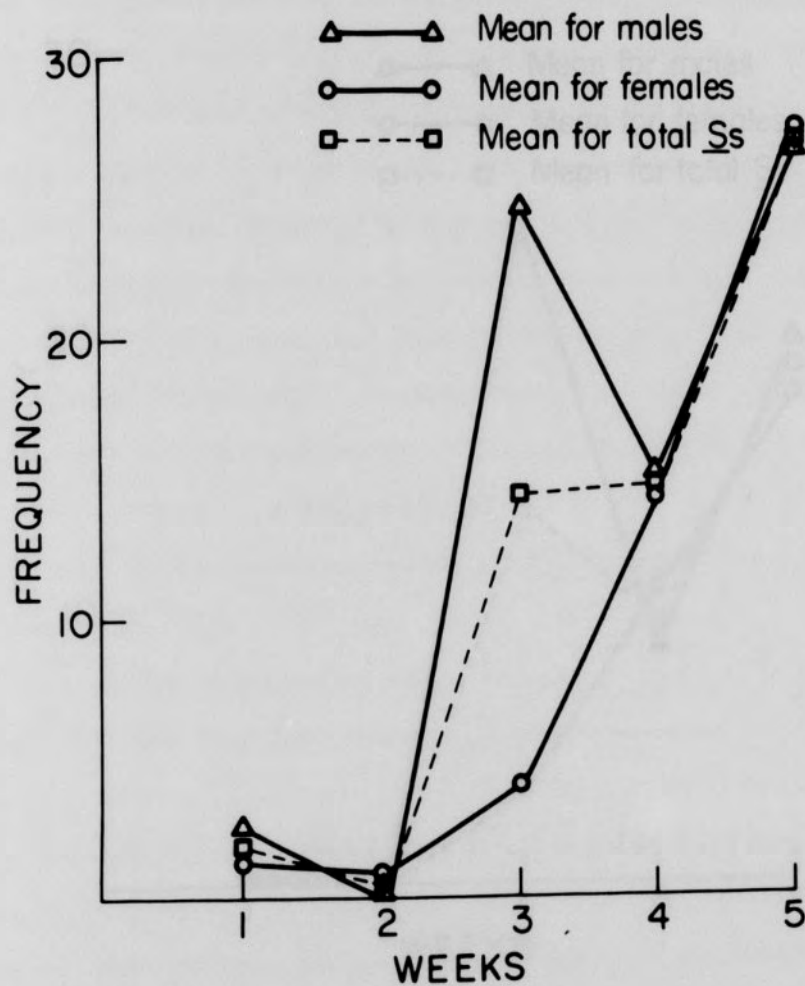


Fig. 4. Frequency over weeks of observation
"In Arms".

