A project submitted in partial satisfaction of the requirements for the degree of Master of Arts in

Education

Educational Psychology, Early Childhood

by

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The satisfaction that come through the pursuit of a goal are found not only in the final realization but in the many pleasurable associations along the way.

I thank the parents who have shared their children and their thoughts with me. I have enjoyed and learned from our times together.

I appreciate the children in nursery school. It is through their growth that I have learned.

I especially thank the staff who have been with me at nursery school through the years. Their dedication, strength, humor and understanding have built a community where growth has happened.

I appreciate the education I have received at California State University, Northridge not only for the academic excellence but for the humanistic values. Special thanks go to Dr. Sarah Moskovitz for her understanding, guidance and inspiration.

I am most grateful to my husband, Howard Bartnof, and my parents Anna and Hyman Miller, for the many times and many ways they found to encourage, assist, and support me. They standing in the wings helped to make all of this happen.
The purpose of this project was to raise the consciousness of parents about healthy eating patterns in their families. The project is divided into three sections: 1) Review of the Literature; 2) description of the Nutritional Awareness Program for the parents at Julia Ann Singer Preschool Center and 3) evaluation of the program.
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PART I

REVIEW OF LITERATURE
I. REVIEW OF LITERATURE

A. MALNUTRITION AS A WIDESPREAD, BUT SOMETIMES HIDDEN AND ALARMING PROBLEM

Nutritional deficiency affects all age groups, but the greatest toll is among the young. The Pan American Health Organization identified malnutrition as a contributory cause of 57% of all deaths in children aged one through four in Latin America. Food and Agriculture Organization estimated that as many as 30% of preschool aged children in low-income countries suffer from second or third degree malnutrition (below 75% and below 60%, respectively, of standard body weight per age); an additional 40-45% of the children have first degree malnutrition (75-90% of them norm). United States Congress, Senate, Committee on Nutrition and Human Needs (1977).

The number of people starving today is greater than the total population of the Earth at the time of the American Revolution. "... 70% of the world's population seriously risks permanent brain damage" from either starvation or malnutrition, Lewin (1975). But malnutrition is not limited to the poor who are starving. In our prepackaged food culture, many people eat excessive amounts of over processed food and as a consequence are malnourished. Due to being nutritionally illiterate, malnutrition is also evident in the upper class, malnutrition is not solely a problem of poor people.
More than 350 million children are malnourished. Seven out of ten children under the age of six. Twenty million of them in the U.S. alone, suffer from the effects of malnutrition or starvation. (Schneour, 1975).

"Hunger", "Malnutrition", and "Starvation" are used synonymously although they have different meanings. Generally according to Schneour (1975), 'Hunger' is defined as the group of symptoms that arise from depletion of food in the body. "Malnutrition most often is defined as an impairment of risk of impairment to mental and physical health resulting from the failure to meet the total nutrient requirements of an individual." "Starvation is the most extreme form of malnutrition."

Many researchers agree that a complex of factors are important in malnutrition, Birch (1970), (see figure below), stressed the cyclical effect of poverty and malnutrition. Intervention in this cycle may be limited when it occurs at a single point. In this cycle, the poor produce a large number of children who are defective intellectually due to malnutrition beginning prenatally and thereafter. The interaction between many factors must be recognized, for it would be tragic to emphasize nutrition at the expense of other factors; social, cultural, educational, psychological, which also have profound influence on intellectual development. Still accord-
Figure 1

Birch, Environmental Relationships Between Poverty and Educational Failure

- Poverty
  - Poor maternal health
  - Poor maternal growth
  - Poor maternal nutrition
  - Inadequate family planning
  - Poor obstetrical supervision
  - Elevated infant mortality
  - Elevated infant morbidity
    - Elevated family size
      - Increased risk of school failure
      - Absence of medical care
  - Malnutrition
  - Social deprivation
  - Environmental inadequacy
  - Disadvantaged Children Health Nutrition and School Failure, pp. 268.
ing to Schneour (1975), "Within all encompassing effort to improve the conditions of disadvantaged populations, early life nutritional considerations must occupy a prominent position."

