SOME BASIC PRECURSORS OF LEARNING DISABILITIES:
THE MATERNAL DEPRIVATION SYNDROME AND THE
FAILURE TO THRIVE SYNDROME

THESIS

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It is hypothesized in this study that children reared with "concerned" mothers (N) will display significantly superior intellectual performance and less neurological impairment as compared with children reared with neglectful mothers (MN) and children diagnosed as failure to thrive (FTT, falling below the third percentile in height and weight). The FTT children will show significantly more deficits than both N and MN groups.

The participants in this study were forty-five children rigidly matched on all possible variables. F-tests and Newman-Keuls' analyses reveal severe intellectual deficits in both MN and FTT groups. The FTT group displayed significantly more neurological deficits lending support for a nutritional basis of this syndrome as opposed to the traditional psychogenic explanation.
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CHAPTER I

Introduction

The importance of normal development processes of the child subjected to maternal neglect (also known as the maternal deprivation syndrome, psycho-social deprivation, distorted mothering, separation syndrome and sensory-environmental deprivation) cannot be overstated. Very few studies have been carried out to assess the deficits of a child reared under the influences of maternal neglect in the home environment (Plaut & Davis, 1972). This dearth of information is understandable in view of the methodological problems involved. The research generated with regard to maternal neglect in the home environment is mostly of an historical or case study nature (Beres & Obers, 1950; Bradway, 1935; Dingman, Meyers, & Mercer, 1967; Elmer, 1960; Fischhoff, Whitten, & Pettit, 1971; Goshen, 1963; Meyerowitz, 1967; Newell, 1936; Spitz, 1945). Attempts have been made to study neglect of children of working mothers (Mortimer, 1973; Oakland & Kane, 1973) but both historical and "working mother" studies yield very little definitive information concerning learning or neurological deficits in these children.

Most research dealing with maternal neglect concern children who have been hospitalized or institutionalized (Yarrow, 1961), the majority of these studies providing exhaustive proof that both physical and psychological deficits do indeed occur in these children. From such data most texts in child development and learning disabilities, and most
independent research studies generalize from the institutional studies to assume that maternal neglect in general will produce psychological and social deficits.

Another general fallacy in studying maternal neglect is that most investigators assume that neglect begins at birth, generally ignoring the data that infant insult can begin at conception, if indeed not before (Frisch, 1971). Little or nothing is said in several highly regarded texts on child development and learning disabilities (Anderson, 1973; Blackwell & Joynt, 1972; Faus, 1972; Longstreth, 1968; Myklebust, 1968; Reese & Lipsitt, 1970; Tarnopol, 1971; UNESCO, 1973; Wilson, 1971) with regard to physical trauma, especially nutritional neglect, in school children, and in pregnant women. Until recent years studies concerning fetal development and nutrition in humans have been largely ignored (Frisch, 1971).

Intellectual and neurological impairment due to nutritional deficits in infancy and early childhood have been well documented (Frisch, 1971). Unless these malnourished infants receive nutritional intervention at an early age, these children will undoubtedly end up in special education classes for learning disabilities or classes for the mentally retarded (Ghadimi, 1973; Valman, 1974).

There is a certain type of child, however, that comprises a substantially large portion of our population and in general is considered to be a product of maternal neglect. Whether the neglect is of a psycho-social nature or a
nutritional nature is the subject of recent debate in the medical field. This infant, who has been historically classified as suffering from "marasmas", a vague and general term which has no operational definition, has recently been redefined as "failure to thrive". The term failure to thrive is used to describe instances of growth failure in infancy or childhood encompassing clinical syndromes differing from other causes of growth failure by its lack of organic causes. The failure to thrive child is diagnosed on the basis of falling below the third percentile in height and weight (Hannaway, 1970). Very little definitive research has been devoted to the cognitive and neurological aspects of children diagnosed as failure to thrive. This, in part, has been due to the preoccupation of researchers concerning the etiology of this problem. Studies concerned with the physiological and psychological outcome for such children are few, vague, and generally methodologically unsound.

A survey of maternal neglect and failure to thrive research reveals several published studies which directly relate to the present study. More frequently encountered are articles which have a less direct but theoretically or historically pertinent relation to the study. Because of the complexity of the problem of the MN and FTT study, a large number of both kinds of aforementioned studies are included in the review for the purpose of clarification.

Therefore, this study is divided into two sections: section one includes studies which relate the important
aspects of maternal neglect, and section two which includes
the most important aspects of the literature concerning the
failure to thrive syndrome.

Maternal Neglect

At the onset Kessler (1966) points out that the terms
"maternal neglect" or "maternal rejection" are no longer popu-
lar and the concepts related to it have been subsumed under
"deprivation". In this review of the research and theoretical
literature, the basic objective is to clarify the concept of
maternal deprivation by identifying the basic variables and
concepts which have been indiscriminately combined under this
term. In the literature three main types of deprivation
emerge: institutionalization, separation, and distorted
mothering.

Most of the generalizations about the effects of "maternal
deprivation" are based on retrospective research in which
institutionalization has been a major background condition.
The research designs of the many studies reported between the
years 1936 and 1955 are very similar in methodological
deficiencies. In all but a few studies there is a sampling
bias due to the method of selection of cases; subjects are
chosen from clinic populations of cases under treatment for
emotional or personality disturbances. Perhaps the most
salient defect in many of these studies is the lack of spe-
cific data on early conditions of maternal care. Only a few
studies of infants and young children give sufficiently
detailed descriptions of the institutional setting to enable
one to isolate discrete variables. Only one study, comparing the institutional and home environments of a small group of infants, makes a serious attempt to give an objective description of the institution (Rheingold, 1960).

In most of the research, institutional settings are characterized in the extreme as lacking in sensory stimulation; they are colorless and bland with little auditory or visual stimulation and with few objects for the child to manipulate. In addition there seems to be a lack of variation in feeling tone with the result being that the infant is not exposed to strongly negative or strongly positive affective stimulation (Yarrow, 1961). Compared with an infant in his own home, there is much less mothering contact, less social stimulation and less stability of mother-figures in the institution. Learning regimens are either lacking, routine, rigid, and unpredictable, and no regard is given for individualization.

General intellectual retardation is commonly found in older children and adolescents with a history of institutionalization (Bender, 1947; Goldfarb, 1945; Levy, 1947; Lowrey, 1940) as well as infants and young children growing up in institutional environments (Dennis & Najarian, 1946; Fischer, 1952, 1953; Gesell & Amatruda, 1941; Skeels, Updegraff, Wellman & Williams, 1938; Spitz, 1945, 1946). The data presented in these studies do not permit one to simply conclude that gross intellectual deficiency is a necessary consequence of institutionalization. In only some studies do some children show severe retardation (Dennis & Najarian,
In others there is only retardation where functioning is on the dull-normal level (DuPan & Roth, 1955; Fischer, 1952, 1953; Freud & Burlingham, 1944; Klackenburg, 1956; Rheingold, 1956). The classic studies of Gordon in 1923 (Longstreth, 1966) and Sherman and Key (1932) underscore the institutional studies in that environmental deprivation does lead to significantly inferior mental functioning. Although these studies have been criticized on various grounds, other researchers (Jordan, 1933; Lichtenstein & Brown, 1938; Skeels & Fillmore, 1937) substantiate Sherman and Key's statement that "... children develop only as their environment demands development" (p. 289).

Several factors seem to be related to the intellectual outcome of these institutionalized youths such as (1) the amount of individualized stimulation, (2) the age of the child when institutionalized, (3) constitutional factors (Yarrow, 1961), (4) the duration of institutionalization, and (5) interpersonal relationships. Several other factors also emerge from the review of the literature that seem to be related to the outcome of the institutionalized youth. Of particular significance is the fact that motor disturbances in the form of bizarre stereotyped motor patterns suggestive of neurological damage have been reported by Spitz (1946) in infants after a long period of institutionalization. Similar, but less extreme, motor disturbances were noted by Fischer (1952, 1953). Bender (1947) and Goldfarb (1943, 1945, 1947)
found hyperactive behavior in many of the children they studied.

