

DEVELOPMENT OF INFANTS
AS AFFECTED BY MOTHER'S EMPLOYMENT

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DEVELOPMENT OF INFANTS
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By

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INSTITUTE FOR CLINICAL SOCIAL WORK

We hereby approve the Dissertation

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Doctor of Philosophy in Clinical Social Work

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ABSTRACT

This study evaluates the effect of the absence of the mother, due to employment or study, on the development of the infant during the first year of life. As increasing numbers of mothers of young children go to work, authorities on child development and other specialists disagree on the consequence of this trend for the development of the child.

The writings of the pioneer researchers of infant development in psychoanalysis are presented, with special emphasis on the stranger and separation anxieties as indicators of adjustment at various ages. Infant studies concerned with mother-infant attachment representing other schools of thought are included in the review. Feminist literature and sociological observations pertaining to maternal employment are also summarized.

The overall methodology is one of exploratory research. Information on maternal employment and scores of tests administered to the infants was obtained from a longitudinal study of child development at U.C.L.A. The population consists of approximately 100 mother-child pairs. The measures of developmental milestones were the Bayley Scales of Infant Development (BSID) and the Strange Situation Test (SST) developed by Ainsworth. Scores are analyzed for effects due to mother's work at five months and at one year.

The findings of the study are that there are no adverse effects due to maternal employment on the child's development during the first year of life. BSID showed no significant differences among infants whose mothers worked full time, infants whose mothers worked part-time and those infants whose mothers did not work. On the SST, the scores of the infants whose mothers worked full-time were higher than those of others.

The findings seem to indicate that such brief separations as are entailed in cases where mothers pursued other task in addition to child rearing did not seem to interfere with development. The higher scores attained by the children of the full-time working mothers are seen as an adaptation to the given environment.

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CHAPTER 1

INTRODUCTION

SECTION 1.1 - MOTIVATION FOR THE STUDY

Mothers both raised their children and worked since the dawn of history. For hundreds of years mothers occupied themselves around the farm keeping their infants close enough to be able to take care of them. The Industrial Revolution brought drastic changes in the mother's availability to her child by removing her place of work from the home, and by making it necessary for her to procure substitute care for her infant. Most often such care was available within the extended family.

In the preceeding several decades, two important developments took place. The first one was increasing predominance of the nuclear family and the corresponding disappearance of the support system of the extended family. And the second phenomenon was the ever increasing interest of mothers of very young children in pursuits outside the home, employment being the major one. Current trends indicate that more and more mothers will be absenting themselves for extended periods during the day for purposes of work or study.

On the basis of statistical evidence, the U.S. Department of Labor concluded that the most significant change in this country's history is the ever increasing number of working mothers. Added on to this phenomenon is the rising army of women who undertake serious

courses of training and study during their mothering years. All this implies drastic changes in child rearing practices. Some child development and other specialists encourage the mother of the young child to continue in pursuit of her own interests and needs by maintaining that the adjustment of the child will not suffer and even might be enhanced by the care being given by a number of friendly and warm people. The concept that a woman can work and also be a successful mother is gaining ground among the mothers themselves. The feminist literature cites many authorities according to whom such absences are not only harmful but may be beneficial to the infant.

On the other hand, the psychoanalytic literature ascribes great importance to the availability of mother during the first years of life for the development of the child. The easy accessibility to the mother during the infancy period is held of particular importance. Spitz, Mahler, Bowlby, Benjamin and others engaged in lengthy investigations of the meaning of the mothering figure to the infant and the dangers involved when the closeness of the dyad is disturbed. While brief and prolonged continuous separations (weeks to several months) were studied intensively, no psychoanalytically motivated study of the effects of daily separations and reunions, such as exist when the mother is working, is known. Most of the pertinent other studies on the effect of non-maternal care during the early period of life center their interest on the type of substitute (day care centers, etc.) and do not emphasize the meaning of separation and stranger reactions on the development of the infant.

SECTION 1.2 - VALUE OF THIS STUDY TO CLINICAL SOCIAL WORK

With the continuing trend among mothers to pursue interests outside the home, it is critical to know what effect the absence might have on their infants. Clinical social workers, who among the mental health professionals are the most frequent to be called to help families, must have credible information on the effect of the daily absence of the mother on the growing ego functions of the child and his evolving capacity for developing object relationship. This knowledge will be helpful in reducing adverse effects on the child and the mother.

While this study does not lay claim to being definitive, the findings indicate that brief periodic absences of the mother, particularly absences associated with full-time work, have no major adverse effect on the development as determined by the Bayley Scales of Infant Development. The study also finds that the infants of full-time working mothers are less likely to 'fall apart' in stressful episodes of the Strange Situation Test than are children of non-working mothers. These findings are developed in terms of statistical analyses in Chapter 4. Because of the significance of the results for members of the mental health professions, a summary in non-statistical terms is included in Chapter 5.

SECTION 1.3 - SCOPE OF THE STUDY

The purpose of this study is to examine the effects of the mother's absence due to work or study on the child's development during

the first year of life. The scores obtained on the Bayley Scale of Infant Development (BSID) and the Strange Situation Test (SST) of Infants of employed, partially employed, unemployed and student mothers, are used for this purpose. BSID is a thoroughly standardized test and is a result of some forty years of research on heterogeneous populations. The SST was developed by Ainsworth and has been widely used by child development researchers to test the quality of the infant's attachment to his mother. In addition to comparing the scores on the two tests among groups with varied work status at different ages of the child, the subjects are also studied in relation to the stability of that work status. 'Work' is used throughout this volume as denoting either employment or study that necessitates the absence of the mother from the home. Most of the analyses in the body of this volume distinguish between part-time work and full-time work.

The sample consists of one hundred children, fifty of whose parents are traditionally married and fifty of whose parents live together under social contract. In both of these groups the father is available to the child. All participating mothers are Caucasian, between ages of 18 and 35, living in California at the birth of the child, and were raised under the influence of the American middle class culture. Most of the infants are first children. The data utilized here were obtained from an investigation of Child Development in Alternative Family Life Styles, a major longitudinal study funded by the National Institute of Mental Health and the Carnegie Corporation of New York. That research is being conducted at U.C.L.A. under the direction

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SECTION 1.4 - ORGANIZATION OF THIS VOLUME

The theoretical background of this study is discussed in Chapter 2. Psychoanalytic exploration of the mother-child attachment, sociological evaluation of the conditions surrounding the working mother, and the evolution of the specific tests utilized here are reviewed. The final section of that chapter summarizes prior studies on the effects of periodic mother-child separations. The methodology of the study is outlined in Chapter 3. The data sources, details of the population under study, and the statistical procedures are described there.

The results of the statistical analysis are presented in Chapter 4. The first two sections of that chapter deal, respectively, with the findings from the Strange Situation Test and the Bayley Scales of Infant Development. The final section contains a detailed analysis of selected data from the prior sections. The interpretation of these findings is provided in Chapter 5. First the findings are summarized in non-statistical terms, next they are evaluated in the context of the study itself and of prior studies to identify correlations, trends, and

*The research was supported in part by the United States Public Health Service Grant No. 1 R01-MH 24947 starting in 1973, Carnegie Corporation Grant B-3694 starting in 1974, and by Research Scientist Award 5-105 MH70541 (1971-1981) to Bernice T. Elduson, Ph. D., Principal Investigator. Thomas S. Welsner, Ph. D., was Co-Principal Investigator. The staff of Senior Investigators included Jannette Alexander, Ph. D., M. R. Mickey, Ph. D., and Irla Lee Zimmerman, Ph. D.

possible inconsistencies. In the final part of the chapter the results are discussed against the theoretical background developed in Chapter 2. Overall conclusions and recommendations for further study are presented in Chapter 6.

Appendices contain material that is significant for utilization of this study in further research. Appendix A identifies the data sources in sufficient detail to permit unambiguous access to all work status information and test scores utilized. Appendix B describes the statistical procedures and contains sample calculations. Appendix C is a reproduction of the evaluation criteria for the Strange Situation Test used by the research team at UCLA.

SECTION 1.5 - ACKNOWLEDGMENTS

The author appreciates the help received from many individuals in the pursuit of this study. Foremost thanks are due to the members of the Doctoral Committee, Drs. H. Rosenfeld, M. Meyer, and B. Summers, and to the Reader of the Research Project Proposal, Dr. E. Lampl. All of these offered much encouragement and helpful suggestions during the planning of the research and for the presentation of the findings.

Deep gratitude is felt for the cooperation received from Dr. Bernice T. Elduson and the staff of the project on Child Development in Alternative Life Styles at UCLA. They not only made their data available but provided frequent and patient guidance on the mechanics of accessing the information, on the methodology of their data collection, and filled in details necessary for interpretation of the data in the

present context. In addition to the Principal Investigator, the following staff members made significant contributions: Janette Alexander, Ph. D. who organized the employment data for the UCLA project and facilitated their incorporation into the present study; Irla Lee Zimmerman, Ph. D. and Maurine Bernstein, R. N., who supervised the psychological data and testing for the UCLA project and graciously permitted their data to be used here; Ruth B. Nelson, Administrative Assistant, who patiently answered questions and coordinated the special data collection; and Helen Garnier and Paula Stern who provided computer assistance.

Finally, the author wants to express sincere thanks to all members of her family for their forbearance during the writing of this Dissertation, and particularly to her husband, Dr. Herbert Hecht, for his counsel on the selection and implementation of the statistical procedures used here.

CHAPTER 2

THEORETICAL BACKGROUND AND PRIOR RESEARCH

The first section of this chapter discusses theoretical material pertinent to an understanding of psychological, developmental, and sociological issues that arise when mothers leave their infants for substantial portions of the day for the purpose of employment or study. This is followed by a review of milestones of infant development that might be affected by absences of the mother or by other changes in the home environment associated with the work status of the mother. The final section deals with the rather sparse research that has been published on the specific effects on child development associated with work related absences of the mother during the first year of life.

SECTION 2.1 - THEORETICAL BACKGROUND

Theoretical questions pertinent to this study are explored in two areas: (1) the psychological effects produced by the regular absence of the mother for substantial portions of the day, and (2) the societal implications of mother's work on infant development. These issues are discussed below in the order enumerated here.

2.1.1 Psychological Theories

There is agreement among the researchers cited below that during the first few months of life there is little specific recognition of the caretaker, and that absence of the mother during this period is not expected to produce significant psychological effects as long as good care is provided by a substitute. Sometime after the age of five months, which is the first date for which work status data are utilized in the present study, it is held that the infant begins to distinguish between the mother and other individuals, and that he might therefore react to periodic absences of the mother. At the age of one year, the next date at which work status is considered here, a highly specific interaction with the mother is postulated by most of the researchers, and from this one would expect significant effects if the mother is not available to the child for a substantial portion of each working day. During the second year a gradually increasing toleration of the absence of the mother is acknowledged in most theories. However, with the onset of the third year, the awareness of the need for the mother is renewed, to be followed by ability to sustain separateness for a part of the day.

Beyond these widely shared views there are significant differences among individual researchers or schools. These are highlighted below by detailed discussions of the works of three leading theoreticians, Spitz, Mahler, and Bowlby, followed by a synopsis of the contributions of others that are pertinent to the present study.

Spitz

Spitz is one of the first to study object relations. The importance of the relationship between the mother and her infant was so evident to him that he wondered why sociologists had so long ignored the fact that "the inception and evolution of social relations" was to be found in the very relationship between mother and child. Spitz (1965) agreed with the ego-psychologists that object relations were crucial to the optimal development of the personality. "What the infant lacks, the mother compensates for and supplies".

Spitz agreed with Hartmann (1939) that the infant emerges from the womb psychologically undifferentiated and objectless. In the course of the first year of life a good deal of development and maturation occurs. From the objectless stage, the infant will enter the stage of the precursor of the object and finally will be capable of internalizing the libidinal object proper.

The objectless state with which life begins does not provide for differentiation between the inside and the outside, between psyche and soma, and between I and non-I. For the first month of life the objectless state is at its height. Starting with the second month, the infant is able to respond to "cues" and interaction with mother begins. The human face starts to acquire a unique place.

The "smiling response", the first organizer, which manifests itself between the second and the sixth month, inaugurates the second step in the object relation development - the pre-object phase. In its earliest stages, the smile is elicited by a gestalt and as such is not

an indication of a true object relation. Nevertheless, despite the fact that the human face lacks specificity and exclusivity, the importance of it can be gleaned from the fact that whenever the partner withdraws from the game, there is an unpleasure response (crying). This is in sharp contrast to lack of a similar reaction whenever a toy or other inanimate object is withdrawn from the infant. By the middle of the first year, the "smiling response" will increasingly be reserved for the mother and other friends and will definitely exclude strangers. Thus, Spitz (ibid.) regards the "smiling response" as "...the prototype and promise of subsequent social relations".

The second organizer, according to Spitz, is the stranger anxiety which appears around the eighth month of life. A decisive change in behavior of the infant can be observed as he manifests discomfort in the proximity of a stranger. Spitz's evaluation of the intensity of this anxiety can be gleaned from the statement that "...anaclitic depression is only quantitatively different from the eight month anxiety" (1946). The second organizer marks a distinct stage in the development of the psychic organization. On the affective level, traces of such emotions as jealousy, anger, love, attachment and others can be observed. The same is true for certain defenses. The acquisition of action patterns, and the beginning of the identificatory process can be detected. The role of the mother at this stage is all significant and will determine the nature of the object relations. "Cultures in which contact between child and mother are regulated differently will have different object relations" (ibid.). Anna Freud (1951) makes a similar observation. She points out that the traditional

form of object relations of the dyad is distorted in cases of infants who had been exposed to different nurses in rapid succession.

The beginning of speech acquisition at a later part of the first year of life is an important event in the blossoming of object relations. This event marks the transition from a state of passivity to one of activity. The ability to repeat the sounds (and words) originating with the mother, constitutes a further internalization of object relations.

The mother is the dominant and active partner in the relationship of the dyad. Her mental state and her activities will exert their influences on the infant. The infant seems particularly sensitive to the quality of mothering especially during the 'critical phases' in the course of his development, two of which occur during the first year of life. This period is an especially difficult one because the ego is only in the process of being established, and thus the consequences of the loss of the mothering figure are more severe than at a later stage (Spitz 1960). Disorders can be traced to either improper or insufficient mother-infant relations. Spitz (1965) states that "...damage suffered by the child deprived of his mother will be proportionate to the length of that deprivation". In the case of a good relationship between the two prior to the mother's absence, the pain suffered by the infant would be more intense. "It is striking that when bad mother-child relationships exist prior to separation, we do not see a single case of anaclitic depression in children" (ibid.). A similar view is held by many other researchers.

Spitz does not discuss whether regular daily separations due to

employment constitute a serious interference in the infant's relationship with his mother or at what phase such absences might be reacted to particularly unfavorably, or the specific difficulties that they might produce. The data utilized by Spitz to develop his theory were obtained from institutionalized children who had undergone long and frequently traumatic separations from their mothers. The main contribution to the present study is that he called attention to the potential symptoms that might arise from any kind of separation.

Spitz was meticulous in the statistical analysis of his observations and in documenting individual responses by means of film. Thus he set the stage for objectivity in future studies in this field.

Mahler

Mahler (1975) states that her theory is based on Hartmann's observation that the "task of man to adopt to man" (Hartmann 1939). Building on Hartmann's postulate of the undifferentiated matrix, Mahler views the infant at birth as objectless. This state Mahler termed the normal autistic phase of life. By the second month of life, a dim awareness of the existence of a need satisfying object can be detected. This awareness grows until by the third month it jells into "...a hallucinatory, or delusional somatic-psychic fusion" (Mahler 1968b). Mahler termed this the symbiotic period of normal development. Central to Mahler's theory is the concept of partnership between two dissimilar organisms, the infant and the mother, which is necessary for the development of the ego of the former and the molding of his instincts

under the impact of reality. This partnership is also imperative for the eventual attainment of object constancy. Serious abnormalities during the symbiotic period result in the breakdown of psychic growth which in turn leads to pathology. On the other hand, a successful symbiotic experience enables the infant to proceed with expanding ego functions and developing a higher level of object relations.