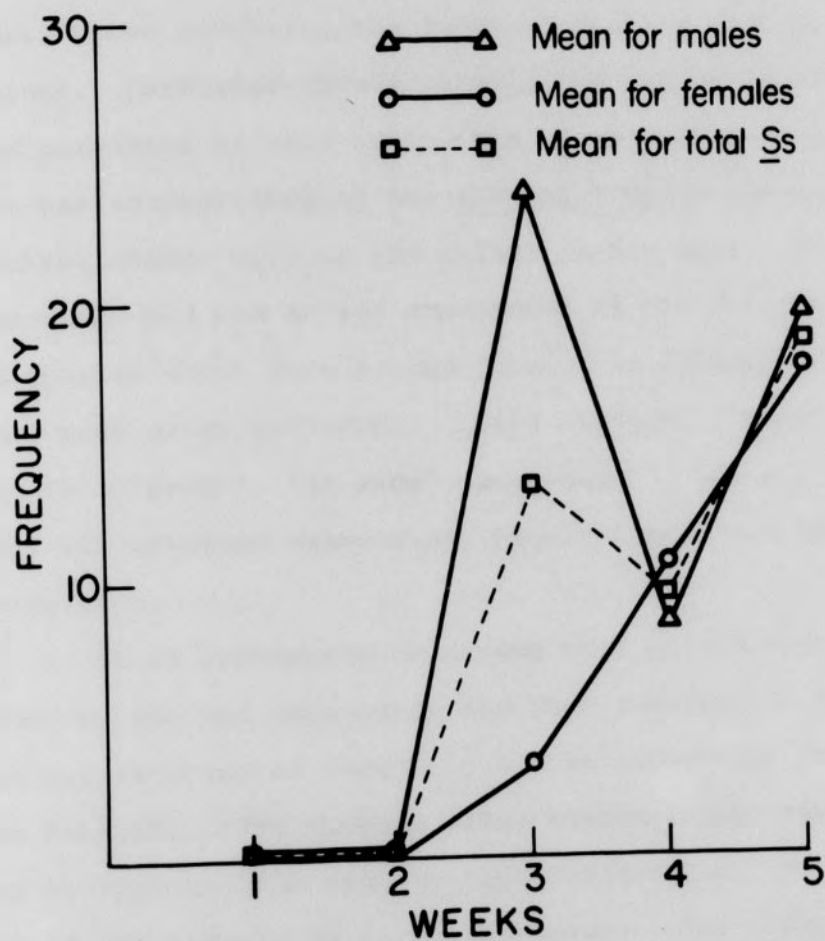


Fig. 5. Frequency over weeks of observation "Eats".

noted that the events which vary most significantly during the first five weeks of life, and the events by which the sex of the infant can be differentiated are, for the most part, those involving the feeding of solid food to the infant. Caretaker-infant interaction was more pronounced and pervasive in this event than at any other time. Feeding was accomplished by the caretaker while she sat (in a rocking chair) holding the infant in her arms. As the caretaker fed the infant she looked at his face. The categories which were scored during the feeding of solid food most often included: "Looks at Face", "Pats", "Holds", "Feeds", "In Arms", and "Eats". Table 2 shows that all of these categories, except "Pats" are highly correlated.

It is reasonable to assume that as the infant grew older he was fed more often and this resulted in a longitudinal increase of frequency of the categories of feeding behavior. The results show, however, that there were sex differences, as well as, age differences, in the feeding of the infants by these caretakers. The response "Feeds" was recorded when the caretaker placed a bottle or a spoonful of food in the infant's mouth. Since the bottle was generally propped, "Feeds" was recorded more frequently during the observation of a solid-food-feeding

period. For males, the addition of solid food to the infant's diet was one week earlier than for most female infants. Figure 6 shows that male infants are fed more frequently at three weeks of age than females. Figure 6, however, includes both spoon and bottle feeding, and, therefore, Figure 5 is presented to demonstrate the differential treatment of the sexes over weeks, since "Eats" included only the consumption of solid food. At three weeks of age eating behavior was observed in five of the six male infants and in two of the six female infants. At five weeks of age eating behavior was recorded for five male and five female infants.

It is interesting to note that there is no significant sex difference within the category "Eats" in spite of the earlier onset of this activity in males. Apparently the relatively equal occurrences of this behavior at all but the third week of life prevented the sex difference in frequency from reaching statistical significance. The earlier solid-food feeding of males accounts for the sex differences in the categories "Feeds" and "Pats". The latter was a behavior which the caretaker exhibited during the feeding of solid and liquid food. This differential treatment of the sexes also accounts for the significant interaction of sex and weeks in the categories