Another function which is related to the intellectual outcome of institutionalized children is language development. Language is one factor in which severe retardation has been found repeatedly in these children (Broadbeck & Irwin, 1946; DuPan & Roth, 1955; Fischer, 1952, 1953; Freud & Burlingham, 1944; Gesell & Amatruda, 1941; Skeels et al., 1938; Rheingold & Bayley, 1959) as well as other children and adults with an institutional history (Bender, 1945, 1947; Goldfarb, 1945; Haggerty, 1959; Lowrey, 1940). With regard to the etiology of language retardation, Fischer (1952, 1953) notes that in many institutions there is little reinforcement by adults of the infant's vocalizations, and consequently reduced opportunity for the child to acquire the signal functions or expressive functions of language. Recent data on the conditioning of vocalizations in infants (Rheingold, Gewirtz, & Ross, 1959) offer substantive evidence of the role of reinforcement in young infants' vocalization.

Studies carried out on the subhuman level provide abundant support that lack of environmental and social stimulation contribute to deficient learning abilities and to hyperactive and random behavior. The classic in this line of investigation is the Thompson and Melzack (1954) study. These investigators used Scottish terriers to demonstrate that restriction of opportunities for development and learning during the first few months of life would have permanent
effects upon the dog's intelligence, activity, emotional reactions and social behavior. There are hosts of other animal studies (Callison & Spencer, 1968; Davis, 1972; Gibson & Walk, 1956; Harlow, Roland, & Griffin, 1964; Tryon, 1940, 1942) to substantiate the Thompson and Melzack experiment.

On a more peripheral level there are a number of physiological studies which correlate enriched environments with greater brain weight (Bennett, Krech, & Rosenzweig, 1964; Krech, Rosenzweig, & Bennett, 1960, 1962; Rosenzweig, Bennett, & Krech, 1964). Hilgard and Bower (1966) and Hyden and Egyhazi (1964) correlate intelligence, environment and cortical biochemical activity.

In summary an enriched environment, both physically and socially, contributes to the overall development of all animals. Institutionalized children are more retarded intellectually and socially. There are also distinct emotional consequences, chiefly, the absence of a normal capacity for inhibition. These children display extremely difficult behavior - hyperactivity, restlessness, inability to concentrate and unmanageability. Furthermore, the institutionalized children seemed to have no genuine attachments, although they were indiscriminately and insatiably demanding for affection. This confirms, at a later age, the observations which Provence and Lipton (1962) made about younger children.

Despite the many different conditions associated with the separation experience, there is some degree of consistency in the findings reported on immediate and short term reactions
of infants and preschool children. In each of the studies reviewed some children develop severe reactions, and the behavior sequences in these cases are quite similar (Bowlby, 1953; Robertson & Bowlby, 1952; Roundinesco & Nicolas, 1952; Spitz & Wolf, 1946). The characteristic anxiety responses of the separation are well known and do not necessitate elaboration in this study. After the initial anxiety reaction the child sinks into apathy, and motor and intellectual functions are depressed (Spitz & Wolf, 1946). When the mother is not restored, Spitz and Wolf (1946) found symptoms of progressive deterioration in infants, a complete withdrawal from social interaction, a sharp drop in development level on infant tests, extreme physical debilitation with loss of weight and increased susceptibility to infections. In children over 12 months of age marked physical and intellectual deficits have not been observed, but severe disturbances in interpersonal relationships have been reported (Bowlby, 1953; Robertson & Bowlby, 1952).

In a follow-up study of 60 children between the ages of 6 and 13 who had been in a sanitarium for tuberculosis for varying periods of time before their fourth birthday, Bowlby, Ainsworth, Boston, & Rosenbluth (1956) found less serious long term effects than in earlier studies. Although there was a marked deficit in intelligence in this group, it was not statistically significant.

With respect to length of separation, viewed by Heinicke and Westheimer (1965) as the most important factor, it seems
that a separation of less than 3 months in 6 month old infants allows a quick recovery, but in children aged 1 to 4 years the extent of drop in the developmental quotient is a function of the length of stay in an institution. Age emerges as an important factor, with children over 34 months showing greater drop in IQ (Roundinesco & Appel, 1951). Trasler (1960) found that of 57 children who failed in foster homes all were admitted to public care before age 5, and he concludes that the first 3 years constitute the most significant period in terms of subsequent disruption for the child. This confirms Goldfarb's earlier (1944) conclusions and is reinforced by Moore (1974) who found anxiety and lowered IQ in later childhood resulting from two kinds of early experiences: placement in daily care with someone other than the mother and placement in care with a number of different people. After age 3, he concludes, children are found to be unaffected by these conditions.

Under the category of distorted mothering are subsumed all the deviations in maternal relationships which usually have their antecedent disturbances in the character or personality of the mother. These disturbances in maternal relationships are manifested in overtly or covertly hostile or rejecting behavior, sometimes more subtly in overprotective behavior, and more often in unpredictable swings from affection to rejection, or in ambivalent behavior. The vast majority of the studies done on distorted mothering, with the exception of autistic, schizophrenic, and generally untestable
children, concern the effects of the mother's psychopathology on the child's personality with little regard given to intellectual or neurological deficits. It must be noted, however, that the environment greatly shapes the distorted maternal pattern, and one cannot be discussed without mention of the other.

The largest group of intellectually deficient people fall within the range of the mildly retarded and show no signs of organic pathology. "This group has been variously labeled subcultural, simple, familial, or garden variety retarded" (Reese & Lipsitt, 1970, p. 563). There is general agreement among researchers in the field that the subcultural mental retardation is most heavily concentrated in the lowest socioeconomic classes and there is some empirical evidence to support such attitudes (Bradway, 1935; Meyerowitz, 1967; Solomons, Cushna, Opitz, & Greene, 1966). These children often come from broken homes with very low incomes, are products of broken marriages, high crime rates, and a general social value system that deviates markedly from the prevalent middle class values of American society.

In the past decades there has been a shift in thinking about causes of subcultural mental retardation. Earlier studies attributed it to hereditary physical defects that were not detectable with the methods available at the time. Today, however, according to Clausen (1967), most psychologists believe that subcultural retardation is a function of environmental experience. Sarason (1953) and Sarason and Gladwin
(1958) emphasized the importance of the social and psychological deprivation which characterizes the home backgrounds of so many mildly retarded children. McCandless states that the behavior of the subcultural retarded can be stated in terms of learning paradigm.

First, the environment from which the subcultural mentally defective person comes is one providing minimal opportunity for learning of the skills which are subsumed under the term intelligence. Second, the environment . . . is one in which he has maximum opportunity to learn self-defeating techniques - e.g., loosely defined, experiences of failure, absolute as opposed to relative thinking, concrete as opposed to abstract thinking, belief in his essential worthlessness, etc. (McCandless, 1952, p. 684).

Other researchers have stressed the important role of experiential aspects in the etiology of subcultural mental retardation (Bijow, 1963; Cromwell, 1961; Zigler, 1966; Zimmerman, 1965). All in all the subcultural mental defective is most obviously inadequate during the elementary school years. Follow-up studies of children diagnosed as mildly retarded in childhood are in almost complete concurrence in finding that the majority make adequate, though low level intellectual postschool adjustments (Charles, 1953; Hegge, 1944; Muench, 1944). These studies do not mention social behavior which is usually marked with character disorders and other antisocial behavior (Baldwin, 1958; Turner, 1958).

Kagan and Moss (1959) find a positive correlation between maternal concern with the child's development in the first three years and his intellectual growth in the years from 6 to 10. Harris (1961) feels that the best educational
insurance a child has is a family which places a high value on education. He found that socioeconomic differences were one of the few general factors which distinguish learners, as a group, from nonlearners.

Until the early 1960's the literature concerning children's intellect concentrates mostly on correlating such factors as parental occupation (Bradway, 1935), socioeconomic status (Furfey, 1958), geographic location (Chapman, Crosby, & Wiggins, 1925) and an abundant pile of research on hereditary correlaries of intellect (Cattell, 1915; Chapman et al., 1945; Ellis, 1904; Gordon, 1927; Nisbet, 1953; Ordahl, 1919). In fact, nowhere is the nature-nature controversy still so alive as with respect to the etiology of cultural-familial mental retardation (Robinson & Robinson, 1965).

Jain and Sathyavathi (1960) report evidence of severe mental retardation in children whose families suffer extreme interpersonal disruption. Unfortunately this is a case history study with no empirical data offered. In 1963, Goshen and Morgantown conducted an experiment comparing neurotic maternal attitudes with mental retardation. This study is replete with case histories but nevertheless provides some empirical data to support the fact that maternal pathology does contribute to lowered intellect in their offspring. In particular it suggests that neurotic maternal attitudes which are characterized by a failure to stimulate and evoke meaningful signals during critical periods of life can result in failure on the child's part in grasping the significance
of language, proceeding to a state recognizable as mental retardation.