This concept can be traced to an earlier paper in which Mahler introduced her view of the symbiotic origin of the human condition and the presence of separation-individuation process as a prerequisite of normal development (Mahler 1955). Separation-individuation as conceived by Mahler are two complementary developments. Both are intrapsychic achievements. Separation refers to the infant's emergence from the symbiotic fusion with his mother. This sense of separateness from the mother eventually leads to a sense of separateness from the world at large. Individuation, in turn, refers to those achievements by the infant which progressively mark the assumption of his own individual characteristics.

By the second part of the first year, the mother has become so specific that she is no longer interchangeable. The sub-phase of differentiation which is the first step in the process of separation-individuation begins at the peak of the symbiotic period - fifth to sixth month of life. It parallels the maturational growth of partial locomotion (sitting, standing, crawling, etc.) and culminates around the ninth or tenth month. Visual and tactile exploration of mother's body and face and the increased ability to "scan the wider world" (Mahler 1975) and make it possible to begin to differentiate self

from non-self. Yet the close proximity of the mother is necessary in order to experience pleasure in one's emerging ego functions and relatedness to the environment. Spitz (1963) observed the same manifestations when he referred to the importance of the 'dialogue' with the mother.

The second sub-phase is practicing, lasting to about the fourteenth month. During this sub-phase the infant is able to actively move away from mother and return to her. The locomotion is highly cathected and the mood is elevated as the infant energetically expands his world. While the practicing period itself is highly narcissistic, it culminates with a sobering realization of one's smallness and the renewal of the need of mother's participation and acceptance.

The third sub-phase, rapprochement, lasts till two years and beyond. Its major characteristic is rediscovery of the mother's importance and the fuller realization of her separateness. Adverse reactions to brief separations are common during this sub-phase and mother can no longer be readily substituted for. Most characteristic of this period of growth are strong ambivalent feelings and behaviors as the child is torn between his wish to restore the unity with the mother at the same time that he is increasingly subjected to the pull toward separateness. Mahler found that during this sub-phase separation reaction is at its height.

Thus, Mahler's theory of separation and individuation regards the second half of the first year through the third year of life as all important and decisive of the quality of the future mental life. It is these three sub-phases that determine the outcome of the fourth

sub-phase during which object constancy is attained. The entire process of separation and individuation with its four sub-phases establishes the 'base line of one's emotional responsiveness" and sets the basic mood. Mahler (1961) points out that loss of a loved person in reality does not occur frequently enough to account for widespread proclivity toward depressive moods and illnesses. It is then enlightening to examine the nature of the intra-psychic process when we are dealing with the sense of loss which in turn sets in motion the affective reactions of helplessness, sadness, grief and depression.

Mahler's clinical work, studies and observations of normal and psychotic infants led her to conclude that the intensity of separation reactions changes from period to period. They are phase specific. During differentiation, separation reactions are typically low-keyed, although at times separation from the mothering person can evoke desperate crying. During the practicing period, when narcissism reigns supreme, there seems to be a relative insensitivity to mother's presence. The rapprochement period when the need for the mother once again becomes intense, deals with separation in a variety of ways: searching, crying, or pointedly ignoring the event. As the development progresses into the fourth sub-phase, brief separations are generally better tolerated (Mahler 1975).

Mahler (ibid.) found that 'stranger reactions' are dependent on "...broad sensory-motor, quasi-cognitive functions of the ego that go far beyond the affect of anxiety" (and wariness). She had observed that in addition to anxiety, the stranger evokes various degrees of curiosity and interest in the infant. It was Mahler's finding that there

exists an inverse relationship between basic confidence which is acquired during the symbiotic period and between stranger anxiety. Anxiety as a reaction to other than the mothering figures is most pronounced during the differentiation sub-phase (In this Mahler is in agreement with most of the other researchers of infant development). This is due, most likely, to the fact that during this period a special relationship to mother has been well established. Anxiety reaction to brief separations is peculiarly specific to mother-infant reunions in the second half of the first year of life. Mahler explained this phenomenon by the fact that the split that still exists in the internal part image of the mother is being activated by such brief separations. During the practicing sub-phase, the stranger reactions appear to be considerably milder but reappear again in strength later on in the process when object constancy is fairly well established.

Bowlby

Bowlby attributes great importance to the mother-child object relationship as it was defined in the classic work of Klein (1932). His initial belief was that the pair were completely inseparable. He held that physical separation from the mother in early childhood would affect the development of personality deeply and adversely and damage future relationships with meaningful objects (Bowlby 1958). Bowlby rejected the dependency theory, preferring the concept of attachment. He espoused the theory of primary object attachment which he regarded as based on ethological evidence, and he took notice of genetic psychology

as it was stated by Piaget (1936). Bowlby was also influenced by the concept of primary object relation put forth by Michael Ballint (1949) and Alice Ballint (1954). Suckling, clinging, following, crying, smiling are regarded as instinctual responses of the various stages which secured the survival of the child by eliciting maternal care, and these are regarded as the building blocks of the primary object attachment. Bowlby (1960) interpreted separation anxiety to be the consequence of disruption of the instinctual bond in the dyad and triggering the expression of mourning very similar to that observed in adults.

To Bowlby, separation implied that the child was uncertain whether the mother figure was available. The distress that this uncertainty created was called grief by Bowlby. He disagreed with Spitz's proposition that the cause of anaclitic depression is the infant's inability to turn aggression toward the outside and therefore it was turned against the self. Instead, Bowlby saw it as "... a rupture of a key relationship and the consequent intense pain of yearning" (Spitz, 1960)0. He agreed with other researchers that separation anxiety could only be experienced around the beginning of the second half of the first year of life.

On the basis of the child's ability to deal with brief everyday separations, Bowlby distinguished between two forms of attachment - secure and anxious. As in other species, the function of attachment in the human race is to protect the survival of the young during the long period of vulnerability by keeping them close to a mothering figure. The child's stable behavioral system - attachment - is complemented by the maternal behavioral system - maternal caring. Attachment is a

system rather than any specific bit of behavior. The manifestations may be either external, internal or both. The specific causes that promote attachment behavior are organized within the central nervous system and respond to the presence, or absence, of attachment objects within the environment. At the beginning of life, the representational model of the child's attachment figure is rather vague. As he develops, the child defines his mothering figure and becomes increasingly able to sustain his relationship with her. The internalization of the attachment figure enables the child to withstand increasingly longer periods of separation without significant distress. The development of the cognitive functions assists the child to understand the circumstances of mother's absence and enables him to utilize external devices (such as letters and telephone calls) to tolerate the separation (Robertson & Robertson, 1971). The younger child, because he has not yet developed such abilities, is at a disadvantage.

Another important concept in Bowlby's theory is the biologically determined monotropic quality of attachment. Although the infant may with development extend his attachments, in the beginning it is to one specific figure. This concept was further explored by Cohen and Campos (1974) who arrived at the conclusion that one year olds did show a preference for their mother in most stressful situations. Bowlby explained that if the infant is innately monotropic, any disturbance of monotropic attachment will distort the normal course of development.

Finally, the existence of 'sensitive phases' was mentioned by Bowlby in his more recent writings (1973). During these critical periods adverse conditions could distort or arrest development.

Restoration of such failures could be extremely difficult. This notion is similar to Spitz's concept that a psychic organization had to be present for affect like grief to take place.

Originally, Bowlby's work was concerned with the implications of long absences of the mother for which he uses the term 'maternal deprivation'. There is agreement among most researchers that these should be distinguished from brief ones which are considerably more common and for which the term 'separation' may be more appropriate. Although the implications of the latter are not fully understood at the present time, it is surmised that they have a number of features in common with 'maternal deprivation'. One of the important factors is whether the separation occurs in the familiar home environment or elsewhere.

Bowlby recognized two kinds of attachment: secure and anxious. This classification of attachment behaviors which was accepted by Ainsworth as a basis for the Strange Situation Test. The latter is one of the two measures of the effect of the mother's work status used in the present study.

Other Theoreticians

A number of researchers point out that the quality of the substitute figure has a direct bearing on the degree of distress the separation will create in the child. Although the Robertsons (1971) concluded that "...responsive substitute care..." forestalled many negative reactions and would promote reunion with the mother, the matter

of the substitute figure and its impact of attachment issues for the child is not undisputed. They conclude their work with the statement: "We continue to share his (Bowlby's) concern about the potential harm associated with early separation from the mother." Ainsworth (1966) points out that breach of a tie is in itself disturbing and "...there is a suggestion that reunion with the parents may be disturbing even in instances where there has been fairly adequate substitute mothering during separation, perhaps in part because of the breach of the new tie with the substitute figure." That the overt disturbance disappears is not necessarily an indication that the separation has had no lasting affect. One of the hidden effects is sensitization to separations that may follow (ibid.).

Piaget's theory of human development was influenced by early twentieth century thinking which explained complex social organizations and higher mental processes in terms of evolution and sociobiology. He saw individuality emerging out of group life. He believed that the infant learns about his own mental processes and how to deal with them from the way in which he was treated by others. "For example, he learns how to identify when he is angry, because such acts are treated as such by others, and he in turn learns to attend to aspects of his angry act and its consequences and thereby knows his feelings." (Piaget, 1937).

The preconceptual child was 'egocentric' because he felt undifferentiated. Via imitative social development he advanced but continued to be confined to understanding of objects only in relation to his own activities.

Piaget immersed himself in infancy through detailed observations

of his own three infants. His ideas are quite specific and span the whole course of infancy. His interest was oriented primarily on how the infant interacts with objects rather than with persons. Therefore his concept of 'object permanence' which takes place at about 18 - 20 months of age, is built on his studies of the infants' interaction with inanimate, transiently cathected, physical objects. Since the present research focuses on the relationship with the mothering person, and since an object constancy with her in the Piagetian sense does not coalesce until around the age of three years, this aspect of his theory is not applicable here.

That there is an age limit below which absence of the mother does not produce significant effects is consistent with Piaget's belief that only with the establishment of 'the permanent object' could anxiety in relation to separation be experienced (Piaget, 1937). Other studies concurred with this view. Schaeffer and Callender (1959) found that babies younger than six months accepted a mother substitute readily, while those over seven months definitely protested the separation. Lamb (1977), too, held that attachment relations emerged and were consolidated in the period of 7-13 months. Flint's study holds a special interest because in it he makes a finer discrimination in the reaction to separation of babies under seven months. While he, too, observed that protest to separation was missing and the new caretaker was accepted, there was a change in the outer behavior nevertheless. The infants seemed to grow quieter as both crying and vocalization had diminished noticeably after their mother had left (Flint, 1964).

Fraiberg (1980) speaks of the 'embryonic period of personality',

the first two years of life, as the time to which "... a very large number of the most severe and intractable disorders of children and adults can be traced." What occurs between the infant and his 'human partners' during this sensorimotor period of development (to age 18 months) will influence greatly the emotional growth and the capacity for learning. Although no standardized scales for the affective tie between the infant and his parents have been published, we know that smiling, gazing, vocalizing, and motor approaches are some of the manifestations of the primary attachment between the baby and his parents. Mother's absence will in this context create a serious disruption in the infant's process of humanization because of his inability to "... understand that ... (his) mommy is -- some place --, even if she is not present."

Benjamin, a contemporary of Spitz, added to the latter's theory on fears in infancy by making a distinction between fear of strangers and anxiety of separation from the mothering figure (Benjamin, 1961). Each fear has a separate time of onset and of maximum intensity, as well as its specific manifestations. Benjamin estimated that the average age of the onset of stranger anxiety is six and one-half months. For separation anxiety the corresponding period is eight months. The interval of the maximum intensity of stranger anxiety is from seven to nine months, and for the separation anxiety it is from thirteen to eighteen months. The dynamic determinants of the two anxieties also differ. While agreeing with Spitz that fear of loss of the mothering person is the main determinant in separation anxiety, it is not the sole determinant for stranger anxiety. Rather the fear of the strange and unknown constitutes the single most important dynamic in stranger

anxiety. These two anxieties, although distinct, are also actively influencing each other. In the application of these theories for the present research, the combination of the two anxieties will be used to understand the meaning of the mother's absence for the infant.

Gesell (1940) and Bayley (1933), who worked with large numbers of infants reported observing fear reactions to strangers. Tennes and Lampl (1964) found that "... fear responses to strangers can occur in children of very early ages, well before an individually differentiated object can possibly exist." Very early causes of fear (occurring as early as three months) can emanate either from animate or inanimate objects. They can also be sudden movements, disturbing noises, etc. The second class of fears are connected with humans and their differences from the mothering figure. It could be a strange voice or other manner of behavior which the infant can pick up through auditory, visual, tactile, or kinesthetic discrimination. Thus, Benjamin (op. cit.) used the term 'fear of the strange' as pertaining to strangeness per se, and 'fear of the stranger' to designate the process in the post-object-development phase.

It is the fear of unfamiliar humans and their actions that the Strange Situation Test was designed to detect and to relate to the quality of object relationship existing at the time of the assessment. Mahler added to the differentiation of the two anxieties -- stranger and separation -- by adding to the former the positive dynamics of curiosity and interest in relation to the stranger. Benjamin's work agrees with that of most of the previously cited authors in identifying separation anxiety as the major factor during the second half of the first year of

life. Benjamin regarded both stranger and separation anxieties as normal developmental phenomena.

Tennes and Lampl (op. cit.) investigated the early manifestations of both separation and stranger anxieties as to their differences and relationships in nineteen infants between the ages of three and 23 months. Their conclusions supported Benjamin's theories regarding the two anxieties and his deductive predictions for later development. The same researchers reached the interesting conclusion that "... the child's libidinal investment in the mother is a necessary but not sufficient condition for the stimulation of separation anxieties. Instead, the intensity correlated better with the mother's hostility and her attempt to inhibit his aggressive drives." (Tennes & Lampl, 1966).

Heinecke (1962) demonstrated clearly that even brief separations constituted a traumatic event for the young child, the degree of trauma sustained depending on the quality of the attachment to the mother, the developmental stage of the child at the time of separation, and the history of previous absences of the mother. In agreement with others cited here, Heinecke states that "... in the neighbourhood of six or seven months ... the reaction to parting is severe." It is also described as similar to the distress of babies who are hungry (Freud, 1943). It is the loss of the mother that is significant to the child, rather than the loss of specific services and care. The requirement for care can be met by a substitute, but the desire to be loved can not. The disorganization and regression that a child manifests already in the first few hours following a separation demonstrate the threat that even

a brief separation can cause. In the light of Heinecke's observations and conclusions it would appear that repeated daily separations from the working mother may have a significant influence on adjustment.

2.1.2 Societal Implications of Mothers' Work

Until the middle of the nineteenth century, the housewife was part and parcel of the family economic unit. With the advent of the industrial revolution, women lost their importance in the primary economy, and it became a matter of social status for men to be able to afford an 'idle wife' who would cater to the psychological needs of her family. This situation is now changing very rapidly. There is much statistical support for the statement of the U. S. Department of Labor that "... the most significant change in labor force in our history ..." is the increasing number of working mothers (Norris & Miller, 1979). The proportion of employed mothers rose from nine percent in 1940 to over 40 percent in 1977 (Kanter, 1977). Obviously, such a drastic change must have an effect on child rearing practices. In addition to the very important financial needs, the reason for mothers seeking employment is to escape the isolation, physical fatigue, lack of identity, and sometimes sense of failure that are a frequent fate of full-time mothers (Bird, 1979). The loss of the extended family and of the support structure which it provided also contribute to the problems that young women face when they are staying home with their children.