An environment which includes poverty, ignorance (malnutrition can be prevalent in the upper socio-economic level), poor housing, poor sanitation, and high rates of infections and disease. These factors, according to Birch (1970) are associated with poor, illiterate and frequently, retarded parents.

According to Shanklin (1979), "The probability that prenatal nutrition is unrelated to infant health is less than one in a million." "Genetics, nutrition, disease, family, school stimulus and other environmental variables all interact to affect mental capacity. Of all early environment influences, it seems that nutrition is by far the most important and significant factor.

Children who are malnourished early in life may be permanently stunted in their growth even if later they receive a sustained adequate diet. "If a scheduled 'growth spurt' for a given organ occurs during a period of severe nutritional deficiency, that organ may be permanently stunted for lack of
materials needed to develop it.\(^1\) Having missed its scheduled
time to develop, it usually never again has the same opportu-
nity to grow. That is why adult malnutrition, with all organs
complete and no longer growing, is a fundamentally different
problem from child malnutrition." (Schneour, 1975). Accord-
ing to Schneour (1975) at birth, an infant's brain has already
reached 25% of its' adult weight and by six months, it is
half-way to final target. In contrast the total body weight
at birth is a mere 5% of its' adult maximum and reaches the
50% mark only at age ten.

"From conception, fetal development is so rapid that if
an adult had been growing at the rate of late fetal growth
throughout life, he would be several trillion times the size
of the earth. Especially significant during fetal growth is
development of the brain, which is developed more during the
fetal stage than any other organ. The complexity of the
nervous system almost defies analysis, but approaches to cell
systems in lower forms of animal life have indicated the
proper direction." (Shanklin, 1979). Obviously prenatal
malnutrition have far reaching developmental impact.

\(^1\)Growth spurts involving cell multiplication in relationship to the
human brain: the first occurs between the fifteenth and twentieth
weeks of pregnancy and involves primary neuron multiplication and
the second begins about the twenty-fifth week and continues until
the second year after birth and is a period of neurological cell
proliferation.
B. THE INFLUENCE OF PRENATAL NUTRITION ON MATERNAL AND INFANT HEALTH

The data indicated that the greater the maternal weight gain during pregnancy, the better the birth weight, growth and performance was in the infant's first year of life. High maternal weight gain is associated with a reduction in prematurity from 15.8 percent to 3 percent. (Singer, 1968). This seems to suggest the abandonment of weight control practices during pregnancy may reduce the rate of prematurity.

A review of the case history of a 29 year old woman in the Montreal Diet Dispensary Study (1973) demonstrates the value of nutritional education and supplementation. The mother obtained services from the Montreal Diet Dispensary only during her last three pregnancies.

Her third child died at the age of one month. A physical and mental assessment was given to all of her other children. It was determined that all of the first seven surviving children are neurologically impaired, whereas the three youngest are healthy. The smallest child of the diet dispensary births weighed 489g. (1 pound, 1.25 ounces) more than the largest of the previous eight children. Table I demonstrates the importance of a substantial program for pregnant women.

C. BIRTHWEIGHT AND DEVELOPMENT

1. Birthweight and development of the baby.
Table 1

CASE HISTORY OF 29 YEAR OLD MOTHER
BEFORE AND AFTER SUPPLEMENTATION PROGRAM

<table>
<thead>
<tr>
<th>BIRTH WEIGHT RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Montreal Diet Dispensary&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M - Male</th>
<th>F - Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Birth Weight in Grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,000</td>
</tr>
<tr>
<td>F</td>
</tr>
</tbody>
</table>

Before joining M.D.D. study—— M.D.D. study——
Table II

RELATIONSHIP OF PRENATAL NUTRITION AND BIRTH WEIGHT TO NEONATAL HEALTH [36]