Very few systematized studies have been carried out to definitively determine the specific type of maternal distortion that affects a child's intelligence. Newell (1935) conducted a study which demonstrated that an immature, emotionally unstable mother would produce a child of inferior intellect. A second study by Newell (1936) using more comparable instruments substantiates results of his 1935 experiment. In 1967, Meyerowitz conducted an exhaustive study which is probably the most methodologically sound experiment done to date. In this study both control and experimental groups are matched on most important variables except family size. All families came from industrialized ghetto areas with substandard housing. While dwelling size was similar for the entire population the larger families had less space per person and in such conditions were found the preponderance of intellectually handicapped children. Here again is found the fact that closely spaced siblings get less parental stimulation, and as a consequence verbal development suffers. In this study it was found that in the homes of the retarded children television and telephones were significantly less in number than in the homes of the impoverished control group. Most important, however, the study revealed that the mother had significantly less social interaction, was often considered hostile and aloof, and participated in little or no outside activities such as picnics or movies with her
children. In addition the mother of the handicapped child belonged to no outside organizations, such as PTA, church groups, or unions.

Another aspect regarded in a sense as distorted mothering, but yielding very little definitive data concerning intellectual deficits of off-spring, are the "working mother" studies. Misconceptions such as out-of-home employment lead to abuse and neglect have not been empirically substantiated (Oakland & Kane, 1973).

Studies of the battered child, a definite product of distorted mothering, have yet to produce any definitive empirical data to substantiate intellectual deficits (except in cases where severe physical cranial trauma has been sustained), although the emotional toll on such children will probably be a drain on potential intellect (Committee on Infant and Preschool Child, 1972; Kemp & Helfer, 1972; Newberger, Hagenbuch, Ebeling, Colligan, Sheehan, & McVergh, 1973).

In summary the review of the literature on the maternal neglect syndrome provides substantial data that many types of neglectful mothering, and general environmental deprivation, have a severely deleterious effect on a child's intellectual and emotional growth, especially during critical periods of infancy and childhood.

Failure To Thrive

The term "failure to thrive" has come into use to describe infants and children who, for extended periods of time, and without obvious evident cause, fail to gain weight
and to grow adequately, and often is accompanied by weight loss. This syndrome is most commonly encountered in infants and in children just beyond infancy. Though in some instances the cause can be accurately identified as dietary deprivation, in most there is no explanation beyond that of social neglect or abuse.

In general the clinical picture is seen as growth failure, developmental retardation, and considerable psycho-social disruption, in addition to signs of physical and emotional deprivation such as apathy, poor hygiene, intense eye contact with people, withdrawing reflexes, and some disorders of food intake which may be manifest as anorexia, voracious appetite or pica. These children frequently improve in both weight gain and social response during hospitalization. Failure to thrive may accompany or preclude overt social or environmental neglect or physical abuse. In many cases the cause does not appear to be solely a defective food intake, but rather some physical or emotional deprivation which may be secondary to family upheaval or illness (Nelson, Vaughn, & McKay, 1969).

As can be ascertained from the above reference which is widely used by medical students and practitioners alike (La Port, 1975), the reasons for the failure to thrive syndrome have not been clearly delineated. The prognosis for such children in terms of later physiological, physical, psychological, and cognitive development is not clear because follow-up findings are scant, vague, methodologically unsound,
and predictive data are simply not available (Glaser, Heagarty, Bullard, & Pivchik, 1968). Patton and Gardner (1962) followed two children who had been diagnosed as failure to thrive into late childhood and noted personality and intellectual damage. No empirical data are reviewed in this study. Glaser's study in 1968 attempted to provide some prognostic data relevant to the intellectual outcome of failure to thrive children. Unfortunately no information was provided on how her groups were matched; further, the ages of the children tested ranged from 6 months to over 8 years and on "formal psychological testing IQ scores approximated a normal distribution with a skewing to the left" (p. 695). Rhinehart's (1972) is a one case, 50-year follow-up study in which, according to the author, the patient was essentially normal. There are abundant studies dealing with the intellect of children who have undergone malnutrition at an early age. These studies are contradictory and do not apply, as far as operational definitions are concerned, to this study. All in all, very little prognostic data are available that are applicable to the intellect of the failure to thrive child. It must be pointed out, however, that due to the generalization effects from the institutionalization studies, most workers dealing with the failure to thrive syndrome offer generally poor intellectual prognoses for these children (Barbero & Shaheen, 1967; Elmer, 1960; Glaser et al., 1968; Hannaway, 1970; Hegsted, 1972).
In view of the fact that most researchers agree that environmental/psycho-social disruption occurs in the families of the failure to thrive child, all of the implications drawn from the maternal neglect studies can also be applied here. The preponderance of failure to thrive research focuses on the psycho-social/environmental aspects of these children, with the role of the mother as the key aspect. Leonard, Rhymes, and Solnit (1966) state that "the mechanisms by which emotional factors influence growth are not completely understood" (p. 600).

From an historical point of view Bender (1947), Goldfarb (1945), Lowrey (1940), Skeels et al. (1948), and Spitz (1945, 1946) report, in addition to other findings in their institution studies, small stature of the children. Spitz (1946) in particular found severe growth retardation in a group of institutionalized youths who lived in an environment that was devoid of sensory and social stimulation. Unfortunately no empirical data are reported either by Spitz or the other researchers concerning height and weight. A study by Widdowson (1951) in two institutions for the homeless in pre-war Germany demonstrated dramatic evidence of effects of a disturbed emotional climate on the heights and weights of children. Stewart (1954) studied excessive infant crying or colic and compared it with growth failure and parental attitudes. Coleman and Provence (1957) present detailed data of two infants in whom retardation of both growth and development resulted from psychological difficulties of the mother's nurturing these infants. Unfortunately the height-weight data
do not meet the definitions of the failure to thrive syndrome.

More specifically Barbero and Shaheen (1967) mentions various environmental and psychosocial disruptions within the families of failure to thrive children. The kinds of derangement within the families of these children are often quite gross and include one or more of the following factors:

- alcoholism, severe financial disruption, sexual incompatibility or promiscuity, serious parental or family illness, childhood deprivation of mother or father, physical abuse between parents, high risk pregnancy and delivery, considerable inexperience in mothercraft, job instability or chronic unemployment, too frequent unplanned or unwanted pregnancies, and considerable strain of the parents with their own families (p. 641).

The authors offer four case histories to substantiate these findings.

Elmer (1960) states at the outset that her study is not a definitive research project, but she offers some explanations concerning the psychological environment in which the child fails to thrive. She maintains that the children have been exposed to great stress at a vulnerable age. She, like many other researchers, asks the question "Can they (the failure to thrive children) reasonably be expected to catch up with their age group and development?" (p. 717). Leonard et al. (1966) describes the families of 13 failure to thrive children as having multiple problems such as the stresses of poverty, substandard housing with overcrowding, threat of eviction, lack of heat, disorganized and chaotic home life, unemployment, illegitimacy, and serious disruptions in marital relationships. Leonard et al. states in their 1969 study that
"A particularly serious hardship in nearly every family was the number of children in quick succession" (p. 603). Not a single mother reported sustained supportive nurturing in her own childhood. The mothers were described as being frequently isolated and lonely and as having very little satisfying adult companionship. They had few, if any, recreational outlets or contacts with friends, neighbors, or community organizations. They were grossly absorbed in the problems of home and children and carried the burden of these problems without adequate help from other people who might provide physical and emotional support. Leonard et al. goes further to speculate that there may be food intake problems.

Hepner (1971) reports that an organized, functioning, mother-child relationship is conducive to normal nutrition (even with the handicaps of a poor diet and a welfare existence in the ghetto), and that a chaotic, poorly functioning maternal-child relationship negates the advantages of adequate nutrient input to a vulnerable, rapidly growing child. Other authors are adamant in suggesting that psychosocial/environmental deficits, especially maternal-child distortions, are the chief causes of the failure to thrive syndrome (Barbero & Shaheen, 1967; Dietzsch, 1972; Evens & Reinhart, 1972; Patton & Gardner, 1962a; Patton & Gardner, 1962b). In view of the above review, most physicians choose to ascribe psychological factors which are traceable to the mother, who by neglecting her child deprives him of emotional rather than physical sustenance. Again, to support this
explanation the physician can summon a substantial body of literature which describes the maternal deprivation syndromes. The retardation, it must be noted, is not due to undereating (Journal of the American Medical Association, 1969).