Recent authors, e. g., Bernard (1974), express the suspicion that the child rearing theories of the first fifty years of the current

century justify the earlier sociological position of women when they proclaimed the indispensability of the mother for the successful growth and development of the child. Margaret Mead (1954), too, expressed doubt that the biological mother must be ever-present during the early years of life. Her cross-cultural studies convinced her that the adjustment of the child is most facilitated if it "...is cared for by many warm, friendly people." In the 1976 revised edition of his work, Spock expressed the view that "... children benefit from a larger emotional reservoir that helps them function independently and confidently ..." if cared for by a number of people.

Norris (1978) further maintains that "The child care that is usually performed by mothers might just as well be carried out by fathers." Others emphasize that it is the quality rather than the quantity of parental care that matters. A typical statement of this school is "If a parent is basically loving, even an hour in the morning and an hour in the evening may be sufficient for attachment to take place" (Brazelton, Koslowski & Main, 1974).

In general, recent sociological studies have questioned the exclusiveness of the mother-infant bond. The concept that a woman can work and also be a successful mother has been gaining ground among the mothers themselves. While in 1970 only one-third of the working mothers felt that pre-school children "... do not necessarily suffer ..." when their mothers work, this opinion was supported by almost one-half only four years later.

SECTION 2.2 - DEVELOPMENTAL MILESTONES

This section discusses the milestones of child development which are used in the study as criteria for the effects of mothers' going to work and the attendant separation. The selection was governed by the material available in the files of the Family Life Style Project at UCLA. Two very pertinent tests had been administered as part of the project: the Strange Situation Test and the Bayley Scales of Infant Development. Background material on each of these tests is presented below.

2.2.1 Strange Situation Test

Description of the Test

The Strange Situation Test administered by the Family Life Style Project to the sample used in the present research, is based on the test constructed by Ainsworth (1978). The test is designed to approximate situations that most infants encounter in real life. The purpose of the test is to study the attachment of the infant to his mother. Laboratory techniques were devised to highlight attachment behaviors. Infants were subjected to very brief separation experiences in an unfamiliar environment and their responses were compared with their responses with similar minor separations in the home environment. Ainsworth credits Bowlby's work (1958, 1969 and 1973) with inspiring research into issues pertaining to infant-mother attachment and early social development.

The test consists of eight episodes with those considered the least stressful occurring first. The standard form of the test is administered to one year old infants under laboratory conditions. Observations of the infant are recorded while he and his mother are together in a strange room containing attractive play material, while a stranger joins the dyad, while the infant is left alone with the stranger, and while the infant is left entirely alone. The mother leaves and returns twice during the test. The infant's reactions to the reunions are carefully monitored. The test lasts for 21-1/2 minutes. The first episode lasts only 30 seconds; the remaining episodes are timed to approximate 3 minutes.

The observations are primarily focused on two behaviors exhibited by the subject. First, amount and nature of the infant's explorations in an unfamiliar environment (locomotion, manipulation of toys, and visual activities are recorded), and the amount and the nature of the infant's orientation to the mother. Signal behaviors such as crying, smiling, vocalizations and oral activities are noted as well. Each infant is scored on six variables and assigned to one of three groups: A, B, or C. For the purpose of further discrimination, the B group is divided into four subgroups and each of the others into two. The scoring by these subgroups is referred to as 'expanded ABCs', and this is the evaluation used in the present study.

The six variables used for scoring purposes are: proximity and contact seeking (active search for either actual physical contact with or proximity to the mother); contact maintaining behavior (the degree of effort shown to maintain contact with mother once it was achieved);

resistance (angry behavior toward the adult); avoidance (represents active avoidance of contact or proximity); search (active attempt to regain proximity and contact with mother); and distance interaction (maintaining contact by behaviors such as smiling, vocalizing or pointing).

Infants in group A manifest avoidance behaviors as the main feature during the reunion episodes. The members of group B show an interest in gaining proximity to and contact with their mother during the reunion episodes without antithetical behavior such as avoidance and resistance; not all exhibit distress at separation. This group is the largest of the three and is considered normative. Group C demonstrates ambivalence towards the mother upon her return; resistant behavior is most conspicuous. A subgroup in C consists of infants whose most prominent characteristic is passivity. This subgroup is considered to possess the greatest potential for disturbance at later ages of any of these categories. The scoring guidelines used by the Family Life Style Project are reproduced in Appendix C.

Theoretical Considerations

Bowlby's dissatisfaction with psychoanalytic understanding of the child's responses to a separation from his mother led him to develop the attachment theory. This theory is the foundation for the interpretation of observations made during the Strange Situation Test. Building on his psychoanalytic orientation, Bowlby turned to the biological discipline of ethology (with its evolutionary view of

behavior), to psychobiology, and to Piaget's structural approach to the development of cognition in order to understand the origin, function, and development of an infant's early social relations. Ainsworth (1978) describes the attachment theory as "open ended", -- not incumbered by propositions and hypotheses. Kuhn (1962) stated that this theory represented a complete shift in developmental psychology.

For Ainsworth this theory constitutes a new paradigm for research into social development and a blueprint for interpreting her findings. Although attachment theory cannot be classified as a cognitive theory, Bowlby assumes that the development of attachment is enmeshed with cognitive development. The relatively long period of helplessness characteristic of human infants makes it essential for their survival to resort to flexibility and learning. Bowlby hypothesizes that a stable behavioral system promotes sufficient proximity to the main caretaker and is essential to permit this learning by the young human. Attachment behavior is a behavioral system and is not to be equated with any specific bit of behavior.

Bowlby, in discussing feelings and their roles, gave particular emphasis to security, fear, anxiety, and anger. Strangeness (unfamiliarity), sudden change of stimulation, rapid approach, height, and being left alone are considered as natural clues to danger. All those constitute fears; the doubt in a young child of the accessibility of his attachment figure (mothering figure), constitutes anxiety. This is the reason why separation anxiety in an infant is of such a paramount importance (Bowlby, 1973).

It is not merely the absence of the attachment figure, but

rather the perception of its possible inaccessibility and unresponsiveness that causes separation distress, and it is the anticipation of such an occurrence that brings about separation anxiety. In the first six months of life the infant seeks contact and proximity. Toward the latter part of the first year, after the formation of a "working model" of his mother as available to him (in Bowlby's sense and as a "permanent object" in Piagetian literature), the infant is capable of forming expectations and to experience anxiety when his mother is not visible to him. His anxiety is manifested by some behavior or other such as crying or attempting to follow her. Infants differ in the consistency and intensity of their distress in brief, everyday separations. The degree of distress most likely will correlate with prior experience concerning the mother's accessibility and availability. Bowlby distinguishes two forms of attachment -- secure and anxious. Ainsworth (1978) concludes that "Thus the mere presence of an attachment figure is not necessarily enough to promote a feeling of security, although it very frequently seems to do so."

According to the attachment theory, three phases of attachment are distinguishable during the first year of life. The formulations are similar to those of Spitz. The initial preattachment phase, characterized by "orientation of signals without discrimination of figure" (Bowlby, 1978), lasts for the first few weeks of life. It is followed by the phase of 'attachment in the making' where preference of one figure over others is observed. This phase of development roughly corresponds to the second and third stages of Piaget's sensorimotor development. And the third phase -- the phase of clear-cut attachment

-- begins when signals and locomotion are used to maintain proximity the mothering figure. This occurs during the second part of the first year of life. This phase continues through the second and third year of life, obviously beyond Piaget's Stage four.

2.2.2 Bayley Scales of Infant Development

The Bayley Scales of Infant Development aim to measure the mental and and psychomotor development of Infants. There are obvious difficulties associated with devising an assessment technique for such an unique organism as the Infant. At no other time is the development so rapid and the available form of measurement so restricted. Yet, the interest in this phase of life has increased greatly in the past two decades as can be seen from the ever increasing number of Infant studies.

Gesell (1928 and 1940), Cattell (1940), and Bayley (1969), are the major contributors to objective measurement during the Infancy period. Together, their works comprise the 'traditional scales'. Although Bayley's scale contains many items similar to those of Gesell, it differs in the method of standardization. The norm in both the Gesell and the Catell scales is based on observations of small institutionalized samples. The Bayley Scale was standardized by testing of great number of babies who were socioeconomically, geographically, and racially diverse. Theoretically, like Gesell, Bayley supports a maturationally and genotypically controlled concept of development. She views intelligence as an emerging and functionally unique development at

different periods of the first thirty months of life.

Bayley's scale is divided into mental and motor areas which are administered as separate tests. In addition there is an Infant Behavior Record which is partly based on the observations in the former two areas. For this reason the plural form 'Bayley Scales' is frequently used. The author describes the individual scales as follows:

"The Mental Scale is designed to assess sensory-perceptual acuities, discriminations, and the ability to respond to these; the early acquisition of 'object constancy' and memory, learning, and problem solving ability; vocalizations and the beginning of verbal communication; and early evidence of the ability to form generalizations and classifications, which is the basis of abstract thinking. Results of the administration of the Mental Scale are expressed as a standard score, the MDI, or Mental Development Index.

The Motor Scale is designed to provide a measure of the degree of control of the body, coordination of the large muscles and of the finer manipulatory skills of the hands and fingers. As the Motor Scale is specifically directed toward behaviors reflecting motor coordination and skills, it is not concerned with functions that are commonly thought of as 'mental' or 'intelligent' in nature. Results of the Motor Scale are expressed as a standard score, the PDI, or Psychomotor Development Index. (It) ... has been labeled the Psychomotor Development Index simply as a means of differentiating the identifying initials from those of the ... MDI."

Bayley's work on testing of infants started with the development of the California First Year Mental Test Scale (1933). It contained 115 items which were judged on a pass/fail basis. This was followed two years later by a test for motor development (1935). Her definitive work (Bayley, 1969) represents the culmination of forty years of work in the field of infant testing. The current scales have been standardized on 1262 children over the ages of two months to two and one-half years which makes them the best standardized test for this age group. No significant differences were found relative to sex, race, order of

birth, or geographical location.

Since the Bayley Scales have been available in the earlier version since the mid-1930s and in the definitive form since 1969, a considerable amount of research based on these scales has been published. Although not especially good at predicting adult IQ, tests have been found valuable for determining the developmental status of a given child, or of groups of children, at a given age.

The present research utilizes Bailey MDI and PDI scores obtained from tests in the infants' homes conducted by the Family Life Style Project at approximate ages of eight months and one year. The scores were adjusted to reflect the expected score at the exact ages indicated and are referred to in the source as Adjusted MDI and Adjusted PDI (see Appendix A). The eight month scores were compared with those obtained from a 50,000 member national sample (Broman, Nichols & Kennedy, 1975) by the UCLA researchers and no significant deviations were found.

SECTION 2.3 - PREVIOUS STUDIES

Historically, infants have been studied much less frequently than older children (Etaugh, 1974). In the 'explosion' of studies on infancy in the past decade, there has been very little work relating to the effects of mother's employment on infant development. In the previously cited study the author reported that "The present reviewer couldn't find a single study dealing directly with psychological effects of maternal employment on infants." Hoffman (1974) confirms Etaugh's findings. Studies that have a bearing on daily separations fall to

complement each other and are occasionally contradictory. There seems to be a trend, however, to conclude that negative effects, if any, are small.

There are studies of attachment behavior of infants in a variety of cultural settings which include observations on the effect of regular brief separations on the quality of the attachment of the infant to his mother. One of such works is Ainsworth's (1963) study of Ganda infants (in Uganda). The author could not find any discernable differences in attachment between infants (ages 0 - 24 months) who were cared for exclusively by their mothers from those who had multiple caretakers. These conclusions were based on readily observable and measurable behavior of the subjects and did not include any special testing to explore defensive reactions to such 'minor' separations.

A study of 18 month old infants conducted in Scotland also found that the intensity of the attachment to the mother did not relate to either the frequency or duration of maternal absences nor to the number of caretakers. Rather, the strength of the attachment was highly influenced by maternal responsiveness and the amount of mother-child interaction (Schaeffer & Challender, 1964). While the emphasis on responsiveness and amount of interaction is consistent with the theories discussed earlier in this chapter, the regular absences clearly must reduce the opportunity for interaction and the amount of stimulation that the mother can offer to her infant. This argument is borne out in a study by Kotelchuck, Zelazo, Kogan and Speltz (1975) on one to two year old infants. They reported that the attachment to their fathers was positively correlated with the degree to which the father actually

cared for the child.

Caldwell, Wright, Honig and Tannebaum (1970) conducted a differential study of the strength of attachment in 30 month old children some of whom attended day care facilities while others were reared exclusively at home. Their findings suggest that daily separations from mother did not affect the quality of the children's attachment but the amount of stimulation that the child received from his mother did influence the quality of the bond. It must thus be presumed that mothers who are not in continuous contact with their children make up for this by more intensive interactions during the time that they are together. Because the cited study deals with considerably older children and considers only the separation at that age it is of only marginal significance for the present research.

The same age group (two to three year olds) was studied by Maccoby and Feldman (1972) in a frequently cited comparison between American home reared children and their contemporaries raised in a kibbutz in Israel. Here, too, no significant differences in attachment were found. Because in the kibbutz environment children are separated from their mothers during working hours starting at a very early age, it is somewhat more pertinent on this score but because of possible other cultural effects of the two environments there are some reservations about the applicability of the findings. Parents in the kibbutz have few of the household responsibilities of their American counterparts and thus can focus more attention on the child during the off-duty hours. Also, the kibbutz mother is usually not very far from the children's house and may see her infant several times during the day.

Different results were obtained by Rabin (1965) who used Griffith's M.Q. in a study of children ranging from eleven to seventeen months. One group was brought up in a kibbutz, the other in a moshav, a settlement of small, individually owned farms sharing communal facilities in which children stay with their mothers. On the other hand, Kohen-Raz (1968) who used Bayley's BMMS found that kibbutz children between the ages of one and 27 months had higher scores than either those raised in middle class families or in institutions.

A number of other studies suggest that the mental development of young children was not adversely affected by the daily separation from the mother, given that adequate substitute care was available. Caldwell et al. (op. cit.) compared the development quotient (DQ) of home reared children and those in day care for a population observed between the ages of 12 to 30 months. They found that the former showed a decrease in scores over the duration of the survey while the latter showed a slight increase. Similar results are reported by the Robinsons (1971) who used the Bayley Mental Scales on children at a single age of 18 months.

Caldwell (1962) found that attachment to the mother for one year old infants was greater for those cared for exclusively by their mothers. The methodology of this study was criticized by Etaugh (1976) because attachment and other variables (such as pre-natal personality of the mother) were not clearly segregated.

Reviewing studies on the attachment behavior of infants between 1963 and 1974, Etaugh concluded "... that strength of attachment to mother is a function of the quality and intensity of mother-child

interactions rather than sheer availability of the mother or the number of caretakers" (op. cit.). Earlier studies had similarly concluded that mother's employment per se exerts little influence on the behavior of children (Hoffman, 1963; Siegel & Haas, 1963; Stolz, 1960).