<table>
<thead>
<tr>
<th>Pediatric Ratings of Infants</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of infants</td>
<td>23</td>
<td>84</td>
<td>76</td>
<td>33</td>
</tr>
<tr>
<td>Average birth weight</td>
<td>8 lb, 2 oz</td>
<td>7 lb, 12 oz</td>
<td>7 lb, 2 oz</td>
<td>5 lb, 15 oz</td>
</tr>
<tr>
<td></td>
<td>(3,685 g)</td>
<td>(3,315 g)</td>
<td>(3,737 g)</td>
<td>(2,592 g)</td>
</tr>
<tr>
<td>Women on good or excellent prenatal diet</td>
<td>56%</td>
<td>19%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Women on poor or very poor prenatal diet</td>
<td>9%</td>
<td>2%</td>
<td>12%</td>
<td>79%</td>
</tr>
</tbody>
</table>
Birthweight is an important indicator of a baby's health and future mental and physical development. A baby who weighs under 5-1/2 pounds has a 3-1/2 times greater chance of mortality and defects such as retardation, aberrations in perception, poor infant development, cerebral palsy, epilepsy, behavioral disorders, apathy, instability, hyperactivity, learning disabilities (i.e.: short attention span, impairment of perceptual-motor integration and abstract reasoning and impaired intersensory integration), respiratory distress syndrome. Fifty-four percent of children with birthweights less than 3 pounds exhibit mental deficiencies as compared to 1% of normal children exhibiting deficiencies. According to Bergner (1969), "low birthweight is well established as an antecedent of excess mortality infants, and of mental retardation and other neurological disorders. The lower the birth weight, the greater is the prenatal death rate and the higher is the incidence of brain disorders and of mental retardation."

Shanklin (1979) reports "there is one estimate that by the age of ten, two-thirds of those who weighed no more than 1,500 g. (3 pounds, 5 ounces) at birth are afflicted with neurological handicaps."

The results of Shanklin's study are presented in the following Table of IQ distribution related to low birth weight in infants.
**Table III**

IQ DISTRIBUTION OF 71 CHILDREN WHO WEIGHED UNDER 1,360 GRAMS (3 POUNDS) AT BIRTH [58]

<table>
<thead>
<tr>
<th>IQ</th>
<th>No. of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 70</td>
<td>14</td>
</tr>
<tr>
<td>70-85</td>
<td>49</td>
</tr>
<tr>
<td>86-100</td>
<td>30</td>
</tr>
<tr>
<td>Over 100</td>
<td>7</td>
</tr>
</tbody>
</table>

**Table IV**

The relationship between birthweight and Socio-economic class is shown below

**INFLUENCE OF BIRTH WEIGHT ON ASSOCIATION BETWEEN IQ AND SOCIOECONOMIC CLASS [59]**

<table>
<thead>
<tr>
<th>(Control Group)</th>
<th>(Low Birth Weight Group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic Class</td>
<td>Middle</td>
</tr>
<tr>
<td>Under 60</td>
<td>1</td>
</tr>
<tr>
<td>(grossly</td>
<td>60-69</td>
</tr>
<tr>
<td>defective)</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td></td>
</tr>
<tr>
<td>(mentally</td>
<td>70-79</td>
</tr>
<tr>
<td>handicapped)</td>
<td></td>
</tr>
<tr>
<td>(borderline</td>
<td>80-89</td>
</tr>
<tr>
<td>defective)</td>
<td></td>
</tr>
<tr>
<td>89</td>
<td></td>
</tr>
<tr>
<td>(dull)</td>
<td></td>
</tr>
<tr>
<td>90-109</td>
<td>10</td>
</tr>
<tr>
<td>(average)</td>
<td></td>
</tr>
<tr>
<td>Over 109</td>
<td>36</td>
</tr>
<tr>
<td>(superior)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
</tr>
</tbody>
</table>


Shanklin further states "The incidence of moderate or severe handicaps increases with decreasing birthweight, particularly at weights of 2,000 grams and under. ... Low birthweight children were less likely to be selected for courses requiring a higher level of academic competence than were heavier children from similar types of homes. Mean IQ scores ... fell with decreasing birthweight in all social groups. A difference in IQ scores by birthweight was still evident when all with moderate or severe handicaps were excluded. ... This is not due to socio-economic factors, being equally evident when comparing children of different birthweight reared in the best homes with those reared in the worst. ... There is no evidence that low birthweight children 'catch up' as they become older."