In addition to a psychogenic explanation of the failure to thrive syndrome, Frisch (1971), Weininger (1972), Whitten (1969, 1972), and Widdowson (1951) are beginning to consider a much simpler and more direct explanation of the undersized infant. Whitten (1972) simply states that the child is not getting enough to eat. A question arises which can be stated thus: Does the poor physical showing of the failure to thrive child result from undernourishment causing neurological impairment or does it reflect the maternal and cultural deprivation usually concurrent with extreme poverty, fatigue and lack of concentration but which may or may not accompany chronic malnutrition?

Fischhoff et al. remarks in the August, 1971 Journal of Pediatrics that "only recently has it been recognized that infants living with their mothers may sustain maternal deprivation" (p. 209). He goes on to comment that little has been published concerning the reasons why these mothers neglect their children and states that virtually no data is available on the mothers' personality structures. In his 1971 study he concludes that the vast majority of these mothers had a character disorder. In addition most were eager to please, came from a family whose father was very strict, had highly constricted and repetitive behavior; her object relations
were of the anaclitic nature, she used denial as her chief defense, and reported no conscious hopes or fantasies about the future. In general this case history study revealed a greater frequency of character disorders over psychoneurotic disorders in the depriving mothers, having a constellation of features which are conducive to inadequate mothering, such as a limited ability to accurately perceive and assess the environment, their own needs or the needs of their children, limited ability to adapt to changes in the environment, adverse affective states, defective object relations, and limited capacity for concern.

In 1969, Whitten, Pettit, and Fischhoff conducted a very controversial, but well designed and conclusive experiment demonstrating that growth failure from maternal deprivation is secondary to undereating. This study consisted of four groups: (1) low level of mothering in the hospital plus adequate calories, (2) high level of mothering in the hospital plus adequate mothering, (3) adequate calories fed in the home by the mother after hospitalization, and (4) adequate calories fed in the home by the mother prior to parental awareness of the diagnosis. In this study 11 of the 13 infants gained weight at an accelerated rate during simultaneous under-stimulation and adequate feeding in the hospital. The two who did not gain, failed to eat amounts sufficient for growth. This is strong evidence that their poor weight status on admission was not emotionally induced, but was the result of undereating. Whitten et al. states that:
the hospital environment that we placed the infant
in, if psychologically different, is certainly not
psychologically favorable, for it virtually dupli-
cated the environments in the institutions described
by Spitz, Provence, and Lipton: environments that
produced the classic effects of maternal
depression . . . " (p. 1680).

In addition, Whitten et al. (1969) points out that as in both
institutional and neglected home studies, authors have pro-
posed that psychological factors are responsible for growth
retardation. The basic criticism applicable to both home and
institution studies and controlled for in Whitten's et al.
study is that in none of the reports has there been acceptable
documentation of adequacy of caloric intake. Both Hannaway
(1970) and Kohler and Good (1969) report weight gain when a
failure to thrive child is hospitalized indicating that mal-
nourishment is a contributing factor. Kerr (1969) notes that
adverse effects of nutritional deprivation upon physical and
behavioral development of children are well documented. He
goes on to state that in reports concerning children with
growth retardation, the nutritional component could not be
documented. He states:

as the social environments have often been
grossly abnormal, it has been concluded that the
growth failure resulted from a psychodynamic state
which in some way prevented the utilization of a
normal diet for physical growth" (p. 833).

Some animal studies substantiate the fact that environ-
mental deprivation does not retard growth. In Kerr's (1969)
study infant Rhesus monkeys reared under conditions of total
social isolation developed behavioral abnormalities, but their
growth rates were comparable to those of control animals.
Harlow et al. (1964) conducted virtually the same type experiment obtaining the same results. The Thompson and Heron (1954) study reports no abnormal growth deficits in their experimental dogs.

The review of the failure-to-thrive-literature reveals that many conclusions drawn concerning the intellectual outcome and the growth status of such children have been generalized from earlier institutional studies which have been demonstrated to be methodologically defective in various ways. In addition most failure to thrive studies conclude that the etiology of this syndrome is psychogenic in nature but later studies relying on better experimental techniques state that growth failure from maternal neglect is secondary to under-eating. Well controlled animal studies seem to substantiate the fact that social deprivation does not cause growth stunting.

It is the purpose herein to seek an objective, multifactored measure of the cognitive and neurological aspects of children who have, in one form or another, been subjected to maternal neglect. A broad spectrum of information, such as that obtained with the Wechsler Intelligence Scale for Children-Revised, would provide a valuable data base for the groups measured. In addition the Bender-Visual Motor Gestalt Test would provide information concerning visual-motor integration and signs of soft neurological damage. In view of the fact that the most salient behavioral features of children with minimal cerebral dysfunction are short attention-spans
and hyperactivity (Feriden & Van Kandel, 1971; Wender, 1971), the sampling of attention-span under a rigid set of criteria would provide further evidence of neurological impairment, if present. The findings of the maternal neglect experimental group and the failure to thrive experimental group will be compared to each other and to a control group of "normal" children reared with "concerned mothers".

A carefully controlled study of this nature under rigidly matched demographic variables would provide prognostic data for future investigators without the need for generalization from other, less comparable studies.

In light of the preceding statements about the implied and assumed but largely unverified and contradictory studies concerning maternal neglect and the failure to thrive syndrome, it would prove helpful for an empirical investigation concerning the possible intellectual and neurological deficits sustained in these two groups. Therefore, the three major hypotheses investigated in this study are the following:

(1) It is predicted that the normal control group will perform significantly better on all aspects of the Wechsler Intelligence Scale for Children-Revised than either experimental group with the failure to thrive experimental group performing significantly inferior to both the normal and maternal neglect groups; (2) It is predicted that the mean number of significant errors made on the Bender Visual-Motor Gestalt Test will be significantly less in the normal control group than in either experimental group, with the failure-to-
thrive group displaying significantly more errors than in either the normal or maternal neglect groups; and (3) In addition it is further predicted that the normal control group will have a significantly longer attention span than either experimental group, with the failure-to-thrive group showing a significantly shorter attention span than either the normal or maternal neglect groups.

For the purpose of this study, all predictions were accepted as significant at the .05 level of probability.
CHAPTER II
Method

Subjects

The subjects were forty-five Black children, divided into three groups of fifteen each and labeled Maternal Neglect, Failure to Thrive, and Normals, henceforth referred to as MN, FTT, and N, respectively. The sample was selected from a population of clinic registrants at three free, federally financed, comprehensive care clinics of the Children and Youth Project of the University of Texas Southwestern Medical School. With regard to the entire group, very specific and rigidly controlled subject criteria were established:

Age. The age of all mothers at the time of first pregnancy was between 13 and 18 years (\( \bar{x} = 16.38 \)).

Motherhood. The subjects' mothers were required to have a minimum of four living children within the home.

Race. All subjects and mothers were of the Black race.

Marital status. No subjects had full-time fathers living in the home. The children were either illegitimate, or the parents had divorced or separated. In some cases a male friend of the mother would reside in the home for brief periods of time.

Physical condition. Subjects with congenital handicaps or with histories of chronic physical diseases were excluded from this sample. In this regard the assumption was made that the FTT group was not chronically diseased or congenitally handicapped. The diagnosis of FTT was made on these children
between the ages of 6 months and 2 years. No child was hospitalized because of this condition and follow-up visits by the nutrition staff to assist in dietary planning were considered ineffectual at best.

**Educational status.** All subjects were chosen from regular (not special education) classes. All were students in self-contained classes and none had attended a kindergarten or head-start program.

**Mental status.** Excluded from participation were children whose behavior was judged both by the experimenter and the classroom teacher as excessively inappropriate or bizarre, or who had clinic records whose history included any sort of mental disturbance.

**Economic status.** Strict adherence to a fixed income was not necessary in view of the fact that all of the subjects' mothers received welfare in the form of Aid to Dependent Children.

**Geographic status.** All subjects were chosen from the West Dallas area and all were housed in federally subsidized housing projects which have recently been described by the officials of Housing and Urban Development as "disgraceful" (Henderson, 1975). The very nature of the West Dallas, "colored town", area is indicative of financial and cultural disadvantage and high crime rate (Makras, 1975).