The generally held belief prior to the 1960's was that maternal employment (while children were in infancy) was all 'bad' for the child. Referring to this legacy, Hoffman (1974) stated on the basis of his early research that "... this has been replaced by a new outlook -- that maternal employment had no effects at all". The absence of negative findings does not mean that mother's employment is irrelevant to the infant's relationship with his mother. The aforementioned author recognizes 'critical periods' in the development during which mother's absence may affect both cognitive and affective involvement and mother's full-time presence in the home with her infant is significant (Bronson, 1962; Dennis & Najjarion, 1957; Hunt, 1961). Nevertheless, it is concluded that "... we do not know whether periodic absence from the infant that is likely to go along with mother's employment is sufficient to undermine her potential as the object of the infant's attachment ..." and thus cause cognitive and affective loss (Hoffman, 1974). The author also cites many empirical studies of school age children which show no deficiencies which could be traced to mother's employment during the subjects' infancy. As a possible explanation it is stated that working mothers "especially in the middle class (make) a deliberate effort to compensate the child for (the) employment".

Studies not directly related to absence of the mother show that the amount of expressive or vocal stimulation or response that the

mother gives to her infant has a direct relationship to his development. The attempts to increase cognitive performance with the help of day care programs in young children who have a history of insufficient mother-child interaction have not been successful (Bronson, 1962). Yudkin and Holme (1963) speculated that an eight or nine hour workday must have a profound effect on the mother's own relationship with her young children.

Of all the previous studies, the one that is most closely related to the present one is that undertaken by Hock (1976) for the Office of Child Development, U. S. Department of Health, Education and Welfare. The purpose of the study was to evaluate the effect of maternal attitudes and child rearing practices on infant development during the first year of life. The investigator dealt with a sample of approximately 180 infants born in Columbus during 1973 and 1974. It was intended to have this sample balanced such that one-half the mothers were working and the other half non-working. There was also an attempt to balance the two populations with respect to socio-economic status, race and sex of the child. Due to attrition the balance with regard to both work status and other demographic variables was impaired.

As part of the study, Bayley Scales of Infant Development were administered at eight and twelve months of age, and a Strange Situation Test was administered at twelve months (tests were also administered at earlier ages but these did not result in significant findings). Hock found no effect of maternal employment on the Bayley Scales for either MDI or PDI. There were also no significant differences between the two work status groups in their attachment behaviors toward the mother.

However, "... the infants of nonworking mothers displayed significantly more intense contact resisting behavior (toward the stranger) than did the infants of working mothers." The study included an evaluation of the caretaking arrangements and found that children who were cared for in a group showed more resistant behavior to both the mother and the stranger than those who were cared for individually. This conclusion was based on rather small cell sizes and is recognized by the author as tentative. As an overall conclusion, Hock states "Employment status of the mother and the related use of non-maternal care does not influence the nature of the mother-child relationship as assessed in this study. Maternal characteristics other than work status per se are important as it is evident that maternal care giving behavior, attitude, and role perception affect infant social-emotional growth." This latter observation is based on statistically significant positive correlations between factors generally recognized as representing good parenting, such as high degree of perinatal involvement, interest in maternal role, etc., and the Bayley scores.

Hock's class of working mothers includes those who worked part-time but no separate correlations are provided for these. Hock's scoring of the Strange Situation Test is different from that used in the UCLA study, and thus specific comparisons can not be made. An overall difficulty in the evaluation of Hock's data is that she published only correlation coefficients between variables and not actual scores. However, the findings of her study are highly regarded within the Office of Child Development and the affiliated research groups.

CHAPTER 3

METHODOLOGY OF THE STUDY

The first section of this chapter describes the data sources used in this study and the nature of the tests that were employed to evaluate the child's development. The second section presents salient characteristics of the population. The third section discusses the statistical techniques used, the reasons for specific selections, and limitations of the resulting analyses.

SECTION 3.1 - DATA SOURCES

The central question addressed by this research is whether there is an effect on a child's development during the first year of life due to absence of the mother for employment or study. For this purpose data on the work status of the mother at the infant's age of five months and one year were obtained from the records of the Family Life Style Project at UCLA through the cooperation of the director of that project, Dr. Bernice T. Eiduson. The same data base also contained scores from a number of tests that evaluate child development.

The test used to judge overall development of the infants is that developed by Bayley as described in the previous chapter. The Mental Development Index (MDI) and the Psychomotor Development Index (PDI) scores from the Bayley Scale of Infant Development (BSID) were

separately evaluated. Scores for each index were obtained from tests conducted at ages of eight months and one year. The eight month test was administered in the child's home, that at one year in a laboratory setting. Ainsworth's Strange Situation Test (SST) was administered to the infants at the age of one year in the standard (laboratory) environment specified for that test, and scores from this were also evaluated as a part of this study. To determine the persistence of effects observed at one year, scores of an SST administered at the age of three years were also evaluated, and the mothers' work status at eighteen months and at two years and nine months was captured for analysis of differences observed in the second SST.

The data were obtained from the UCLA data base by case number. The association of employment and test data, and the definition of groups and aggregation of data in these were carried out as part of the present research. The statistical analysis of the resulting group measures is presented in Chapter 4. A listing of the data utilized at specific ages is shown in Table 3-1. The file numbers of the UCLA data source accessed for these variables are identified in Appendix A.

TABLE 3 - 1 DATA UTILIZED IN THIS RESEARCH

Data Item	Child's Age					
	5 mos.	8 mos.	1 yr.	18 mos.	2y9mo.	3 yrs.
Mother's work status	x		x	x	x	
Bayley Scale		x	x			
Strange Situation Test			x			x

All work status data that preceded or were concurrent with a test were analyzed as possible factors in affecting test scores. In

several cases the stability of the work status was also analyzed as a possible effect on the scores.

SECTION 3.2 - DEMOGRAPHIC DATA

The population from which these data were obtained is part of the 209 families of children born during 1973 and 1974 who made up the sample of the Family Life Style Project. The total sample comprised approximately 50 families in each of the following four life styles: single mothers (never married), living groups (religiously motivated or occasional), unwed couples (social contract families), and traditional families. The latter two groups, unwed couples and traditional families, comprise the population for the present study. The classification of life style is based on status at the birth of the child. Some changes in status took place during period covered by the study (primarily social contract families entering into traditional marriage) but during the first year the number of such changes was small.

In the preliminary analysis, social contract and traditional families were treated as separate groups but it was found that there was no significant difference in the effect of mother's work on the child's test scores among them. It was decided to drop the distinction in order to maintain a reasonable population size for each of the cells for the primary analysis in this study. The data presented in Chapter 4 therefore do not consider family status as a variable. The total population thus comprises somewhat over 100 families. Because of

missing data on either work status or test scores, the population available for a specific analysis rarely exceeded 80 infants. Analysis for stability of work status, which requires complete data at several intervals, could be carried out for only 50 to 60 infants.

The families participating in this study were all volunteers. Selection of traditionally married families was based on a random sample of obstetricians from the California AMA directory. Each physician was asked to nominate one woman who met the project criteria. She was contacted during the third trimester of her pregnancy and asked to participate. The non-traditionally married families were similarly recruited but referral sources included La Maze programs, physicians who perform home births, and other institutions utilized by individuals seeking alternative life styles. Participants were offered a small remuneration to motivate staying with the study. By virtue of this, and of very effective follow-up by project personnel, the attrition rate was remarkably small. After five years, 205 of the original 209 families were still active participants.

As may be inferred from the above, the entire population was living in California at the time of birth of the infant. Approximately 50 percent lived in the Los Angeles area, and the rest were about evenly divided between San Francisco and San Diego. All participants were Caucasians, the mothers were between 18 and 30 years old at the time of birth, and were drawn predominantly from middle and upper-middle class socioeconomic groups (58 percent of the parents were in these categories by the Hollingshead-Redlich classification; most of the remainder were stable working-class families). About three-quarters of the infants

were first-born, the others were second children.

Planning for, or attitude toward, work by the mother after the birth of the child were not selection criteria for the Family Life Style Project. As a result, the distribution of the population among the work status categories is non-uniform, and statistical techniques had to be adapted to cope with this. As might be expected, less than one-half of the mothers worked at all during the first year, and less than one-fifth worked full-time.

SECTION 3.3 - STATISTICAL TECHNIQUES

The review of prior research in this field had indicated that the mother's work status produces only small, subtle, and possibly inconsistent effects on the development of the child. It was therefore decided to focus on statistical techniques that can efficiently identify differences in small populations due to a single factor. Moreover, in view of the fact that the results of this study may be of interest to professionals in the social work and mental health fields with only minimal background of statistics, the potential for presenting results in non-statistical terms was also a consideration. Such a non-statistical discussion of the results is presented in Chapter 5.

The principal statistical tool that meets these criteria is the test of hypotheses about a single parameter. In the present context, a hypothesis is a statement that the mother's work status affects the development of the infant as measured by test scores. The specific statistical techniques utilized are Student's *t*-test for hypotheses

about the mean and Fischer's F-test for hypotheses about the standard deviation. These test are described later.

Since it is desirable to be cautious about formulating conclusions in a field of such high potential impact, the decision that work produces an effect should be arrived at only if there is conclusive evidence that the difference in scores is not due to a random variation. For this reason, the null hypothesis (i. e., the hypothesis which is sustained unless there is a high probability that it is false) is that no effect on test scores is produced by the mother's work status. The alternative hypothesis is that an effect is produced, and the direction of that effect (Increase or decrease) is selected on the basis of the underlying theory or of prior research data.

Because psychoanalytic theory predicts that periodic absence of the mother will have an unfavorable effect on the development of the child, the alternative hypothesis for the Bailey scores (which are an accepted Index of general Infant development) is that the mean for working groups will be lower. Because prior research had indicated a higher acceptance of strange persons or situations for the children of working mothers, the alternative hypothesis for the Strange Situation Test is that the mean for working groups is higher. Because working mothers may be expected to present a more homogenous group than non-working mothers, the alternative hypothesis for tests of the standard deviation was in all cases that mother's work will decrease the dispersion of the scores. There are no erroneous conclusions produced if the alternative hypothesis is formulated in the wrong direction (it will never be accepted in the presence of data that do not sustain it).

Negative signs of test statistics (in the t-test) and true fractions (in the F-test) alert the investigator to the fact that the data show a trend counter to that presented by the alternative hypothesis, and he may then decide on a different strategy for the analysis. In a few instances contrary test statistics are encountered in Chapter 4, and notes are provided in each case to indicate the significance of these.

The exact statistical level that is established to denote 'conclusive evidence' is a matter of judgment. If set extremely high (e. g., requiring 99.9% confidence that the alternative hypothesis is not accepted on the basis of random variations in the data), important effects which do not manifest themselves at that level might be overlooked. If set too low, spurious effects will lead to acceptance of alternative hypotheses when these should be rejected. Because of the exploratory nature of the present study there is emphasis on not overlooking possible effects, and a rather modest confidence level of 85 percent has been selected. This means that alternative hypotheses may be accepted when there is up to 15 percent probability that expected randomness of the data will lead to this result when the null hypothesis is indeed true. The probability of accepting the alternative hypothesis under these conditions is called the significance level and it is conventionally designated by the letter p . In our case $p < 0.15$, where the $<$ sign represents the fact that the alternative hypothesis will be accepted for significance levels no greater than 0.15. It follows from the above that a low number for p represents a high degree of confidence that a valid effect has been observed. In many cases the statistics obtained as part of this study permit confidence levels much greater

than 85 percent for acceptance of the alternative hypothesis, and the associated significance level is then shown in the tables of Chapter 4 in a line labeled ' $p < .$ '.

The statistical analysis comprises two phases. The first of these evaluates only the presence or absence of an effect due to the mother's work. The second phase (also referred to as detailed analysis) attempts to assess the specific nature of the effect found in the first phase or gross analysis. In the latter it is assumed that all test scores are Normally distributed (i. e., follow a Gaussian distribution). This assumption is valid for the Bayley scores (both by the construction of the test and by analysis of the scores obtained for the sample) but it is not valid for the scores of the Strange Situation Test. The latter represent a numerical transformation implemented by the UCLA research team of the extended ABC classification generally employed as an overall assessment of this test. The specific translation of the ABC's to numbers is different at the one year and three year levels and is presented in connection with the data from these tests in Chapter 4. In both cases the highest score represents the typical (and most frequently encountered) behavior pattern, and the distribution is therefore positively skewed (the mode is at or near the high end). The analysis of this data by means of statistical techniques calibrated for Normal distributions is not rigorous and the deficiency is made up in part in the detailed phase of the analysis presented in Chapter 4.

A Normally distributed random variable, such as an ensemble of test scores, is completely defined by two parameters: the mean and the standard deviation. If two groups of scores do not differ in either

mean or standard deviation it may therefore be concluded that the two populations from which these scores were obtained do not differ with regard to factors that affect these scores. This is the basis of the analysis carried out in Chapter 4. One group of scores is designated as the reference or baseline. In part A of the tables presented in Chapter 4 the scores of infants of non-working mothers are used as the baseline, and comparisons (of mean and standard deviation) are made for the scores of infants of part-time working mothers, full-time working mothers, and of all working mothers treated as a single group. In part B of each table the reference is the population of infants of non-working and part-time working mothers combined, and a comparison is made with the scores of infants whose mothers work full-time. This method of analysis covers all aspects in which the duration of the absence might affect scores, and it permits all comparisons to be evaluated by the simple statistical methods of test of a hypothesis about a single parameter. Moreover, the arrangement of data in part A of each table represents increasing involvement with work and thus permits trends in test achievement due to involvement with work to be easily recognized.

The effect of mother's work on the mean score was evaluated by Student's t-test. The test is based on the difference between the mean of the reference population and the mean of the group that is being compared. This difference is divided by the standard deviation of the means to yield the test statistic, which may also be thought of as a normalized difference (a given test statistic may represent a large difference for a population with widely dispersed scores or a smaller difference for a population with less dispersed scores). The test

statistic is then compared with the critical number found in tables of the t-distribution. If the test statistic is less than the critical number for the specified significance level and appropriate degrees of freedom, the null hypothesis is accepted (It is concluded that there is no statistically significant difference among the scores). If the test statistic exceeds the critical number, the alternative hypothesis is accepted.

In the formulation of the conventional t-test it is assumed that the reference population is infinite or that the mean of the reference population is exactly known. In the present study neither of these conditions is met. The mean of the reference population was calculated on the basis of a finite sample, and some random error may therefore be associated with its value. A modified form of the t-test was used which accounts for the resulting discrepancy. The exact test is described in Appendix B and a sample calculation is presented there.

The effect of mother's work on the standard deviation (dispersion) of the scores was evaluated by Fischer's F-test. The test statistic in this case is the square of the ratio of the standard deviations for the two groups to be compared. The test statistic is evaluated against the critical number for the specified significance level and appropriate degrees of freedom. If the test statistic is less than the critical number, the null hypothesis is accepted; otherwise the alternative hypothesis is accepted. The F-test inherently accounts for a finite reference population in terms of the degree of freedom for the denominator of the test statistic. An example of the use of the test is shown in Appendix B.

CHAPTER 4

STATISTICAL ANALYSIS OF THE DATA

This chapter presents the scores of the tests conducted at various ages together with the results of the statistical procedures discussed in the preceding chapter. Only the inferences immediately obtained from the statistical analysis are discussed here. The broader interpretation of the findings in the light of theory and prior studies is carried on in Chapter 5.

The present chapter is organized into three major sections which address the general analysis of the Strange Situation Test (SST), the general analysis of the Bayley Scales of Infant Development (BSID), and a detailed analysis for specific questions arising out of the general analysis sections.

SECTION 4.1 - ANALYSIS OF THE STRANGE SITUATION TEST

The One Year Test

The purpose of this analysis is to determine whether the mother's work has a statistically significant effect on the child's score on a SST administered at age one year. The mother's work status was recorded at the child's age of five months and again at one year and classified as non-working, part-time working, or full-time working. The

exact sources and criteria for this classification are described in Appendix A. The SST score utilized is the 'Expanded ABCs'. For the purpose of statistical analysis the scores were transformed into numerical ratings as follows (this transformation was already accomplished by 'recodes' in the original data source):

A1 - 3	B3 - 8
A2 - 4	B4 - 5
B1 - 6	C1 - 2
B2 - 7	C2 - 1

Statistical tests were used to compare the mean and standard deviation for each work classification at age five months and for certain combinations of work classifications as shown in tables 4-1A and 1B. In table 1A the reference or baseline is the population of children of non-working mothers, while in table 1B the reference is the combination of children of non-working and part-time working mothers.