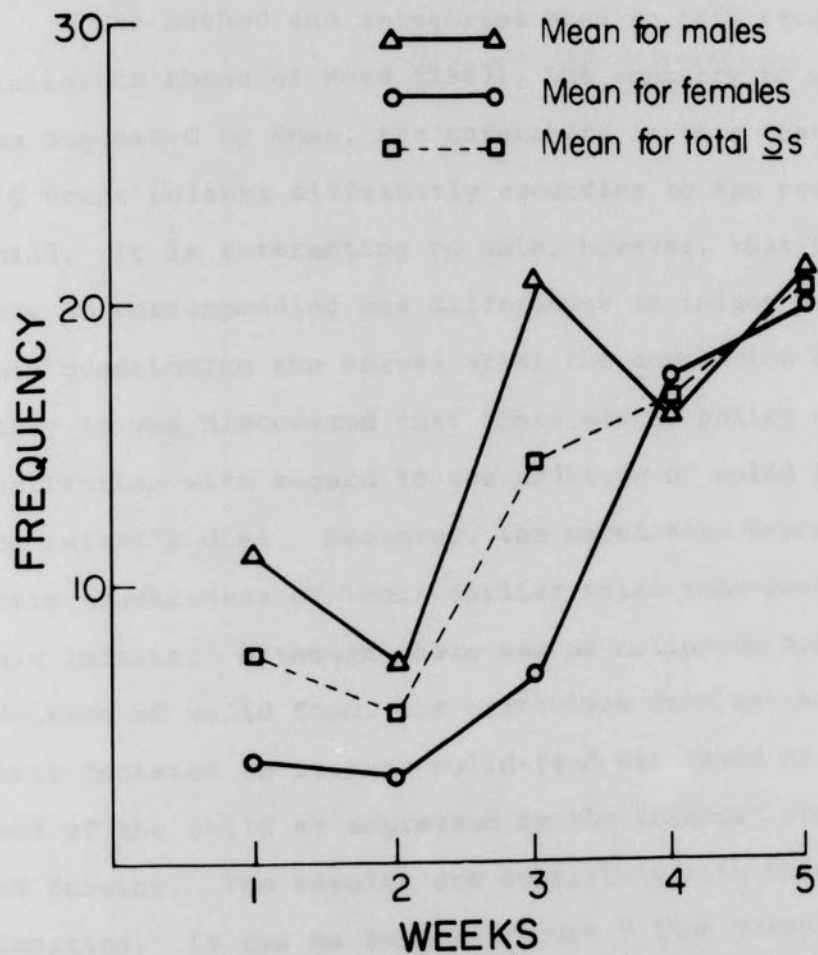


Fig. 6. Frequency over weeks of observation "Feeds".

of "Looks at Face", "Holds", and "In Crib". In addition, this effect is demonstrated by the quartic curve of male scores for these categories and for the categories of "In Arms" and "Eats" (see Figures 1-5).

The method and categories used in this study are similar to those of Moss (1967), but contrary to what was suggested by Moss, the caretakers in this institution did treat infants differently according to the sex of the child. It is interesting to note, however, that there were no corresponding sex differences in infant behavior. Upon questioning the nurses after the completion of this study it was discovered that there was no policy at this institution with regard to the addition of solid food to the infant's diet. Moreover, the caretakers expressed their unawareness of their earlier solid-food-feeding of male infants. Although there was no criterion for the addition of solid food, the caretakers felt as though their decision to include solid-food was based on the need of the child as expressed by the infants' crying and fussing. The results are consistent with this explanation. It can be seen in Figure 7 that males did cry more than females at three weeks of age and that they were fed solid food (see Figure 5) more often than females at that three week period.

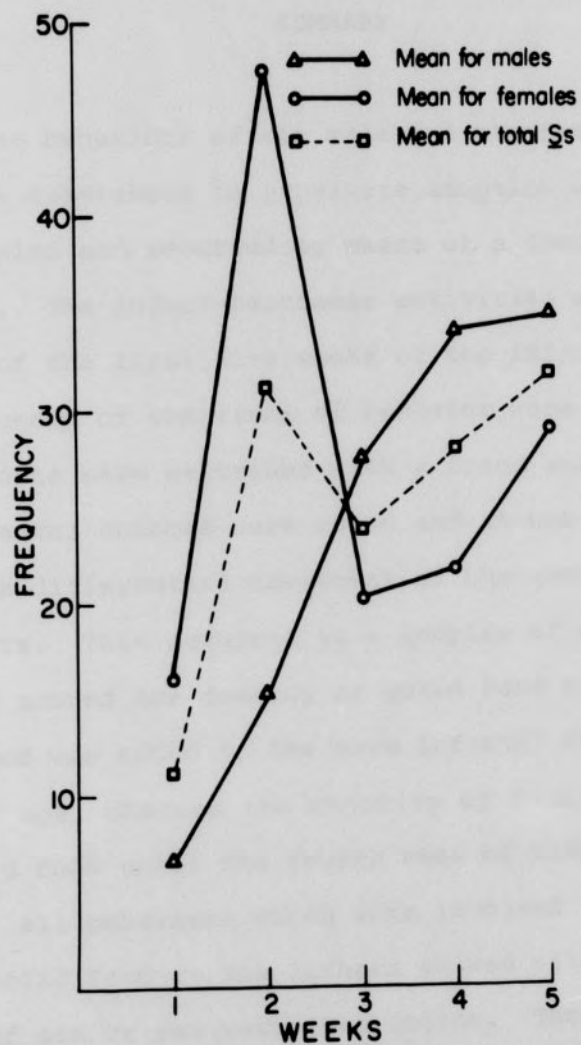


Fig. 7. Frequency over weeks of observation "Cries".