**Birth status.** According to clinic charts all subjects were products of full term pregnancies with little or no delivery complications and no documented physical trauma in infancy.
Sex. At the outset, the population for a study of this nature was quite large, but due to the rigid standards placed with regard to subject criteria and other specific variables, the sample was narrowed to the point where only males were in a large enough supply to meet criteria standards; thus only males are included in this study.

Materials

Four objective measures were utilized in this study: the Wechsler Intelligence Scale for Children-Revised, the Bender Visual-Motor Gestalt Test, the Parental-Authority-Love Scale and an observational measure of attention span, henceforth referred to as the WISC-R, BG, PALS, and AS, respectively.

The WISC-R is a widely used and well standardized measure used with children from age 6 to 16 years 11 months, and is developed on the same principles and in the same form as the Wechsler Adult Intelligence Scale. The WISC-R is a revision of the 1949 version of the WISC and this revision, according to Wechsler (1974):

represents a synthesis of two somewhat opposing aims: (1) the retention of as much of the 1949 WISC as possible because of its widespread use and acceptance, and (2) the modification or elimination of items felt by some test users to be ambiguous, obsolete, or differentially unfair to particular groups of children (p. 10).

In addition, other items were added to strengthen the reliability of the test, although an effort was made to keep the test as short as possible. It is important to mention with regard to the revision of the 1949 WISC that the WISC-R included both whites and non-whites in the same proportion
found in the 1970 Census for the age range tested. Since Blacks were included in the standardization sample the WISC-R is a valid and reliable instrument for use with the population selected for this study. In addition to providing for racial differences, the standardization process used on the WISC-R sampled equally for sex, age, geographic region, occupation and head of household, and urban-rural residence.

The WISC-R consists of verbal subtests, performance subtests, a verbal intelligence quotient, a performance intelligence quotient, and a full scale intelligence quotient. There are twelve scored subtests, two of which are supplementary; the Digit Span subtest of the Verbal Scale and the Mazes subtest of the Performance Scale. The Verbal Scale includes tests of Information, Similarities, Arithmetic, Vocabulary, and Comprehension. The Performance Scale includes tests of Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding.

The split-half reliability coefficients for the WISC-R are commendably high. The Verbal, Performance and Full Scale IQ's have high reliabilities across the entire age range: the average coefficients being .94, .90, and .96, respectively. The reliability coefficients for the individual tests are quite satisfactory, especially within the age ranges tested in the study. The lowest coefficient was .63 on the Coding subtest at age 6-1/2. The preponderance of the coefficients are in the high 90's and 80's with a few in the 70's and only six coefficients in the 60's (Wechsler, 1974).
Little information is given in the Wechsler manual concerning validity, and the data presented are representative of fairly small groups. "The average coefficients of correlation for the WISC-R Verbal, Performance, and Full Scale IQ's with the Stanford-Binet IQ are .71, .60, and .73, respectively" (Wechsler, 1970, p. 51). This data differs little from other validity studies carried out on the 1949 WISC (Buros, 1972). The WISC-R is a convenient, reliable instrument for testing children, which uses up-to-date material intrinsically interesting to the child.

The Bender Visual-Motor Gestalt Test was used in this study to measure visual-motor integration and more specifically any type of minimal cerebral dysfunction or neurological organicity. Buros (1972) reviews the BG mostly as a projective instrument for personality assessment, and viewed in this fashion the test has very poor reliability and validity. Buros states, however, that "some valuable contributions to differential diagnosis of organicity with the Bender have been made . . . " (p. 162). In addition, significant differences have been found between Bender records of normal and brain-injured patients (Baroff, 1957; Beck, 1957; Bensburg, 1952; Feldman, 1956; Koppitz, 1962). Koppitz (1964) performed the most definitive study dealing with organic brain damage and the BG. The study consisted of 103 patients who had been diagnosed as having brain damage on the basis of factors such as traumatic birth, meningitis, encephalitis, high fever in infancy, history of convulsions in early childhood, cranial
trauma, positive EEG's, brain tumors and positive neurological examination by a neurologist. The differences in the experimental group and the 281 members of the control group in Bender design copying were subjected to chi square analysis, and the results across the ages of 5 through 10 years were significant beyond the .001 level. For the purpose of this study the Koppitz scoring method was used.

In view of Koppitz's (1964) statement that a definitive diagnosis of neurological impairment should never be made solely on the basis of a single Bender testing, observational measures to assess attention span, activity level and/or distractability were conducted. These behavioral measures were performed in view of the fact that short attention spans correlate quite highly with minimal cerebral dysfunction (Ferinden & Van Handel, 1971; Wender, 1971). The AS observational measure was done in the classroom and was carried out in six 5 minute time spans totaling 30 minutes during a time when the entire class was performing individual, at-seat tasks. Criteria instituted by the author which constituted "on-task" behavior were that the child be in his seat at all times during the half-hour observation with his eyes focused on the material with which he was working. "Off-task" behavior instituted by the author included behavior such as (1) child initiated help from the teacher, (2) inappropriate noises, (3) inappropriate gestures, (4) throwing objects, (5) squirming in the chair to the extent of raising one buttock from the seat, (6) dropping pencils or other materials, (7) getting
out of the seat for any reason such as to sharpen pencils or get other material, (8) talking with classmates, (9) poking other students, or otherwise causing general disturbances.

In light of the fact that an objective measure was needed to help substantiate maternal neglect, the Parental Authority-Love Scale developed by Walter C. Williams in 1954 was used. This is one of the few scales designed to be directly administered to the child to evaluate his impressions of the parent. The PALS test consists of thirty-two items each of which is scored for both authority and love. The child responds by simply stating "like my mother" or "not like my mother". The scoring of the test is straightforward, and the recording of scores is simplified by a special format. The scoring sheet also includes a grid for plotting summarized scores (Johnson & Bommarito, 1972). The grid is divided into four quadrants each of which identify a specific parental attitude which will be described below. The basic assumption underlying the PALS test is that the behavior of the child is an interaction of his personality with his environment. Since the child's environment is determined to a great extent by the personalities and behavior of his parents, a large part of his behavior is his reaction to his parents' behavior as he sees and interprets it. In addition, when one reviews the great amount of data dealing with the parent-child interaction, two qualities emerge as being of utmost importance for adequate parenthood: First, a parent should be a source of warmth and emotional support, called "Love"; second, a
parent ought to be a person who should or must be obeyed for some reason, called "Authority" (Williams, 1961, p. 2).

With the PALS test five parental combinations can be identified: (1) high authority-high love, which is indicative of a parent who may be democratic or overprotective and who provides safeguards with understanding; (2) high authority-low love, which is indicative of an authoritarian, exploitative parent who enforces obedience through fear and/or punishment; (3) low authority-high love, which marks a parent who is permissive or overindulgent and provides few controls and sets few limits; (4) low authority-low love, which identifies a parent who is ignoring and self-centered and generally neglects the child physically, socially and emotionally; and (5) a parameter described as "psychologically unknown" and is usually a parent who is unpredictable because she is either inconsistent or absent (Williams, 1958).

The items on the PALS test were derived by sequential experimentation using seven child psychiatrists, seven clinical psychologists and six psychiatric social workers as raters on the two dimensions. Interdisciplinary agreement was 94 percent on the rating scale. In addition, the PALS test was subjected to an initial study using two populations of boys (100 in each group). One group was classified as "acting-out" because of referral to legal or social agencies for repeated socially undesirable behavior. The other group (controls) was classified as "normal" because of having no such record and being rated by their teachers as "conforming" in being
socially desirable, although in a normally healthy and aggressive way. All boys were matched on important variables. Parental ratings were also divided into two groups: desirable or undesirable socially, both for individual parents and for parents in combination. A socially desirable rating was defined as one in which the child indicates that the parent is high in love, and a socially undesirable rating is one in which the parent is described as rejecting or "psychologically unknown" (Williams, 1958).

Results support the prediction that the children would use the tests to identify parental attitudes. Statistically significant results (P = .001) were obtained in comparing the two populations. Acting-out boys will rate their parents in a socially undesirable way but it was found that the reliability was higher when only one parent was rated (Williams, 1958). Other studies (Johnson, 1962; Miles, 1971) corroborate the initial study carried out by Williams in 1958. These studies, using children who have been placed in foster homes because of parental neglect of various forms, substantiate the fact that they will rate a parent on a low love-low authority basis.