TABLE 4 - 1

EFFECT OF MOTHER'S FIVE MONTH WORK STATUS ON STRANGER TEST AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	46	20	34	14
Mean score	m	5.98	6.04	6.29	6.64
Standard deviation	s	2.56	2.21	1.88	1.26
t-Test statistic	t'		0.10	0.62	1.31
degrees of freedom	df		44	80	49
significance	p <		-	-	0.1
F-Test statistic	F		1.34	1.85	4.13
significance	p <		-	0.05	0.005

TABLE 4 -1 (CONTINUED)

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	66	14
Mean score	m	6.00	6.64
Standard deviation	s	2.44	1.26
t-Test statistic	t'		1.42
degrees of freedom	df		40
significance	p <		0.1
F-Test statistic	F		3.75
significance	p <		0.01

The first null hypothesis is that there is no difference in the scores based on work status of the mother, and the alternative hypothesis is that the scores for children of working mothers are higher than those for non-working mothers. The null hypothesis is sustained unless there is at least 85% confidence ($p < 0.15$) by a modified form of Student's t-test (see appendix B) that work status of the mother causes a higher score. Where the difference in scores supports a higher confidence level this is also indicated in the tables.

The second null hypothesis is that there is no difference in the standard deviations of the scores due to work status of the mother, and the alternative hypothesis is that the standard deviation of scores among children of working mothers is smaller than that among the children of non-working mothers. The null hypothesis is sustained unless there is at least 85% confidence ($p < 0.15$) by Fischer's F-test (see Appendix B) that the standard deviations are different.

Against the reference population of infants of non-working

mothers, infants of part-time working mothers did not have statistically significantly different scores. For the combined working (part-time and full-time) population, there was no statistically significant difference in the mean score but the standard deviation was significantly smaller. Children of full-time working mothers had significantly higher mean scores and the standard deviation was smaller with a high degree of statistical significance. Against a reference population of infants of non-working and part-time working mothers, infants of full-time working mothers had higher mean scores and a smaller standard deviation of scores, both at a statistically significant level.

An equivalent evaluation of the effect of the mother's work status at child's age of one year on the SST administered at one year is shown in table 4-2.

The inference from these statistics is very similar to that for table 4-1. Infants of part-time working mothers show a slight, statistically not significant, increase in SST scores over infants of non-working mothers. For the combined working population, and for infants of full-time working mothers, the elevation of scores is at a statistically significant level, in the latter case at a highly significant level. Compared to infants of non-working and part-time working mothers, infants of full-time working mothers show a highly significant elevation in test scores and a significantly smaller standard deviation of scores.

TABLE 4 - 2

EFFECT OF MOTHER'S ONE YEAR WORK STATUS ON STRANGER TEST AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	56	22	40	18
Mean score	m	5.70	5.86	6.40	6.56
Standard deviation	s	2.30	2.40	2.08	1.40
t-Test statistic	t'		0.27	1.56	3.02
degrees of freedom	df		38	91	51
significance	p <		-	0.1	0.005
F-Test statistic	F		0.92	1.22	2.70
significance	p <		-	-	0.025

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	78	18
Mean score	m	5.75	6.56
Standard deviation	s	2.31	1.40
t-Test statistic	t'		3.11
degrees of freedom	df		44
significance	p <		0.005
F-Test statistic	F		2.72
significance	p <		0.01

Similar statistics are presented in table 3 based on mothers' work status throughout the first year (as determined by data taken at five months and one year). The following classification of mothers is used: (1) non-working at child's age of five months and at child's age one year, (2) working at least part-time at both dates but not working full-time at both (called Xcl. F in the table), (3) working either full-time or part-time at both dates, and (4) working full-time at both dates. The re-arrangement of the work status classifications was necessary in order to achieve reasonable population sizes. Note that

the total population covered by Table 4-3 is considerably less than that covered in Tables 4-1 and 2. The difference is due to the exclusion of mothers who worked at only one of the dates from Table 4-3.

TABLE 4 - 3

EFFECT OF MOTHER'S WORK STATUS DURING FIRST YEAR ON SST AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Xcl. F	P or F	Full
Population size	N	36	13	22	9
Mean score	m	5.5	5.77	6.18	6.78
Standard deviation	s	2.5	2.35	2.08	1.39
t-Test statistic	t'		0.35	1.13	2.05
degrees of freedom	df		24	54	26
significance	p <		-	0.15	0.05
F-Test statistic	F		1.13	1.44	3.23
significance	p <		-	-	0.05

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	49	9
Mean score	m	5.57	6.78
Standard deviation	s	2.44	1.39
t-Test statistic	t'		2.09
degrees of freedom	df		21
significance	p <		0.025
F-Test statistic	F		3.08
significance	p <		0.05

The inference from this table is again similar to that obtained from the two previous ones in that infants of full-time working mothers (and to a lesser degree infants from the combined working population), have significantly higher mean test scores and a smaller standard

deviation of test scores.

The overall message conveyed by these statistics is clear and consistent among all three tables: Infants of full time working mothers are a population that is distinct from that of infants of non-working mothers, and also from that of non-working and part-time working mothers combined. The difference in the means is most pronounced when the comparison is based on the mother's work status at child's age of one year. The difference in standard deviations is most pronounced when the comparison is based on the mother's work status at child's age of five months. Statistics based on continuing work status throughout the first year of life do not show a major difference from the statistics derived from work status at the individual dates.

The Three Year Test

The SST was again administered at child's age of three years. The primary purpose for analyzing the results of this test in the present context is to determine whether the effects observed at one year persist to a later age. Two key dates for mother's work status are considered -- at child's age of one year and at two years and nine months (the latter is also referred to as pre-test status). Mothers were classified as non-working, part-time working, and full-time working by the same criteria used in the one year test. An evaluation of the effect of mother's continuous work status is presented later.

The SST utilized is again the expanded ABCs. At age three a different transformation to numerical values was used in the original

data source and this has also been adopted here:

A1 - 8	B3 - 4
A2 - 7	B4 - 3
B1 - 6	C1 - 2
B2 - 5	C2 - 1

The primary change from the coding used at age one is to evaluate the A ('Calm') responses as appropriate at age three and thus to assign to these the highest numerical value. Most parts of the statistical analysis were also performed by using the same transformation to numerical scores that had been used at age one and the conclusions drawn from this were identical to those reported below. The effect of mother's work at child's age of one year is shown in Table 4-4.

TABLE 4 - 4

EFFECT OF MOTHER'S ONE YEAR WORK STATUS ON SST AT THREE YEARS

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	52	16	32	16
Mean score	m	6.27	6.44	6.50	6.56
Standard deviation	s	1.96	1.50	1.81	2.13
t-Test statistic	t'		0.38	0.57	0.49
degrees of freedom	df		34	72	24
significance	p <		-	-	-
F-Test statistic	F		1.71	1.17	0.85
significance	p <		-	-	-

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	68	16
Mean score	m	6.31	6.56
Standard deviation	s	1.85	2.13
t-Test statistic	t'		0.43
degrees of freedom	df		21
significance	p <		-
F-Test statistic	F		0.75
significance	p <		-

Although some slight increase in mean scores is evident as a function of mother's work, this increase is not statistically significant. Neither is there any statistically significant difference in the standard deviations among the work status classifications. In this instance the standard deviation of test scores for children whose mother was full-time employed was even slightly larger.

TABLE 4 - 5

EFFECT OF MOTHER'S PRE-TEST WORK STATUS ON SST AT THREE YEARS

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Work Status			
		Non-W	Part	P & F	Full
Population size	N	29	21	55	34
Mean score	m	6.62	6.09	6.16	6.21
Standard deviation	s	1.63	1.99	2.00	2.03
t-Test statistic	t'	-	-1.00	-1.13	-0.89
degrees of freedom	df	-	39	70	63
significance	p <	-	-	-	-
F-Test statistic	F	-	0.67	0.66	0.64
significance	p <	-	-	-	-

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	50	34
Mean score	m	6.40	6.21
Standard deviation	s	1.79	2.03
t-Test statistic	t'		-0.44
degrees of freedom	df		67
significance	p <		-
F-Test statistic	F		0.78
significance	p <		-

The effect of the mother's work status at child's age of 2 years and nine months (pre-test work status) on the child's score of the SST administered at age three is shown in Table 4-5.

Two differences will be noted between Tables 4-4 and 5: the number of non-working mothers is very much lower in Table 4-5, and the mean score of their children on the SST is in this case the highest of all the work status groups. The greater involvement of mothers in work is understandable at this age. However, as in Table 4-4, the differences in scores are not statistically significant by the criteria selected for this research. Note also that there is no consistent trend of involvement with work on the mean scores that was present in all the preceding tables (in particular, the mean score for children of part-time working mothers is the lowest in this case).

The effect of continuing work status of the mother on the child's score for the three year stranger situation test is shown in Table 4-6. Four dates were considered as criteria in this table: at child's age of 5 months, one year, 18 months, and two years nine months. The work classification is generated by the same method as was used for table 3. Non-working implies that the mother had this status at all four dates, and full-time working implies that the mother was working full-time at all four dates. Part- or full-time means that the mother was in one of these categories at all four dates, possibly changing between them. The excluding full-time category (Xcl. F) is comprised of mothers who worked at all four dates but were part-time workers on at least one of them.

TABLE 4-6

EFFECT OF MOTHER'S CONTINUING WORK STATUS ON SST AT THREE YEARS

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Xcl. F	P or F	Full
Population size	N	14	8	15	7
Mean score	m	7.07	7.12	7.00	6.86
Standard deviation	s	0.89	1.36	1.56	1.86
t-Test statistic	t'		0.08	-0.12	-0.26
degrees of freedom	df		19	29	12
significance	p <		-	-	-
F-Test statistic	F		0.43	0.33	0.23
significance	p <		-	*	*

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	22	7
Mean score	m	7.09	6.86
Standard deviation	s	1.48	1.86
t-Test statistic	t'		-0.30
degrees of freedom	df		9
significance	p <		-
F-Test statistic	F		0.63
significance	p <		-

* The reciprocals of the F-Test ratios are significant at the 0.05 level.

The small sample size for Table 4-6 makes one cautious about drawing inferences from it. The differences in mean scores are small and not statistically significant. There is also no consistent trend in the mean score as a function of the mother's involvement in work. Note that the Xcl. F. category has the highest mean score whereas children of part-time working mothers had the lowest mean score in Table 4-5. A particularly intriguing observation is that the mean scores for all categories in Table 4-6 are higher than those in Tables 4 and 5. This

Is further explored in Table 4-7.

TABLE 4-7
EFFECT OF STABLE WORK STATUS ON THREE YEAR SST

Data Item	Symbol	Work Status	
		Stable	Changing
Population size	N	29	53
Mean score	m	7.03	6.03
Standard deviation	s	1.55	1.91
t-Test statistic	t'		2.55
degrees of freedom	df		71
significance	p <		0.005
F-Test statistic	F		1.57
significance	p <		0.1

The column labeled 'Stable' comprises all entries of Table 4-6, i. e., those whose mothers have followed a consistent work (or non-work) pattern. The column headed 'Changing' represents all children whose mothers made one or more changes from non-work to work status (or vice versa) during the period covered by this study (5 months to 2 years 9 months). It is seen that stability of the work status has a significant effect on the mean (increasing it), and that it causes a modest reduction in the standard deviation.

A further investigation of the population whose work status had been changing was carried out in order to determine whether there were any underlying reasons for the lower mean score. Three classifications were considered: those who had a uniformly increasing trend in work (i.e., going from no work to work status and remaining there), those who did not follow a trend (going from no work to work and then back to no work), and those who had a decreasing trend (from work to no work and remaining there). The results are shown in Table 4-8.

TABLE 4 - 8
EFFECTS OF TREND IN WORK STATUS FOR CHANGING POPULATION

Data Item	Symbol	TREND IN WORK STATUS		
		Increasing	No Trend	Decreasing
Population size	N	22	27	4
Mean score	m	5.64	6.41	5.75
Standard deviation	s	2.01	1.91	1.71
t-Test statistic	t'		1.25	0.12
degrees of freedom	df		49	6
significance	p <		0.15	-
F-Test statistic	F		1.11	1.38
significance	p <		-	-

Using the group with increasing extent of work as the reference, it is seen that children whose mothers did not follow a persistent trend in work status had a somewhat higher mean score, just at the borderline of statistical significance by the criteria selected for the present research. The group that showed decreasing trend in work status was not significantly different from the reference. This group was very small and did not make a major contribution to the overall statistics of the population that underwent a change in work status. There were no significant differences in the standard deviations of scores for these three subgroups. All classifications considered in Table 4-8 had a significantly lower mean score than the stable population listed in Table 4-7 and had a lower mean score than any of the classifications considered in Table 4-6 (no tests for statistical significance were made between individual classifications of Tables 4-6 and 8).

SECTION 4.2 - ANALYSIS OF THE BAYLEY SCORES

The purpose of this analysis is to determine whether the mother's work has a statistically significant effect on the Mental Development Index (MDI) or on the Psychomotor Development Index (PDI) of the Bayley Scales of Infant Development (BSID). The BSID was administered twice: at the child's age of approximately eight months in the home, and at the age of one year in a laboratory setting. In both cases the scores analyzed here are adjusted for the exact age by methods that are part of the test procedure. For the eight month test only the mother's work status at age five months was a meaningful basis for the work classification. For the test at one year the work status at both five months and at one year were used for classification.

Statistical tests identical to those introduced in the preceding section were used to determine whether any difference in the mean scores or in the standard deviations could be attributed to the effects of the mothers' work. The null hypothesis is in both cases that there is no difference due to work status. The alternative hypothesis for tests of the mean is that the scores of children of non-working mothers are higher than those of working ones, and the alternative hypothesis for tests of the standard deviations is that this is larger for the non-working population.

The analysis of data pertaining to the eight month test are shown in Tables 4 - 9 and 4 - 10.

TABLE 4 - 9

EFFECT OF MOTHER'S FIVE MONTH WORK STATUS ON BAYLEY MDI AT EIGHT MONTHS

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	49	22	37	15
Mean score	m	107.5	102.64	106.5	112.2
Standard deviation	s	16.53	13.41	15.79	17.70
t-Test statistic	t'		1.31	0.28	- 0.91
degrees of freedom	df		52	81	23
significance	p <		0.1	-	-
F-Test statistic	F		0.66	0.91	1.15
significance	p <		-	-	-

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	71	15
Mean score	m	106.0	112.2
Standard deviation	s	15.70	17.70
t-Test statistic	t'		- 1.26
degrees of freedom	df		20
significance	p <		0.15*
F-Test statistic	F		1.27
significance	p <		-

* Full-time working group has higher mean score.

Children of non-working mothers had a higher MDI than children of part-time working mothers. The confidence associated with this statement is just at the border of 90%. On the other hand, children of full-time working mothers had a higher mean score than any other classification, not at a statistically significant level compared to the

non-working reference population but statistically significant by our criteria compared to the combined non- and part-time-working population in part B. The overall conclusion of these findings is that the sample size used here is too small to permit general conclusions to be drawn. This point is further addressed in Section 4.3.