SUMMARY

The behaviors of six male and six female infants and their caretakers in a private adoption agency were time-sampled and recorded by means of a checklist of 26 items. The infant-caretaker activities were observed on each of the first five weeks of the infant's life. The frequency of the items of behavior were measured and the data were described with a trend analysis. Developmental changes were noted and it was found that there was differential treatment of the sexes by the caretakers. This occurred in a complex of activities centered around the feeding of solid food to the infants. Solid food was added to the male infants' diets at three weeks of age, whereas the majority of females were not fed solid food until the fourth week of life. Consequently, all behaviors which were involved in the feeding of solid food to the infants showed either the main effect of sex or sex-week interaction. These behaviors included: "Feeds", "Pats", "Looks at Face", "Holds", "In Crib", "In Arms", and "Eats". Therefore, it was concluded that the infants who were observed in this institution were treated differentially by the caretakers and

that the time-sampling technique can be employed in a longitudinal design which assess both caretaking and infant behaviors.

BIBLIOGRAPHY

- Bell, R. Q. Retrospective attitude studies of parent-child relations. Child Development, 1958, 29, 323-338.
- Caldwell, Bettye M., Hersher, L., Lipton, E. L., Richmand, J. B., Stern, G. A., Eddy, Evelyn, Drachman, R., and Rathman, A. Mother-infant interaction in monomatric and polymatric families. American Journal of Orthopsychiatry, 1963, 33, 653-664.
- David, Myrian and Appell, Genevieve. A study of nursing care and nurse-infant interaction. In B. M. Foss (Ed.), Determinants of Infant Behavior. New York: Wiley, 1959.
- Edwards, A. L. Experimental Design in Psychological Research. New York: Holt, Rinehart and Winston, 1950.
- Gerwirtz, Hava B. and Gerwirtz, J. L. Visiting and care-taking patterns for kibbutz infants: age and sex trends. American Journal of Orthopsychiatry, 1968, 38, 427-443.
- Harlow, H. F. and Zimmermann, R. R. Affectional responses in the infant monkey. Science, 1959, 130, 421-432.
- Lakin, M. Personality factors in mothers of excessively crying (colicky) infants. Monographs of the Society for Research in Child Development, 1957, 22, No. 1 (Whole No. 64).
- Levine, J., Fishman, C., and Kagan, J. Social class and sex differences as determinants of maternal behavior. American Journal of Orthopsychiatry, 1967, 37, 397.
- Moss, H. A. Methodological issues in studying mother-infant interaction. American Journal of Orthopsychiatry, 1965, 35, 482-486.

- Moss, H. A. Sex, age, and state as determinants of mother-infant interaction. Merrill-Palmer Quarterly, 1967, 13, 19-36.
- Rheingold, Harriet L. The modification of social responsiveness in institutional babies. Monographs of the Society for Research in Child Development, 1956, 21, No. 2 (Whole No. 63).
- Rheingold, Harriet L. The measurement of maternal care. Child Development, 1960, 31, 565-575.
- Rheingold, Harriet L. The effect of environmental stimulation upon social and exploratory behavior in the human infant. In B. M. Foss (Ed.), Determinants of Infant Behavior. New York: Wiley, 1961.
- Robertson, Joyce. Mothering as an influence on early development: A study of Well-Baby Clinic records. Psychoanalytic Study of the Child, 1962, 17, 245-264.
- Schaefer, E. S. and Bayley, Nancy. Maternal behaviors, child behavior, and their intercorrelations from infancy through adolescence. Monographs of the Society for Research in Child Development, 1963, 28, No. 3 (Whole No. 87).
- Schaffer, H. R. and Emerson, Peggy E. The development of social attachments in infancy. Monographs of the Society for Research in Child Development, 1964, 29, No. 3 (Whole No. 94).
- Tynes, Harriet. A residential nursery for very young babies. Children's Bureau Research Reports, 1967, 1, 23-28.
- Wright, H. F. Observational child study. In P. H. Mussen (Ed.), Handbook of Research methods in Child Development. New York: Wiley, 1960.