Procedure

The children who participated in this experiment were culled from clinic registrants in a West Dallas project area as previously described. The classroom observation (AS) to evaluate attention-span and/or activity level was done before any formal psychological testing; therefore, no contamination
due to the child's familiarity with the examiner could take place to bias the child's behavior. It must be noted, however, that since the examiner knew beforehand which group the child was assigned to, there is a possibility that experimenter bias was operating.

The criteria for including a child into the MN experimental group are as follows: (1) Concurrence by at least three health team members who have had contact with both the child and the mother that maternal neglect is indeed a problem. The preponderance of this information was provided by the social worker, nurses, dentist and the clinic pediatrician. Clerks and secretaries were very helpful in supplying such information since they are in a position to observe the mother-child relationship in the waiting room for extended periods of time. (2) Evidence of maternal neglect or rejection as measured on a standardized mother-child relationship scale. (3) Complaints from school personnel concerning inadequate clothing, nutrition, hygiene, tardiness and absences. (4) The social worker's report of maternal neglect (which included such factors as inadequate food in the home and the mother absent from the home much of the time leaving siblings to care for each other) plus recent reports from the social worker that maternal neglect is operating with regard to younger siblings within the household. This information is usually well documented in clinic records. (5) Allegations of maternal or sibling abuse which is perpetrated by the mother, another sibling, or a male friend. In view of the fact that direct evidence of
abuse is extremely difficult to obtain and even more difficult to prove, most of this type of information was communicated to the experimenter by the clinic nurses or social workers. In some cases there is documentation of abuse entered in clinic records, but in view of the volatile nature of such information there is reluctance on the part of any clinic staff member to document such information without specific proof. (6) The mother is unreliable in keeping clinic appointments and does not follow up on necessary medical appointments. The average age of this group is 7.93.

In view of the fact that it is well documented that FTT children are products of neglectful mothers, all of the criteria listed above for the MN group was applied to the FTT group. In addition the FTT child must have been diagnosed by the pediatrician as falling below the third percentile in height and weight, using age as the criteria and the Stuart Growth Grid scale as the criteria for comparison. The average age for this group is 7.93.

The criteria for inclusion into the control group of N's, children with "concerned mothers", includes. (1) Concurrence by at least three health team members that the mother is indeed conscientious and concerned about her children. Once again, most of this information was supplied by the social workers, nurses, dentist and pediatrician. It must be stated that the clinic clerks and secretaries were of great value in supplying such information since they are in a position to observe the mother-child relationship in the waiting room for
extended periods of time. (2) Ratings which are conducive to good mother-child relationships as measured by a standardized mother-child relationship scale. (3) No evidence of nutritional or other physical neglect reported on routine physical examination by the pediatrician. (4) No complaints from social workers or school personnel with regard to clothing, hygiene or school attendance. (5) The mother consistently keeps and follows up her clinic appointments, be they of a medical or dental nature. The average age for this group of children is 8.10.

The WISC-R, BG, and PALS were administered in quiet, well lit rooms, and small chairs and tables were used in all cases. The standard instructions for administering the WISC-R were followed stringently although ample encouragement was offered. The Koppitz method of administration and scoring the BG was used with all subjects. In view of the fact that the scoring of the Bender drawings can take on a somewhat subjective nature, especially when experimenter bias can be operating, the scoring of all drawings in this experiment was done by a person with a M.A. in clinical psychology and who is familiar with the test.

In administering the battery, the PALS test was administered first. Since many of the children could not read, the statements were read to them by the examiner. Scoring of the PALS is simplified to the point where it allowed the examiner to administer the BG second in the battery, and to score the PALS test at the same time. This process did not hinder
observation of the child's drawings or negate the possible need for any further instructions to be given concerning the Bender. The process was time-saving in that it allowed the examiner to eliminate any children who did not fall within the appropriate "concerned mother" or "neglectful mother" grids on the PALS.

An attempt to counterbalance to control for time of testing was made by scheduling children from each group to be tested at various hours throughout the day. Although Cronbach (1960) states that "the time of day may influence scores, it is rarely important" (p. 44), this procedure insured that children in any one group were not all tested at the same time of day. All in all, the technique allowed for a very even distribution of test administration times across all groups.
CHAPTER III
Results and Discussion

A one-way analysis of variance was performed to ascertain any significant differences in the means of the fifteen variables analyzed for the three groups. The variables include the full scale WISC-R IQ, the WISC-R Verbal IQ and the five subtests of the Verbal test, the WISC-R Performance IQ and the five subtests of the Performance test, the Bender Gestalt, and the Attention-Span means. The F-ratios for the fifteen variables were all significant at or beyond the .01 level; thus true differences do exist somewhere in the data. A summary of the analysis of variance can be found in Appendix A. For general comparisons, Table I presents the means and standard deviations for all three groups on all variables measured. From examination of this table, it can be seen that the control group differs quite drastically from the two experimental groups as hypothesized; however, on many variables the hypothesis that the two experimental groups would be significantly different does not seem to hold.

To find out which groups were statistically significant, and on what variables, the Newman-Keul's Range analysis was performed for making a-posteriori tests to allow for analysis on all possible comparisons. As shown in Table II the original hypotheses were supported on only two variables measured: the WISC-R Performance IQ and the Attention-Span sampling.

In four cases (the information subtest, the vocabulary subtest, the coding subtest and the attention span sampling)
<table>
<thead>
<tr>
<th>Variables</th>
<th>N (control)</th>
<th></th>
<th>MN (experimental)</th>
<th></th>
<th>FTT (experimental)</th>
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<td></td>
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<td>x</td>
<td>S.D.</td>
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TABLE II
Summary of the Newman-Keul's Range Products of the N, MN, and FTT Groups on the WISC-R, BG, and AS

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<tr>
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*P = 0.05
there appeared to be a violation of the assumption of homogeneity of variance. However, in all four cases the significance level achieved was so high, it seems unlikely that these differences could have been produced by inhomogeneity of variance since the F-tests were robust with respect to this assumption. The only alternative would have been a non-parametric statistical analysis which would not have allowed for the multiple comparisons made in this study. However, a non-parametric procedure (the Kruskal-Wallis analysis of variance by ranks) was performed on the four questionable analyses of variances, and statistical significance was achieved at the .01 level of significance in each case, indicating the significant F-values were not spurious. A summary of the Kruskal-Wallis analysis can be found in Appendix B.

Further examination of Table II reveals that, for the most part, the control group differs significantly from both experimental groups, with no significant differences in the means of the two experimental groups. This pattern is seen on the following variables: (1) the WISC-R Full Scale IQ, (2) the WISC-R Verbal IQ, (3) the similarities subtest of the Verbal Scale, (4) the arithmetic subtest of the Verbal Scale, (5) the comprehension subtest of the Verbal Scale, (6) the picture arrangement subtest of the Performance Scale, (7) the block design subtest of the Performance Scale, (8) the object assembly subtest of the Performance Scale, and (9) the coding subtest of the Performance Scale.
In one case, the information subtest of the Verbal Scale, there is no difference in the control group and the FTT group, although there are significant differences between the control group and the MN group and the FTT and MN group.

In one instance, on the picture completion subtest of the Performance Scale, the only significant difference in the means is between the N (controls) and the FTT experimental group. No differences were obtained between the N and the MN groups and the MN and the FTT groups.

In another single instance there is no difference between the MN and the N groups, on the mean errors on the Bender-Gestalt Test. There are, however, differences between the FTT and N groups and the FTT and MN groups.