TABLE 4 - 10

EFFECT OF MOTHER'S FIVE MONTH WORK STATUS ON PDI AT EIGHT MONTHS

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	49	22	37	15
Mean score	m	107.4	106.9	107.6	108.5
Standard deviation	s	9.20	13.60	12.29	10.50
t-Test statistic	t'		0.17	- 0.05	- 0.36
degrees of freedom	df		31	66	22
significance	p <		-	-	-
F-Test statistic	F		2.09	1.78	1.30
significance	p <		0.025	0.05	-

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	71	15
Mean score	m	107.3	108.5
Standard deviation	s	10.61	10.50
t-Test statistic	t'		- 0.42
degrees of freedom	df		21
significance	p <		-
F-Test statistic	F		0.98
significance	p <		-

The average PDI of all groups was within a narrow range, and none of the comparisons of the mean PDI showed a statistically significant difference. The standard deviation of the class of children of part-time working mothers was statistically significantly higher than

that of non-working mothers. Both the highest (133) and the lowest (70) score of the entire population were contained in this group. While the high score was approached by several children of non-working mothers (132, 131), the score of 70 must be considered an outlier. The next lowest score was 84 (child of a non-working mother), followed by several 90 and 91 scores that were found among all three work classifications. If the child that contributed this score is eliminated from the group, the mean PDI for part-time classification becomes 108.6 and the standard deviation is 11.02. This produces an F-statistic of 1.43 which is not statistically significant by our criteria. The F-statistic for the combined part-time and full-time working group was affected by the same outlier, although the effect here was less because of the larger population. Eliminating this child from the group would also bring this F-statistic into the non-significant range. It is thus concluded that mother's work status at child's age of five months does not have statistically significant effects on either the MDI or on the PDI at age eight months.

The effect of the mother's work status at child's age of one year on the MDI and PDI from Bailey tests administered at one year is shown in Tables 4-11 and 12, respectively. The statistical analysis uses the same techniques as were discussed above. While the children of full-time working mothers have the highest scores on these tests, none of the differences among the classifications is at a statistically significant level. Similar results for the PDI are shown below.

TABLE 4 - 11

EFFECT OF MOTHER'S WORK STATUS AT ONE YEAR ON MDI AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	58	22	40	18
Mean score	m	109.7	108.4	109.9	111.6
Standard deviation	s	9.84	11.64	10.24	8.21
t-Test statistic	t'		0.41	- 0.14	- 0.88
degrees of freedom	df		34	84	35
significance	p <		-	-	-
F-Test statistic	F		1.40	1.08	0.70
significance	p <		-	-	-

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	80	18
Mean score	m	109.2	111.6
Standard deviation	s	10.3	8.20
t-Test statistic	t'		- 1.04
degrees of freedom	df		32
significance	p <		-
F-Test statistic	F		0.63
significance	p <		-

TABLE 4 - 12

EFFECT OF MOTHER'S WORK STATUS AT ONE YEAR ON PDI AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	58	22	40	18
Mean score	m	100.7	97.5	100.0	103.0
Standard deviation	s	12.5	10.6	12.2	13.6
t-Test statistic	t'		1.15	0.29	- 0.63
degrees of freedom	df		47	88	28
significance	p <		-	-	-
F-Test statistic	F		0.72	0.95	1.18
significance	p <		-	-	-

TABLE 4 - 12 (CONTINUED)

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	80	18
Mean score	m	99.8	103.0
Standard deviation	s	12.1	13.6
t-Test statistic	t'		- 0.91
degrees of freedom	df		24
significance	p <		-
F-Test statistic	F		1.26
significance	p <		-

On this test, also, there was neither a consistent trend among the classifications nor any statistically significant difference. It is thus concluded that mother's work status at one year has no statistically significant effect on the child's MDI or PDI obtained from a Bailey test at one year.

Next, we examine whether the persistent work status of the mother during the first year of life had any effect on MDI or PDI at the child's age of one year. Three work classifications are established: mothers who worked neither at five months nor at one year (non-working), mothers who worked at least part-time at both dates but not full-time at both dates (part-time), and mothers who worked full-time at both dates (full-time). Short designations of these categories were given in parentheses. Data from this analysis are shown in Table 4-13 for MDI and in Table 4-14 for PDI.

In this comparison the children of non-working mothers have the highest scores but the differences in neither mean nor in the standard deviations are at statistically significant levels.

TABLE 4 - 13

EFFECT OF MOTHER'S WORK STATUS DURING THE FIRST YEAR ON MDI AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	32	14	23	9
Mean score	m	112.1	108.5	108.7	109.1
Standard deviation	s	10.67	13.91	11.71	8.21
t-Test statistic	t'		0.86	1.09	0.90
degrees of freedom	df		21	46	18
significance	p <		-	-	-
F-Test statistic	F		1.70	1.20	0.77
significance	p <		-	-	-

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	46	9
Mean score	m	111.0	109.1
Standard deviation	s	11.71	8.20
t-Test statistic	t'		0.59
degrees of freedom	df		17
significance	p <		-
F-Test statistic	F		0.49
significance	p <		-

TABLE 4 - 14

EFFECT OF MOTHER'S WORK STATUS DURING THE FIRST YEAR ON PDI AT ONE YEAR

A. Reference Population: Children of Non-Working Mothers

Data Item	Symbol	Non-W	Work Status		
			Part	P & F	Full
Population size	N	32	14	23	9
Mean score	m	103.7	99.3	101.0	103.7
Standard deviation	s	11.09	11.84	12.88	14.60
t-Test statistic	t'		1.19	0.81	0.00
degrees of freedom	df		25	45	11
significance	p <		-	-	-
F-Test statistic	F		1.13	1.35	1.73
significance	p <		-	-	-

TABLE 4 - 14 (CONTINUED)

B. Reference Population: Children of Non- and Part-Time Working Mothers

Data Item	Symbol	Work Status	
		Non-& Part	Full
Population size	N	46	9
Mean score	m	102.3	103.7
Standard deviation	s	11.38	14.60
t-Test statistic	t'		- 0.27
degrees of freedom	df		10
significance	p <		-
F-Test statistic	F		1.64
significance	p <		-

It is concluded that continuous work status of the mother during the first year does not have statistically significant effects on either the MDI or the PDI from a Bailey test administered at one year of age.

SECTION 4.3 DETAILED STATISTICAL ANALYSIS

As was already mentioned in Section 3.3, the scores of the Bailey tests follow a Gaussian distribution which is completely defined by the mean and the standard deviation. Since work status of the mother did not account for statistically significant differences in either mean or standard deviation of the scores, a detailed statistical analysis of the Bailey scores is not warranted.

It may be of some interest to discuss the sensitivity of the statistical procedure used for the analysis of the results of the BSID. The critical number of the t-distribution for 85 percent confidence and 20 degrees of freedom (typical of the comparisons involving full-time working mothers in Tables 4-9 through 14) is 1.11. The denominator of

the fraction which forms the test statistic ranges between 3 and 4 (see Appendix B). For the lower one of these values, the discrimination of the test is therefore a difference in scores of 3.33, for the upper one it is 4.44. These numbers are equivalent to one-third to one-fifth of the standard deviation of the scores, and may be considered to provide a fair degree of discrimination. The controlling factor in determining the discrimination of this test is the number of full-time working mothers. If the population in this category could be increased to between 80 and 100, a difference in scores of approximately two points would become statistically significant.

In the Strange Situation Test a detailed statistical analysis is required for two reasons: (1) It is acknowledged that the distribution of these scores is not Normal, and hence not uniquely defined by the two parameters which were analyzed in Section 4.1, and (2) significant differences in scores based on work status of the mother were detected, and these should be further explored in detail.

Where a Normal distribution of test outcomes can not be postulated, the most commonly used method of statistical analysis is Pearson's Chi-square procedure, also called 'goodness of fit' test because it evaluates how well two or more separate distributions fit category by category [HAYS73]. Unfortunately, because it makes no assumption at all about the shape of the distribution, the procedure does not have much power of discrimination. This will be shown by applying it to the scores of the SST administered at one year with subjects classified by mother's work status at one year. The gross analysis for this population is presented in Table 4-2. It was found

there that the children of non-working and part-time working mothers did not differ significantly but that there was a highly significant difference (for both mean and standard deviation) between the children of non-working and full-time working mothers.

To perform the Pearson test, the frequencies of observations (number of scores) in each interval of the distribution must be available. It is generally recommended that the expected number of observations in each cell be not less than five. This criterion can not be achieved with our small sample. To achieve reasonable cell populations without sacrificing discrimination between scores, the aggregation of two scores per cell was found advantageous. The result is shown in Table 4-15. The infants of non-working mothers were taken as the reference population, and the expected frequencies (exp) for other populations were computed on the basis of the proportion of the total population for these work status categories to the non-working population. The actual frequencies (act) are also shown.

TABLE 4 - 15

FREQUENCIES FOR ONE-YEAR SST BASED ON WORK STATUS AT ONE YEAR

Score	Non-W (act)	Part-Time (exp) (act)	Full-Time (exp) (act)
1-2	6	2.44 3	2 0
3-4	12	4.89 2	4 2
5-6	10	4.07 6	3.33 4
7-8	26	10.59 11	8.67 12
Total	54	22	18
Test statistic (Chsq)		2.76	4.41
Critical number (85%)		5.53	5.53

Thus, the Pearson procedure not only failed to establish a significant difference between the scores of infants of non-working and part-time working mothers, but it also failed to establish a significant difference between the scores of infants of non-working and full-time working mothers. Yet this latter difference had been clearly indicated in Table 4-2 and it is also quite evident from the comparison of expected and actual observations in the last two columns of Table 4-15 (keeping in mind that the expected number of observations is based on the relative frequency of scores in the non-working population). It is thus concluded that Pearson's Chi-square procedure does not offer an improvement over the analysis carried out in Section 4.1, and the alternative hypotheses accepted there represent the best identification of differences that can be achieved with conventional techniques.

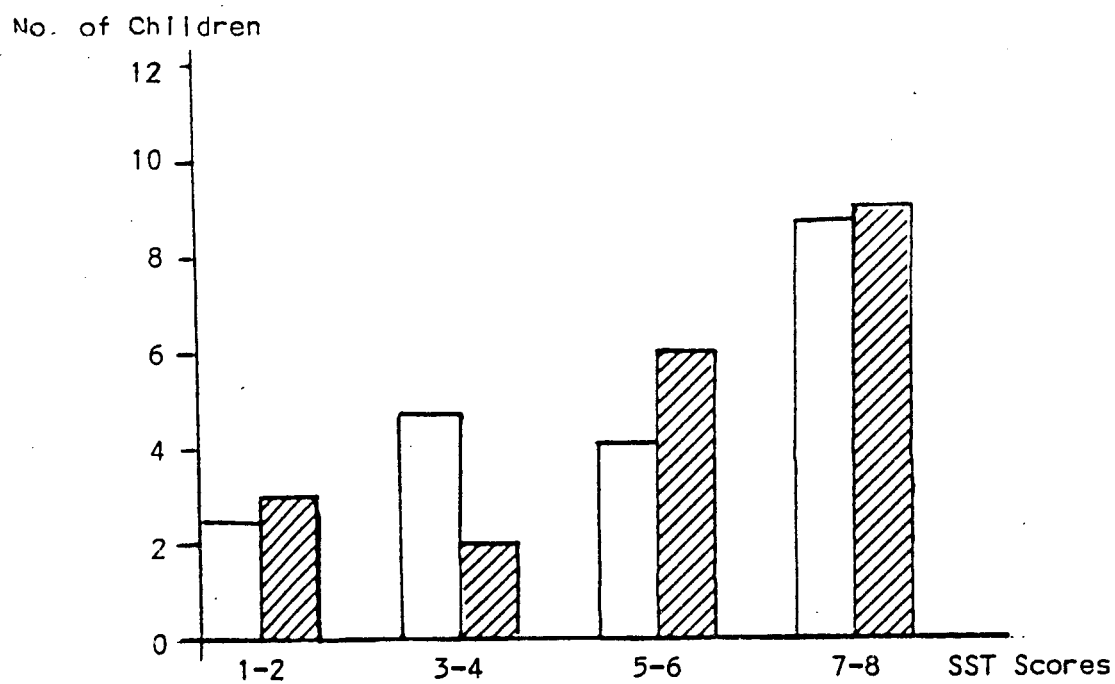
There remains the detailed investigation of differences that were found. The most significant ones were the higher mean SST scores, and the smaller associated standard deviations, for children of full-time working mothers in Tables 4-1 and 2. As is evident in Table 4-15, the reason is the absence of any infants with scores 1-2, and the low proportion (50 percent of the expected number) with scores 3-4. A correspondingly higher proportion of the total population is contained in the category that scored 7-8. This shift in populations accounts for both the elevation of the mean and the reduction in the standard deviation (the latter because the lower tail of the distribution is lacking).

The expected and actual values of scores for infants of part-time and full-time working mothers, based on a reference population

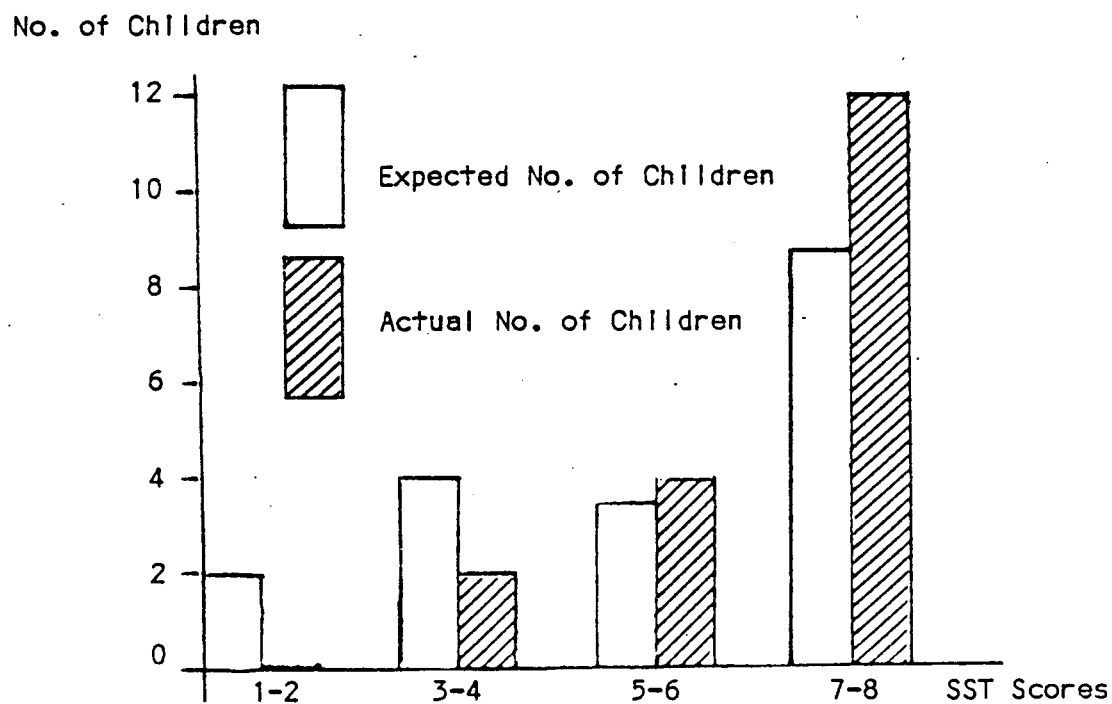
of non-working mothers, are compared in graphical form in Figure 4-1. The actual scores of infants of part-time working mothers are seen to be higher or lower than the expected values in a nearly alternating pattern which indicates no consistent difference. On the other hand, scores of infants of full-time working mothers are consistently lower than the expectation in the lower scoring categories and consistently higher in the higher than the expectation in the higher scoring categories. Moreover, the greatest differences in either direction are experienced at the extremes.