APPENDIX A

Checklist of the Categories of Observation

Name	Weight	Date	Time
Caretaking			
N of caretakers			
Looks at face			
Talks			
Talks to infant			
Pats			
Shows affection			
Holds			
Diapers			
Feeds			
Adjusts position			
Other			
In crib			
In arms			
Seated			
Asleep			
Hiccough			
Vocalizes			
Cries			
Finger in mouth			
Bottle in mouth			
Looks at toy			
Pacifier in mouth			
Fusses			
Eats			

APPENDIX B

Memorandum to the Caretakers

To: The Nurses of the Children's Home Society
From: Kathleen Bloom

As you know, I am doing a research project for my Master's degree in Psychology at UNC-G. I would like you to know exactly what I will be doing because I will be spending a good deal of time at the nursery this summer.

The research project involves recording a baby's typical behavior during a normal day and seeing what changes might take place in the baby's activities from the 1st to the 5th week of life. It is very important that the baby I am observing is having a very typical day, that is, that things are happening as they usually do, even if I were not present. It is important that my presence not cause any change in how the baby acts or in what you would normally do for the baby.

Therefore, it would be most helpful to me if you would treat the baby I am observing just as you treat the others. For example, feed, diaper, hold, or talk to the infant, exactly as you always do. Give the baby your normal amount of attention and don't give it special attention.

It is also important that, while I am observing an infant, we do not talk to each other as we did during my practice days of looking at the infants. This is because a normal day in the life of this infant would not include our talking or my voice, and I would like the infant to be as unaware of my being there as possible. Of course a normal day would include nurses talking to each other or to the other babies, so please continue to do that as you typically do.

Thank you so very much for letting me come to look at the infants and for helping me to see what a normal day is like in the life of an infant. Without your help this project would not be possible.

APPENDIX C

Observer Reliability

Item of Behavior	Percent of Agreement
Caretaking	71.40
N of caretakers	95.50
Looks at face	66.60
Talks	60.00
Talks to infant	50.00
Pats	50.00
Shows affection	*
Holds	75.00
Diapers	81.80
Feeds	66.60
Adjusts position	100.00
Other	*
In crib	100.00
In arms	*
Seated	100.00
Asleep	100.00
Hiccough	*
Vocalizes	*
Cries	69.80
Finger in mouth	91.40
Bottle in mouth	100.00
Looks at toy	*
Pacifier in mouth	98.20
Fusses	62.20
Eats	*

*this behavior was not observed during the assessment of reliability

APPENDIX C Observer Reliability

Item of Behavior	Percent of Agreement
Caretaking	71.40
N of caretakers	95.50
Looks at face	66.60
Talks	60.00
Talks to infant	50.00
Pats	50.00
Shows affection	*
Holds	75.00
Diapers	81.80
Feeds	66.60
Adjusts position	100.00
Other	*
In crib	100.00
In arms	*
Seated	100.00
Asleep	100.00
Hiccough	*
Vocalizes	*
Cries	69.80
Finger in mouth	91.40
Bottle in mouth	100.00
Looks at toy	*
Pacifier in mouth	98.20
Fusses	62.20
Eats	*

*this behavior was not observed during the assessment of reliability

APPENDIX C

Observer Reliability

Item of Behavior	Percent of Agreement
Caretaking	71.40
N of caretakers	95.50
Looks at face	66.60
Talks	60.00
Talks to infant	50.00
Pats	50.00
Shows affection	*
Holds	75.00
Diapers	81.80
Feeds	66.60
Adjusts position	100.00
Other	*
In crib	100.00
In arms	*
Seated	100.00
Asleep	100.00
Hiccough	*
Vocalizes	*
Cries	69.80
Finger in mouth	91.40
Bottle in mouth	100.00
Looks at toy	*
Pacifier in mouth	98.20
Fusses	62.20
Eats	*

*this behavior was not observed during the assessment of reliability

The University of North Carolina
at Greensboro

JACKSON LIBRARY



CQ

no. 742

Gift of
Kathleen Bloom
COLLEGE COLLECTION