Although the original hypotheses were supported on only two variables of the fifteen analyzed, the preponderance of the data reveal a significant difference between the control group and the experimental groups, with no significant differences between the experimental groups. Among these groups such drastic differences were not expected on the Full Scale WISC-R IQ. The control group's mean IQ is about average, considering the demographic and socioeconomic conditions present (Intellectual Development of Children, 1971), but both experimental groups' Full Scale IQ means are in the mildly retarded range. This is a more drastic deficit than reported by many of the institutional researchers (DuPan & Klackenburg, 1956; Rheingold, 1956). Several explanations can be offered to account for such extreme differences in the
Full Scale IQ of the control and experimental groups. First, the experimenter may have culled some of the more extreme maternal neglect cases from the clinic files; thus a form of sampling bias could be operating. However, the experimenter stayed within the bounds of the criteria set for maternal neglect, and it was part of this study to determine if maternal neglect is found within the home. In 1971, Fischhoff was surprised to report that perhaps children living with their mothers may sustain maternal neglect. A second possible explanation is that these children, in addition to probable environmental, sensory, verbal, and physical deprivation, may sustain a particular form of maternal neglect that suppresses potential intellectual growth. It must be pointed out that in a study conducted by Bond (1973) it was found that Black mothers react to their children in many significantly different ways, and in many instances quite negative ways, as compared to another predominant ethnic group within the West Dallas area. If these specific forms of mothering are magnified or distorted, a child with a low measured intellect may result. In summary, this study shows that with regard to Full Scale WISC-R IQ the children reared with "concerned" mothers are significantly more intelligent than those reared with neglectful mothers. Within the limitations of this study, this data directly supports the thesis that maternal neglect can indeed operate within the home environment and does produce intellectual deficits of a gross nature. In
light of this evidence there is somewhat less need to generalize from other, less comparable data.

On eight other dependent measures analyzed, the original hypotheses were not supported in that, as with the Full-Scale WISC-R IQ, the control group differed significantly from the two experimental groups, with no significant differences between the experimental groups. These measures were (1) the WISC-R Verbal IQ, (2) the arithmetic subtest of the Verbal Scale, (3) the similarities subtest of the Verbal Scale, (4) the comprehension subtest of the Verbal Scale, (5) the picture arrangement subtest of the Performance Scale, (6) the block design subtest of the Performance Scale, (7) the object assembly subtest of the Performance Scale and (8) the coding subtest of the Performance Scale. The explanations offered above with regard to the Full Scale IQ can be extended to include these variables measured.

With regard to the WISC-R Verbal IQ, the same pattern of no significant differences in means of the FTT and MN groups emerge. The differences are not as drastic between these three means as was noted on the Full Scale IQ, but nonetheless, statistical significances were obtained between the N control group and the FTT experimental group, and between the N control group and the MN experimental group. The mean Verbal IQ's are 86, 71 and 60 for the N, FTT and MN groups, respectively. As can be seen, the direction of the Verbal IQ means for the two experimental groups run counter to the hypothesis. Although not significant, the FTT group has a higher mean Verbal
IQ than does the MN group. This places the N's at about average for their socioeconomic group, the FTT's fall within borderline functioning, and the MN group falls within the mildly retarded range. The same progression appears on the arithmetic, similarities, and comprehension subtests of the Verbal Scale where there are no significant differences between the two experimental groups but there are significant differences between the two experimental groups and the control (N) group. Again, the direction of the Verbal Scale subtest means, with the exception of the arithmetic subtest, run counter to the original hypotheses. Although statistical significance was not met, four of the Verbal Scale subtests show larger means in the FTT group than in the MN group.

On the Verbal Scale of the WISC-R, the analysis of the data shows that the information subtest reveals a pattern completely unexpected in the original hypotheses. The subtest shows no significant differences in the control group (N) and the FTT group, although a significant difference exists between the N group and the MN group, and between the MN and FTT groups. Although this is a chance happening, one would expect, that from the nature of the subtest, a significant difference would occur between the N and FTT groups. In addition, since statistically significant differences were found among all three groups on the vocabulary subtest, it can be said that "concerned mothers", even in an impoverished environment, produce more verbally intelligent children. Once again, however, the direction of the vocabulary subtest means
run counter to the original hypotheses. The N group has the largest mean, but contrary to prediction, the FTT has a mean larger than the MN group.

Specifically the N group of children reared by "concerned" mothers are much more intelligent, as measured by the WISC-R Verbal Scale, than are the MN and FTT groups "reared" by neglectful mothers. With regard to the specifics of the WISC-R Verbal Scale subtests mentioned above, it can be said that the N group is superior to the MN and FTT groups in their ability to concentrate, reason arithmetically, make proper social and anticipatory judgements; they are more advanced in their accumulated learning ability, range of ideas, and have a higher level of reasoning ability.

With regard to the WISC-R Performance Scale IQ, significant differences are found in all three groups and in the directions predicted. The N group performed significantly superior to both the MN and FTT groups with the MN group performing significantly better than the FTT group. Four of the Performance Scale subtests (picture arrangement, block design, object assembly, and coding) reveal significantly higher means for the N group as compared to both the MN and FTT groups. Counter to the original predictions, however, no significant differences exist in the means of the MN and FTT groups, but the numerical progression of the means for these four subtests was as expected, the MN group has higher means than the FTT group. On the picture completion subtest of the Performance Scale, a significant difference was obtained in
the means of the N group and the FTT experimental group. No differences were obtained between the N group and the MN group or between the MN group and the FTT group. The stable pattern found on the Performance Scale subtests, as opposed to the contradictory and unexplainable outcomes on the Verbal Scale, can most likely be attributed to the fact that children from impoverished environments and of different ethnic origins (non-white) perform much better and with less scatter on the Performance Scale than on the Verbal Scale (Anastasi, 1968; Coleman, 1972; Cronbach, 1960; Kessler, 1966; Kirk, 1962; Krech et al., 1962; Lerner, 1971; Longstreth, 1968; Nunnally, 1970; Reese & Lipsitt, 1970; Ruch, 1967; Wilson, 1972). This data should not be illogically extended to conclude that the more the impoverishment, the better the Performance IQ. In this study it is seen that the most impoverished groups (MN and FTT) perform significantly inferior to a less impoverished N group. The exception in this explanation, however, is that the FTT group performed considerably poorer on the Performance Scale than they did on the Verbal Scale. The N group and the MN experimental group, however, performed better on the Performance Scale than on the Verbal Scale. Again, with regard to the Performance Scale and its subtests, it can be said that neglected children perform significantly inferior to children reared with "concerned" mothers. Specifically, the N group of children reared with "concerned" mothers demonstrate superior ability, as contrasted to the MN and FTT experimental groups, to anticipate
and plan, analyze and reproduce abstract designs and have good visual-motor coordination and perception. This group is also better able to see relationships, appraise small details and learn unfamiliar tasks quicker and easier. All in all, the N group demonstrates more mental alertness and a better capacity to concentrate.

The results on the BG reveal significant differences in the mean number of errors between the FTT and N groups and between the FTT and MN groups. No significant difference was obtained between the MN group and the N group. The implications are that the FTT group manifests a significant deficit with regard to visual-motor integration. More specifically the FTT children show evidence of minimal cerebral damage.

The data from the observational technique from the AS sampling reveal that the mean number of minutes of "off-task" behavior was significant among all three groups and in the predicted directions. The N group revealed much less "off-task" behavior than did the FTT and MN groups. The FTT group displayed significantly more "off-task" behavior than did the MN group. The meaning and significance of this "off-task" behavior can be interpreted in many ways. From the experimenter's point of view such behavior is indicative of short attention span, distractability and restlessness. Much of the behavior observed was of a very impulsive nature, demonstrated a limited ability to concentrate, low frustration tolerance, erratic and random responses to assignments, preoccupation with extraneous, irrelevant stimuli and a poor
ability to organize. The impulsive nature and extreme motor activity observed in many of these children bordered on the realm of extreme hyperactivity.

Other explanations and interpretations are plausible but do not seem to fit well with the observations made. For example, children confronted with dull, drab, uninteresting material may twist and squirm and in general make any behavioral gestures which will reduce boredom. Many teachers inadvertently reinforce active behavior on interval schedules that are highly resistant to extinction. Along the same dimension Wilson (1972) states that many problem children seem to cluster in certain classrooms, under certain (unspecified) conditions, and with certain teachers. Wilson states that a year or two with the wrong teacher "causes the child's educational lag to become compounded by a poor self-concept, emotional overlay, and a tendency to give up" (p. 3). A child who has given up in school is undoubtedly frustrated and will react appropriately (or inappropriately) to relieve the frustration. The classical reactions to frustration such as aggression or withdrawal (absenteeism) behavior may occur.

Rappaport (1966) states that a non-learning child has:

the feelings within himself and the feedback from the outside environment that mold a concept of an insecure and threatening world and a concept of himself as an inept person without identity. Such a child does not receive the normal satisfaction of recognition, achievement, or affection (p. 242).