The statistical significance of the difference between the expected and actual population for a given score range on the SST can be evaluated by means of the cumulative Poisson distribution. This method shows that the population deficiency for infants of full-time working mothers in the 1-2 and in the 1-4 (combined 1-2 and 3-4) score ranges is significant by the criteria adopted here ($p < 0.15$). None of the other differences meets the significance criterion.

By the scoring used for the one year SST, scores 1-2 represent the 'C' children of Ainsworth's ABC categories, the group that is also characterized as 'falling apart' on the stressful episodes of the test. Scores 3-4 represent the 'A' children, also characterized as 'calm' or 'undemonstrative'. The most significant finding of the statistical analysis of the data is that children of full-time working mothers tend to be underrepresented or not represented at all in these lower scored categories on the one-year SST. At the three year test this distinction was no longer valid, although the children of mothers who had worked at one year still had a slightly higher mean score (not statistically significant).



A. CHILDREN OF PART-TIME WORKING MOTHERS



B. CHILDREN OF FULL-TIME WORKING MOTHERS

FIG. 4 - 1 COMPARISON OF EXPECTED AND ACTUAL POPULATIONS
ON THE ONE YEAR SST.

CHAPTER 5

INTERPRETATION OF FINDINGS

The first section of this chapter summarizes the findings of the statistical analysis in non-statistical terms. The second section discusses these findings in the context of the environment of the study and in the light of related prior studies. Then the findings are reviewed against the theoretical background developed in Chapter 2. The final section covers the limitations of this study.

SECTION 5.1 - SUMMARY OF FINDINGS

Under two separate headings, Strange Situation Test and Bayley Scales, the findings developed in the previous chapter are interpreted here in non-statistical terms. Qualifications and limitations of the statistical methods are therefore not covered, and the reader interested in a rigorous analysis is referred back to Chapters 3 and 4.

5.1.1 Findings of the Strange Situation Test

At the age of one year, children of full-time working mothers had higher average scores on the SST than children of non-working mothers. This finding was particularly pronounced with regard to the mother's work status at one year (Table 4-2) but it was also evident

with regard to the mother's work status at five months (Table 4-1). These findings were supported by a general trend of increasing average scores as commitment to work increased (non-work to part-time to full-time). The scores of children whose mothers worked full-time at both the five months and one year benchmarks (and who can therefore be presumed to have worked throughout that period) were about the same as those of mothers identified as working at one year without reference to prior status (comparison of Tables 4-2 and 4-3).

The detailed analysis (Table 4-15) showed that none of the children of full-time working mothers were in the C category, which designates the greatest degree of disturbance on this test. The representation of the children of full-time working mothers in the A category was also lower than expected; this category is also considered non-normative.

The association of numerical scores with the overall ratings of the SST (conventionally expressed as ABC's) is unique to the UCLA study, and for this reason no comparison with scores of a general population is possible. However, the distribution of the alphabetical categories for the population of the present study is essentially identical to that reported by the originator of the SST: about 20 percent A, 70 percent B, and 10 percent C (Ainsworth, 1978). Although the population of the present study is small and is taken from a specific socioeconomic sector (see Section 3.2), there is therefore no indication that these results were obtained on an atypical sample.

The scores of the SST administered at three years do not show any effect that can be associated with the work status of the mother

either at one year or at two years and nine months (Tables 4-4 and 4-5). There is also no effect of work status per se when that classification is based on continuous adherence to a given status at ages 5 months, one year, eighteen months, and two years nine months (Table 4-6). However, it is noted that the children of mothers who had a stable work status throughout this period had higher mean scores on the three year SST than children whose mothers had changing work patterns (Table 4-7). Within this population of changing work status, the 'no trend' category, where changes were usually minor (e. g., going from no work to part-time work and back to no work) had higher scores than those whose mothers had an increasing or decreasing commitment to work (Table 4-8). Because the evaluation of the three year SST was undertaken only to assess the continuation of patterns observed at one year, no further analysis of this effect of changing work status is attempted in this volume. In general it is concluded that the higher scores for children of full-time working mothers observed at one year did not persist at the age of three years.

5.1.2 Findings from the Bayley Scale

The Bayley Scales of Infant Development were administered at eight months and at one year. The Mental Development Index (MDI) and the Psychomotor Development Index (PDI) were separately evaluated at each of these ages. These tests were selected as an overall measure of infant development that would capture a variety of effects that might be due to the work status of the mothers. The statistical analysis did not

show significant effects due to the mother's work at any age and any index (Tables 4-9 through 14). There was a notable absence of a trend in the BSID scores with mother's involvement in work. In most cases the scores of infants whose mothers worked part-time were slightly lower than those whose mothers did not work, but the scores of infants whose mothers worked full-time were slightly higher than those of both of the other categories.

At eight months, the average MDI and PDI of the population analyzed here were higher than those for the UCLA study as a whole (107.1 vs 103.6 on MDI and 107.5 vs. 105.6 on PDI). The Family Life Style Project noted that the traditionally married group had significantly higher scores. That group made up 50% of the sample studied here and only 25% of the entire Project population. The analysis of the overall scores by UCLA indicates that they are comparable to those obtained for a large national sample (Broman, Nichols & Kennedy, 1975). At one year the sample reported on here conformed closely to the UCLA sample (109.6 vs. 109.6 on MDI and 100.4 vs. 98.3 on PDI). The changes reported from the eight months results agree in both cases with those reported for the entire Project population. The dispersion of scores within a given group was also about the same for all indices and all populations discussed above.

These findings indicate that the BSID scores for the population studied here were reasonably typical of those of a national sample, and that these scores were not materially or consistently affected by the mothers work status during the first year of life.

SECTION 5.2 - INTERPRETATION IN THE CONTEXT OF THE STUDY

This section addresses the validity and consistency of the results discussed above. The most significant effect observed is that children whose mothers worked (particularly full-time) had higher scores on the Strange Situation Test administered at one year than children whose mothers did not work. The statistical significance of this effect is quite high ($p < 0.005$, see Table 4-2), and it is further supported within this study by (a) the consistently higher scores for children whose mothers worked full-time when that status was assessed at other time periods (Tables 4-1 and 4-3) and (b) the consistent increase in scores with maternal involvement in work (Tables 4-1 through 3).

Further corroboration of this effect is found in an earlier study (Hock, 1976) which also used the SST at one year to study the effects of mothers' work status. The scoring of the SST in that study is quite different, and this precludes any direct comparisons. However, the overall conclusions of the previous study are that there is no major effect due to work status on behavior in the SST directed toward the mother. A significant increase in contact resistance and proximity avoidance with respect to the stranger for children of non-working mothers. If an overall (ABC) score had been derived from these observations, it would therefore tend to be higher for children whose mothers worked (no distinction between part-time and full-time work was made there).

It may therefore be concluded that there are neither internal inconsistencies within this study nor conflicts with other studies

regarding the finding that mother's Involvement with work tends to be associated with higher scores on the SST administered at one year. After having cited all pertinent support for this statement, it is also appropriate to mention what it does not mean. Uppermost in this category is that a high score on the SST as used in this study necessarily indicates superior development or maturity on the part of the infant, either at the time that the test is given or as a predictor for a later age. The SST measures reactions to rather specific situations that are assumed to be 'strange', and the increase in scores may be due to the fact that they are less 'strange' for children of working mothers.

There is also a need to caution that the statistical correlation between high scores on the SST and the mother's Involvement in work does not constitute proof of a cause and effect relationship. The same correlation can be observed for causes originating in the infants (e. g., the most fearful or disturbed infants preventing their mothers from going to work by their behavior), as by causes originating with the mothers (e. g., the more competent mothers opting for work). The examples were cited to emphasize the distinction between correlation and causation. They are purely hypothetical, and there is no evidence in the present study for or against either of them. However, the previously cited study by Hook includes some evidence that mothers who considered themselves irreplaceable (in their maternal role) in prenatal and early postnatal interviews had a lower tendency to go to work and also had children who exhibited a higher degree of disturbance on the SST at one year. Neither the present nor previous studies imply that a

mother picked at random can, by going to work, cause the child's SST score to increase or in any other way favorably affect his development.

Next, the question must be addressed whether the findings on the three year SST invalidate or circumscribe the conclusions that might be drawn from the one year test. In this regard it must first be noted that there are extremely few prior references to use of the SST at three years, and none at all that can be compared with its use in the Child Development in Alternative Life Styles Project. The observations made as part of the test, and later translated into scores, are keyed to behavior (and differences in behavior) typical for one year olds. That responses appropriate at one year are not appropriate at three years (and vice versa) motivated the change in translation of the expanded ABC categories to numerical scores by the Project (see Section 4.1). The SST at three years can hardly be called a standard test at the present time, and separate research is required to establish whether it is meaningful. The UCLA reports indicate little correlation in the results at one year and at three years for their entire population, and the specific comment is made that not a single child placed in the C category at age one was placed into the same category at age three. The failure of the results of the three year SST to agree with those of the test given at one year cannot be taken as a positive indication that the results seen at one year are transitory, and on the other hand it does not indicate that they are persistent. A prudent statement is that correlation between work and high scores on the SST was seen at one year, and that persistence of these findings to a later age has not been confirmed by the research reported here.

The analysis of the Bayley MDI and PDI scores did not show any conclusive effects that can be correlated with mothers' work status. Certain weak tendencies, well below the level of statistical significance used in the present study, are seen in that the scores of the children of part-time working mothers are lower, and of children of full-time working mothers are higher, than those of children of non-working mothers. A much larger population will have to be studied to elevate the statistical significance of these effects (if they exist). Hock (1976) used the eight month BSID as a criterion of child development in her studies. In spite of a slightly larger and more work-status balanced population, she, too, found no correlation between work status and Bayley scores.

The analysis of average BSID scores of groups of infants whose mothers followed different work (or non-work) patterns during the first year of life showed no effect due to these differences in work status. Insofar as the Bayley scales are a measure of overall development, this finding therefore implies that the development during the first year of life is not affected in a major way by the mother's work status. Neither the Bayley scores nor any other measures analyzed here attempt to assess latent effects or to predict emotional or behavioral adjustment of the child at a later age. It is also cautioned again that these findings do not imply that there will be no effects on an arbitrary child when his mother leaves him to go to work.

SECTION 5.3 - INTERPRETATION OF FINDINGS VIS-A-VIS THE THEORIES

This section attempts to formulate the findings described above in the light of the theoretical background presented in Section 2.1. At first glance the effect of mothers' work on the development of their infants evidenced by the tests administered during the first year does not seem to agree with what would be predicted by the psychoanalytic theories discussed in Chapter 2. All of the theorists regard the physical separation from the mother (which is implicit in her going to work) as harmful to attachment formation and hence likely to hinder the further emotional development. To the extent that the BSID captures this development, no adverse effects arising from the mothers' work were seen here or in the most closely related prior study. Specific measures of attachment behavior (included in the SST but not separately analyzed here) were described as not affected in a prior study. The overall reaction to strange situations is in the present analysis shown to be favorably affected by the mother's going to work.

A more detailed review will considerably narrow the perceived contradictions between the theories and the results of the tests. First of all, with respect to Spitz's work, the population studied here was not exposed to maternal deprivation as he uses the term (in connection with institutionalized children and long term absence of the mother). Mahler's and Bowlby's theories are more applicable to the environment of the present study but there exists a wide divergence of methodology. The previous work had been based on observations of individual children, frequently in a clinical setting and without controls. The emphasis had

been mostly on longitudinal observations of a small population. It is possible that a specific behavior pattern that followed separation from the mother will persist, even over a fairly long period, although the initial anxiety that gave rise to this behavior has been dissipated. Since the behavior was (in the beginning correctly) assessed as a measure of anxiety, there is no obvious reason in the individual case observation to change this assessment. There may also be a tendency in clinically oriented studies to focus on special populations.

In contrast, the methodology followed here uses observations on groups at specific ages (and without primary controls on the onset of the mother's work). In this approach it is not possible to measure specific reactions to changes in the availability of the mother. As explained in the preceding section, a general inventory of infant development was used to capture the effects and the responsiveness of that instrument to present or past emotional stresses is open to question. Some reservations must also be expressed regarding to validity of the Strange Situation Test even though it is directly motivated by the theories of separation anxiety and stranger anxiety. The short duration (three minutes, typically) of the individual episodes limits the observation of the complete reactions that a child might have to separation and encounter of strangers.

The present findings do not directly suggest that earlier investigators were biased to seeing the mother in a purely domestic role, as is claimed by the sociological studies cited in Section 2.2. Nevertheless, it must be recognized that some bias might have been present, and if it was it would most likely result in failure to dwell

on positive, adaptive behavior after the initial anxious reactions.

The interpretation of the findings most consistent with the psychoanalytic theories is that there may be harmful effects of separation from the mother due to work, but that these are not of such magnitude that they produce a pronounced obstacle to normal development in most cases. The adverse effects of the daily separations may also be compensated for by a more positive attitude on the part of the mother during the contact periods, or, conversely, a lesser feeling on the part of the mother that she is sacrificing a career or education in order to care for the infant. The observations reported in Section 5.1 also support a hypothesis that reactions to strangers may become less anxious when there is a frequent exposure to being cared for by a person other than the mother. Finally, the mothers' expectations of their role may have a significant effect on the child's reaction to the separation associated with the mother's work status.

SECTION 5.4 - LIMITATIONS OF THE STUDY

A factor which inhibits drawing broad conclusions from this study is that in our sample the mothers who went to work were self-selected. They may, or they may not, be significantly different in their relation with their infants from non-working mothers. If there are indeed differences, these may have produced effects on the test scores which can not be separated from the effects of the work status under the present methodology. This is a matter of great importance which is discussed below as a topic for further investigations.

Among other recognized limitations of this study are:

Small sample size of the part-time and full-time working groups (typically 20 mother-infant pairs in each)

2. Population drawn from a narrow socio-economic and geographical environment
3. Essentially no coverage of effects that are latent during the first year but manifest themselves later. The analysis of the three year SST (which was intended to address that point) must be regarded as inconclusive.
4. The effect of different caretaking arrangements was not evaluated. In particular, the role of (and the attachment of the infant to) the father may be significant where the mother is a full-time worker.
5. The use of a single score for the SST rather than scores for individual episodes or reactions.
6. There was no accounting for the sex of the children. At least one earlier study found mild differences in the separation reaction between boys and girls.

It is also recognized that this study utilized only observable behavior of the children. Internal processes were not captured by the methodology used here and were therefore not included in the analysis.

CHAPTER 6

CONCLUSIONS AND USE OF FINDINGS

This study investigated the effect of mother's work (employment or study) on the development of infants for a population of approximately 100 mother-infant pairs drawn from Caucasian, predominantly middle-class backgrounds in California. The first year data were acquired during 1974-75.

The conclusions drawn from the study are summarized in the first section of this chapter, and their relation to applicable theories is also discussed there. The next section presents the implication of the findings for clinical practice, and the final section derives recommendations for further studies from the background gained on the present one.

SECTION 6.1 - CONCLUSIONS

The two principal conclusions are that full-time work of the mother has no adverse effects on

1. development of infants generally as measured by the MDI and PDI of the Bayley Scales of Infant Development (BSID) administered at eight months and one year of age
2. social development as measured by the Strange Situation Test (SST)

administered at one year.

The above effects were noted for all tests with respect to the mother's work status at the infant's age of five months. For the tests administered at one year these effects are also valid with respect to the mother's work status at that time. The above findings are in general agreement with those reported earlier in a study of a more broadly based population in Columbus, Ohio.

The most interesting result of this study is that at the age of one year, children of full-time working mothers had higher average scores on the SST than children of non-working mothers. This finding was particularly pronounced with regard to the mother's work status at one year, but was also evident with regard to the mother's work status at five months. In addition, there was a general trend toward increasing average scores with commitment to work. None of the children of full time working mothers were in the C category which is comprised of children who exhibit the greatest difficulties around attachment to their mothers. The scores of the SST administered at three years do not show persistence of these effect. However, the children of mothers who had a stable work status throughout this period had higher mean scores on the three year SST than children whose mothers changed work status. This raises possible questions about the influence of maternal characteristics which are addressed as part of the recommendations at the end of this chapter.

The most likely explanation for the results of the analysis of the SST is that children whose mothers worked found the "strange" situation less strange than those of the non-working mothers simply

because of greater exposure to such situations and the need to adapt to strangers. There is also a need to caution that the statistical correlation between high scores on SST and the mother's involvement in work does not constitute proof of a cause and effect relationship. It is also pertinent to mention what the findings do not necessarily mean that children of working mothers are 'better off'. At the same time, however, this suggests that the experience of children of working mothers might equip them to deal with strange situations and strangers. The SST scores measure reactions to a specific situation and are not a comprehensive index of normative development.

There was a notable absence of a trend in the BSID scores with mother's involvement in work. The findings relative to the BSID are in agreement with those of a prior study which showed that the scores are not materially or consistently affected by the mother's work status during the first year of life.

These findings contrast with what psychoanalytic theories relating to mother-child separation during the first year of life lead us to expect. However, it must be recognized that the theories were themselves developed from a large body of observations. It is therefore important to identify the differences in the populations under study and in the methodology that may account for this contradiction. Three major factors must be considered in this connection:

1. The duration of the separation - the observations of most of the psychoanalytic theoreticians were conducted under stressful circumstances that involved a long-term separation (e. g., institutionalization of the child, hospitalization of the mother);

the separations due to work which were studied here are less traumatic and of much shorter duration. Thus they permit the mother to remain the main caretaker despite her daily absences.

2. The method of observation - the investigations on which the psychoanalytic schools of mother-child separation are based used longitudinal studies, frequently initiated at, or very shortly after, a severe change in the availability of the mother; the present study used horizontal comparisons of infants controlled as to age and work status of the mother but without explicitly taking into account the time since the mother's start of work. Adverse effects are much more likely to be seen under the former method, particularly under closely spaced observations that were usually employed. The tests used in the present study measure behavioral manifestations and do not claim to reflect the totality of inner processes; tools used by the earlier researchers frequently focused on specific difficulties brought on by the separation but may not have encompassed overall development of the infant.
3. Societal Influences - the pioneer studies of mother-child separations on which the psychoanalytic theories are based were conducted at an earlier time, in an environment in which it was the normal expectation for the mother of an infant to be at home; the present study deals with metropolitan populations in the mid-1970s when it had become much more accepted for mothers to leave the home even when their children were still very young. That the mothers' own needs interact with the effects of separation is conjectural at this time, and further studies in this area are suggested below.

It must also be mentioned that less than one-half of the mothers in this sample worked at all at the infant's age of one year, and less than one-quarter worked full-time.

The findings of the present study therefore do not contradict those of the psychoanalytic schools per se, but they suggest that some other factors bearing on the effects of mother-child separation due to work must also be considered today.

SECTION 6.2 - IMPLICATIONS FOR CLINICAL PRACTICE

The above interpretation of the results of the study is significant for clinical applications. The practitioner need not feel constrained to view potential consequences of the absence of the mother due to work only as impairment of the mother-infant bond. Rather, each case can be evaluated individually, considering strengths and needs of mother and child. The effects of work-related separation, insofar as they are measured by the tests used in the present study, need not be detrimental to the child's development. The exposure to additional caretakers may under the right circumstances be beneficial in preparing the child for future contacts with other than primary persons and unfamiliar environments. The need to tolerate such contacts is increasing at the present time due to changes in the family and in social institutions.

Although the results reported above are consistent with those of several other empirical studies, our present state of knowledge does not rule out that subtle effects due to daily separations may manifest

themselves in adverse reactions under conditions which were not encompassed in the limited tests employed here.

SECTION 6.3 - RECOMMENDATIONS FOR FURTHER STUDY

The present study was exploratory in nature, and the identification of subjects for further research is therefore an essential part of the conclusions. There can hardly be any doubt that the effects of the mothers' work status on infant development and maternal well-being are of great significance in our society. The mother-child interactions are complex, and in depth studies of individual factors contributing to this relationship are essential. Some suggestions along these lines are:

1. Study populations drawn from a variety of socio-economic and geographical environments.
2. Study the effects of different caretaking arrangements. In particular, the role of (and the attachment of the infant to) the father may be significant where the mother is a full-time worker.
3. Evaluate individual factors of infant tests. A particular example is the evaluation of individual episodes in the Stranger Situation Test.
4. Include follow-up to a later age so that effects which manifest themselves only then can be evaluated.
5. Account for the sex of the children. At least one earlier study found mild differences in the separation reaction between boys and girls.

6. Investigate the role of the infant's temperament on toleration of daily separations.
7. Study the influence of maternal characteristics on the infant's ability to tolerate daily separations.

To permit a more meaningful evaluation of psychoanalytic theories against the findings of a horizontal study, the time since last change in mother's work status should be included as an explicit variable. More frequent observations of the children is also desirable but it must be realized that this is expensive and may not be feasible for a large sample.

A rather challenging tentative finding is that consistency of work status, rather than the status by itself, may produce effects. This should be explored in further work.

Several possibilities for the interaction of maternal needs and characteristics with the effects of work-related separation have already been mentioned. Research in this area is urgently needed in support of clinical practice. Particularly significant will be differential studies between economically necessary work and that undertaken for other maternal needs. Regardless of the motivation of the individual mother, it will also be important to evaluate the contribution of the environment, e. g., by comparison of the effects of separation in communities that differ in the percentage of mothers of young children who stay at home.

Current sociological trends will make the findings of such studies of interest to an increasing number of families and will equip the clinician to provide the necessary help to both mother and child.

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APPENDIX A

DATA SOURCES

All data for this research were obtained from the computer data base of the UCLA Project on Child Development in Alternative Family Life Styles through the cooperation of the Director of that project, Dr. Bernice T. Elduson. The data base is organized by Forms, roughly corresponding to a specific age or event in the life of the children encompassed by the study, and each Form contains a number of Variables, these being the files of a specific data item for all of the children. In the following the references to the computer data base are given in format FxxxVyyy where xxx is the Form number and yyy the Variable number. Leading zeros are suppressed for all numbers. In several cases the relation between the variables obtained from the data base and their use in this research project is obvious, e. g., a test score is used unchanged. Where this is not the case, the relation is explained in the Remarks column of table A-1.

TABLE A - 1 SOURCES OF DATA UTILIZED IN THIS RESEARCH

Item	Age	Source	Remarks
Mother's work status	5m	F32V613/615	See note 1
"	12m	F133V11/17	See notes 1 and 2
"	18m	F105V328/29/37	See notes 1 and 3
"	2y9m	F120V12/44	See notes 1, 2 and 4
Stranger score	12m	F86V128	Use recodes
"	3y	F116V80	"
Bayley Adjusted MDI	8m	F40V173	
" " PDI	8m	F40V174	
" " MDI	12m	F87V26	
" " PDI	12m	F87V27	

Notes:

1. Work may represent employment or study at a school. Simultaneous part-time employment and part-time study is scored as full-time work
2. Less than 4 days of work are scored as part-time, four or more days of work are scored as full-time
3. Since part-time work was not explicitly listed in this Form, it was inferred from earnings as follows: Earnings less than \$ 300.- per month were scored as part-time, above that full time, except for major profession and managerial classifications where the dividing line was set at \$ 600.-
4. Volunteer work away from home was counted as employment

APPENDIX B

STATISTICAL PROCEDURES AND SAMPLE CALCULATIONS

1. GENERAL

N is the population size for which valid data are available for both mother's work status and the pertinent test score.

The mean, m , is computed from $m = \sum x[i]/N$ for $i = 1 \dots N$

The unbiased sample standard deviation, s , is computed from

$$s = \sqrt{\sum x[i]**2 - Nm**2 / (N - 1)}$$

where $**$ denotes exponentiation, and again $i = 1 \dots N$.

2. STUDENT'S t - TEST

The conventional t -test validates the hypothesis that the mean of a sampled population is equal to the known mean of a normal reference distribution. In our case the reference population is of finite size and the mean is obtained from the sample. Therefore a modified form of the test applicable to this condition is used (Bowker, 1964, p. 174). The parameters of the reference population are identified by capital letters (N , M , S), and the parameter of the sampled population are identified by small letters (n , m , s). The test statistic is computed as

$$t' = (M - m) / (S^{**2}/N + s^{**2}/n)^{**1/2}$$

with

$$df = \{(S^{**2}/N + s^{**2}/n)^{**2} / [(S^{**2}/N)^{**2}/(N+1)] + [(s^{**2}/n)^{**2}/(n+1)]\} - 2$$

Accept the null hypothesis if $t' \leq t_t[p; df]$ where t_t is the critical number for the conventional t -distribution for df degrees of freedom and a significance level of p .

Sample calculation for Table 1, non-working (reference) and part-time (sampled) populations are shown below. All calculations are carried to 8 decimal places with rounded results shown.

$$N = 46 \quad M = 5.98 \quad S = 2.56$$

$$n = 20 \quad m = 6.04 \quad s = 2.21$$

$m - M = 0.06$ (here reversed because the alternative hypothesis is $m > M$)

$$S^{**2}/N = 0.14 \quad s^{**2}/n = 0.24 \quad Q = S^{**2}/N + s^{**2}/n = 0.39 \quad Q^{**1/2} = 0.62$$

$$t' = 0.10$$

$$Q^{**2} = 0.15 \quad R1 = (S^{**2}/N)^{**2}/(N+1) = 0.000042$$

$$R2 = (s^{**2}/n)^{**2}/(n+1) = 0.00274 \quad R = R1 + R2 = 0.00278$$

$$df = (Q^{**2}/R) - 2 = 44$$

The critical number for this case is $t_t[0.15; 44] = 1.08$ (from tables, with interpolation). Since $t' < t_t$ the null hypothesis is accepted and it is concluded that there is no significant difference between the means of the two work status classifications.

3. FISCHER'S F-TEST

Using the symbols previously introduced, the test statistic is

$$F = S^{**2}/s^{**2}$$

with $[N-1;n-1]$ degrees of freedom for the numerator and denominator, respectively. This is compared to the critical number for the F-distribution, $FF[p;N-1;n-1]$ which is obtained from tables. The null hypothesis is accepted if $F \leq FF$ for the desired significance level, p .

Sample calculations for Table 1, non-working (reference) and part-time (sampled) populations are shown below. All calculations are carried to 8 decimal places with rounded results shown.

$$N = 46 \qquad S = 2.56$$

$$n = 20 \qquad s = 2.21$$

$$F = 6.55/4.88 = 1.34$$

The critical number for this case is $FF[0.15;45;19] = 1.44$ (by interpolation from tables). Since $F < FF$ the null hypothesis is accepted and it is concluded that there is no statistically significant difference between the standard deviations of the two work status classifications.

REFERENCE

Bowker, A. H. and G. J. Lieberman, Engineering Statistics, Englewood Cliffs, NJ: Prentice-Hall Inc., 1964

APPENDIX C

CRITERIA FOR THE CLASSIFICATION OF ONE-YEAR-OLDS IN THE STRANGE SITUATION TEST

GROUP A: Little or no tendency to seek proximity, interaction or contact with the mother, even in reunion episodes.

- Little or no tendency to cling when picked up or to resist being released.
- Tendency to ignore the mother on her return, greeting her casually if at all. Or, if there is approach and/or less casual greeting, the baby tends to mingle his welcome with rejection responses -- turning away, moving past, averting the face, pushing away, etc.
- Tendency to treat the stranger much as the mother is treated, although perhaps with less rejection.
- Either the baby is not distressed during separation, or the distress seems because the baby is left alone; it does not occur when the stranger is present, and it is alleviated when the stranger returns.

Subgroup A1:

- The baby greets his mother upon reunion casually (with mere look or smile) or not at all.
- The baby either does not approach his mother, or the approach is abortive -- i. e., the baby turns back, goes past, etc., or he

comes only after much coaxing.

- Tendency to ignore, move away from, avert the face, and generally to avoid interaction with the mother in the reunion episodes.
- If picked up, the baby does not cling; does not resist being put down; may squirm to get down.
- No stranger anxiety; the baby behaves to the stranger as to the mother.

Subgroup A2:

- The baby shows a mixed response to the mother upon reunion, with some tendency to greet and to approach, intermingled with a marked tendency to turn away from, move away from, avert the face, move past, or to ignore.
- If the baby is picked up he may cling momentarily; if he is put down he may resist or protest momentarily; but there is also a tendency to squirm to be put down, to turn his face while being held, and other signs of mixed feelings.
- No stranger anxiety; the baby behaves to the stranger much as to the mother.

GROUP B: The baby responds to the mother's return in the reunion episodes with more than a casual greeting, either with a smile or with a cry and a tendency to approach.

- The baby either wants proximity and contact or he wants interaction with the mother and is active in seeking it, especially in the reunion episodes.

- The baby may or may not be friendly with the stranger, but he is clearly more interested in interaction and/or contact with the mother than with the stranger.
- The baby may or may not be distressed during the separation episodes, but if he is distressed it is clearly related to the mother's absence and not merely to being alone. He may be somewhat comforted by the stranger but it is clear that he wants his mother.

Subgroup B1:

- The baby greets his mother, smiling, upon her return and is interested in establishing interaction with her, although he does not especially seek physical contact or cling to her.
- The baby shows little distress during the separation episodes.

Subgroup B2:

- The baby greets his mother upon reunion, tends to approach and seems to want contact with her, but to a lesser extent than B3.
- Although the baby accepts contact if he is picked up, he does not cling especially, and he does not resist release conspicuously.
- The baby is not as active in seeking interaction with the mother as in B3.
- The baby shows little distress during the separation episodes.

Subgroup B3:

- The baby responds to his mother's return but may cry instead of smiling.

- The baby actively seeks physical contact with his mother, approaching her, clinging to her when contact has been achieved, and resisting release.
- The baby may or may not be distressed in the separation episodes, but if he shows little distress he clearly is more active in seeking contact and in resisting release than are B1 and B2 babies.

Subgroup B4:

- The baby wants contact and actively seeks it by approaching, following, clinging, and by resisting release.
- These babies differ, however, from B3 babies by showing more insecurity in the strange situation. They are actively preoccupied with the mother when she is present and explore little. They are entirely distressed when she is absent.

GROUP C: The baby displays generally 'maladaptive' behavior in the strange situation.

- He shows inability to use the mother as a secure base from which to explore — either failure to explore or lack of enjoyment of it, or both.
- Although there may be some active, positive behavior to the mother in the reunion episodes, it is less than that shown by group B, and mixed with passivity, anger, withdrawal or detachment to an extent much greater than the group B babies show.

Subgroup C1:

- There is perhaps some exploration in the separation episodes, but less than either group A or group B, and interfered with by either anxiety or anger or both.
- There is some active, positive behavior toward the mother in the reunion episodes -- perhaps reaching, some clinging, some resistance to being put down, but highly ambivalent behavior to the mother, mingling contact with angry behavior and resistance to the mother.
- Distress during separation episodes.
- Angry, resistant behavior toward the stranger.

Subgroup C2:

- Striking inability to use the mother as a secure base from which to explore, whether because of anxiety, passivity, or detachment.
- At the same time there is inability to initiate active, positive behavior to achieve proximity, contact, or interaction with the mother, even in pre-separation episodes. There are some abortive attempts, perhaps, but ineffective.