Peers usually are very capable of reinforcing acting-out behavior and if the child in question is subject to rejection
from his peers his activities may be of an attention-seeking nature, thus various forms of reinforcement are operating. The child may act-out in the classroom the various situations modeled at home and thus generate much activity. In general, the child may be tired or hungry; he may not be able to see or hear well; his shoes may be too tight or he may need to go to the restroom; all of which may create any number of classroom problems.

Summary

This study reveals that on all variables measured, the performances of the control group of "normals" was significantly superior to the maternal neglect experimental group. This data substantiates the findings of the many institutional studies which attribute the lowered intelligence of these children to maternal and sensory deprivation. In general the MN children show a significantly retarded academic background, little ability to solve problems, whether concrete or abstract, and severe deficits in language development.

The animal studies substantiate the fact that early social and environmental deprivation can indeed produce learning deficits among other abnormalities (Denenberg, 1964; Harlow & Harlow, 1962; Melzack, 1969; Thompson & Quimby, 1964; Weininger, 1972). Language development is a major factor in which severe retardation has been found repeatedly in institutionalized and foster home children (Bender, 1945, 1947; Broadbeck & Irwin, 1946; DuPan & Roth, 1955; Fischer, 1952, 1953; Freud & Burlingham, 1944; Gesell & Amatruda, 1941;
Goldfarb, 1945; Haggerty, 1959; Lowery, 1940; Rheingold & Bayley, 1959; Rheingold et al., 1959). Language and vocabulary deficits do occur in disadvantaged minority groups, but not in the magnitude as shown by this study and not when compared to a carefully matched control group. Another interesting finding in this study was the fact that the MN group showed significantly more motor activity as measured on the AS observation. These observations are congruent with the observations made by Bender (1947), Fischer (1952, 1953), Goldfarb (1943, 1945) and Spitz (1946) with regard to institutionalized youths. The analysis of the BG drawings reveal no difference between the MN group and the N group; thus, for the MN group no visual-motor integration deficits are present. Prugh and Harlow (1962) object to the general belief that any home is better than any institution. They point out (as does this study) that there can be severe deprivations in the home and that a child's needs may not be met by his family and conclude that some children would be better served by removal.

With regard to the FTT group on the WISC-R, a quite different pattern can be seen as opposed to the MN and N groups, although, in all, the interpretations of the results are quite similar (little academic achievement, deficits in problem-solving abilities, lack of social or anticipatory awareness and lack of abstract thought). The main difference, as opposed to the N and MN groups, is that the Performance Scale IQ is substantially below the Verbal IQ (18 points).
Generally this pattern is expected when general motor or visual-motor deficits are present. With regard to such IQ discrepancies, Beck and Lam (1955), Clements (1966, 1969), Ferinden and Van Handel (1971), and Wender (1971) state that with the WISC, a Verbal IQ that is 15 to 40 points higher than the Performance IQ is one of many indications to look for when diagnosing minimal cerebral dysfunction. In addition, Ferinden and Van Handel (1971) state that a child with neurological impairment will, on the picture completion subtest, respond that there is nothing missing. This was a frequent occurrence in the present study and upon examination of the data the only significant difference in the means for the picture completion subtest is between the N and FTT groups. In general the pattern seen on the WISC-R in this study is one most frequently seen in children with minimal cerebral dysfunction.

The mean errors on the BG are significantly larger in the FTT group than in either the N group or the MN group. The pattern reveals significant differences in the FTT and the N groups and no significant difference in the MN and N groups. The preponderance of errors made on the BG with regard to the FTT group was rotation, perseveration, lines for dots, and shape distortion. Most of these children either could not recognize their mistakes or refused to admit so when questioned.

Since Bender (1947) explicitly states that the BG test should never be used alone to diagnose for minimal cerebral
dysfunction an AS sampling was conducted. The original hypotheses concerning this observation was supported in that the N group had significantly less "off-task" minutes than did the FTT or MN groups. The FTT's displayed significantly more "off-task" behavior than did the MN group. Daryn (1961), Ferinden and Van Handel (1971), and Wender (1971) all state that the most outstanding behavioral characteristics of minimal cerebral dysfunction are impulsivity, short attention spans, poor capacity to concentrate and, of course, hyperactivity. Bender (1947), Fischer (1952, 1953), Goldfarb (1943, 1945, 1947), and Spitz (1946) all report excessive motoric activity in the institutionalized children they studied. All in all, the analysis of the data for the FTT group indicate "soft" signs of neurological impairment or minimal cerebral dysfunction. In addition, this group reveals the intellectual deficits found in the MN group.

There are several viable explanations to account for the organic signs of the FTT group: (1) Naeye, Blane and Paul (1973) report that larger brains are present in the newborns of mothers who were best nourished, implicating that fetal brain growth may reach its full potential only under circumstances of full maternal nutrition. Maternal malnutrition probably plays a very important role in future intellectual development. (2) Cranial trauma may indeed induce symptoms of minimal cerebral dysfunction as seen on standardized tests and observations; however, no mention was indicated in clinic medical charts of any such trauma. (3) In addition to maternal
neglect another explanation which has been subjected to little empirical research can be offered. Bell (1968) states that "most often the child is seen as unidirectionally affected by parental influences without taking into account that parental socializing behavior could be partly dependent upon constitutional or temperamental characteristics of the child" (p. 194). Pollitt (1973) states that

Disregard for the behavior of the child as a host is surprising because of published reports that nutritionally marasmic children are weaned early, are commonly the offspring of grandmultiparous women with a history of closely spaced pregnancies, and are likely to have low birth-weights (p. 366).

Such characteristics would suggest that sucking responses, arousal level, and interrelationships with the mother are adversely affected in the infant prior to the onset of malnutrition. In turn, such conditions probably hinder food intake and thus affect nutritional status. The author introduces evidence which demonstrates that selective behavior of the malnourished child, such as sucking and lethargy, probably contribute to nutritional deficiency. Lethargic behavior and immature sucking responses hinder milk intake and secretion. Pollitt (1973) states:

Similarly, both factors might adversely affect the ability of the child to stimulate the attention of a mother heavily burdened by care of other children. Physical and sociopsychological environmental conditions will probably dictate developmental course to a great degree also" (p. 266).

These interpretations of infant-induced malnutrition are quite plausible, however very little empirical data is available to substantiate these accounts. (4) According to the
study by Whitten et al. (1969), the infants are simply not getting enough to eat mainly because of maternal neglect. In the present study, the pattern of neurologic deficits seem to lend less support to the psychogenic explanations of FTT and supports studies such as the one by Whitten et al. With regard to the FTT syndrome as viewed in this study, it is concluded that these children have poor intellectual prognoses. In addition, the present data support recent studies that imply that the child's stunted growth is due to nutritional deficits in infancy and early childhood. Also many researchers (Berg, 1973; Cravioto & Robles, 1965; Stock & Smythe, 1973) acknowledge the fact that most data indicate that severe malnutrition in early infancy will cause permanent mental retardation and brain damage.

With regard to learning, Birch and Gussow (1970) mention the fact that sociologists, psychologists and educators have come up with social, psychological and educational answers to the question of why so many poor children fail in school. The Coleman Report on Equality of Educational Opportunity (1967) showed that on nationwide tests of verbal and non-verbal achievement, children from all of the principal minority groups (with the exception of Orientals) were substantially behind the majority by the first grade, and further behind as their education progressed. The sociologists, psychologists and educators enlarge our understanding of some of the causes of educational failure in the poor, and help to define certain steps necessary to remedy them.
There is some danger, however, that our initial focus on social and cultural variables relevant to educational achievement may lead us to neglect biosocial factors which directly or indirectly influence the developing child and alter his primary characteristics as a learner. As an organism, the child is not only a mind and personality capable of being unmotivated, unprepared, hostile, frustrated, understimulated, inattentive, distracted, or bored; he is also a body which can be tired, hungry, sick, feverish, parasitized, brain damaged or otherwise organically impaired (Birch & Gussow, 1970, p. 7).

The data leave little doubt that severe malnutrition, even with hospitalization, has long term persistent effects, not only on measured intelligence, but also in learning of basic academic skills (Berg, 1973).
APPENDICES
### APPENDIX A

Summary of the Analysis of Variance of the N, MN, and FTT Groups on the WISC-R, BG, and AS

<table>
<thead>
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<th>Variance Estimate</th>
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APPENDIX B

Summary of Kruskal-Wallis Analysis by Ranks on the Four Variables Shown to Violate the Assumption of Homogeneity of Variance

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*P = .01
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