According to Churchill (1966), a group of 51 children with "undifferentiated" mental retardation were found to have a significantly lower birthweight than a group of 51 children with IQ's above 110 matched to the retardates for sex, age and area of residence. The IQ - birthweight relationship was found to be independent of socio-cultural factors in the middle class studied.  

2 Dr. Cecil Mary Drillen reported in (Brewer, 1970) "More maternal complications are associated with low birthweight babies than those of normal weight babies. Out of 400 low birthweight babies, 52% of the mothers experienced complications while out of 400 normal birthweight babies only 10% of the mothers experienced complications."
Our infant mortality rate is now about 20 out of 1,000 live births which places us about 14th among advanced nations. Our infant mortality rate has continued a slow decrease. The prematurity rate according to Lowe (1978) has risen to over 8.2 percent. By 1968, 7.7 percent of all American babies were underweight at birth according to government sources.

2. Nutrition of the Pregnant Woman

In one study, children with the lowest IQ's were those whose obstetricians had insisted that the mothers drastically curtail calories to control their weight. According to Brewer, obstetricians recommend 1,700 calories in the last three months of pregnancy. Brewer (1977) states the mothers requirement is 2,600 calories during this time and recommends focusing on nutrition not pounds. A restrictive diet for a pregnant woman needs more consideration. If the mother is restricted on her caloric intake, it could interfere with the process of placentas. This is important in that when the size of the placenta is reduced, the surface area available for nutrients to transfer via blood flow is reduced. This blood flow reduction results in insufficient supply of oxygen, nutrients, protein, minerals, and calories. Therefore, if a mother is told that she has gained enough weight and put on a low calorie, low salt diet the chances increase for failure in normal fetal development.
During the last 8 weeks of pregnancy, the baby gains one ounce per day. The brain is developing most rapidly during this period. Cells divide to make new ones and individual cells enlarge as they mature. Malnutrition retards both types of growth but is especially devastating to new cells. From one month before birth to five months after birth, 11,000,000,000 neurons (the cells which process and analyze information) are being formed. This stresses the fact that the quality of a mother's diet has everything to do with her baby's birthweight and later development. The optimum time to begin supplementation is as early as possible in pregnancy and that supplementation should continue throughout pregnancy.

Toxemia, is caused by a lack of nutrients essential in pregnancy, especially protein. Toxemia is a disease generally seen as a disease of hypertension and kidney failure during pregnancy. These lack of nutrients results in the malfunctioning of the liver. Various compensatory mechanisms throughout the body are called upon when the liver fails to function. These mechanisms account for the high blood pressure and abnormal swelling that characterizes toxemia.

According to Brewer, when obstetricians restrict salt intake a heretofore common practice for mothers, it limits the blood flow. He argues that salt is needed to remain healthy. In low salt groups, there were: 3 times more damage
placentas; 2-1/2 times more toxemia; 2 times more numbers of infants death. In higher salt groups, the mothers had fewer delivery complications and a reduced number of leg cramps.

Swelling had been thought in negative terms according to Brewer, those babies that were born to mothers with normal swelling were of higher weight than those born to mothers with no swelling.

D. BEHAVIORAL AND COGNITIVE CHARACTERISTICS OF MALNOURISHED CHILDREN

The evidence indicates that inadequate prenatal and pre-natal nutrition may have negative effects on brain development and cognitive growth. According to Shanklin (1979) "Inadequate nutrition, especially from mid-pregnancy to five months of age, when the number of brain cells increases to approximately 80% of the adult capacity, can result in a permanent deficit of or damage to brain cells. ... During the most rapid period of brain development, which occurs from the last trimester of pregnancy to the first month or two of life, malnutrition can cause irreversible neurological damage. .... After the age of two, poor nutrition basically retards the growth of individual brain cells, resulting in mental deficiencies which are more likely to be reversible." Shanklin (1979).
Lewin (1975) stresses impairment in language ability showed the greatest lag for malnourished children. Severely malnourished children began to lag behind in language at about six months. Studies show that the damage may be long lasting and may even be permanent. Those who had minimal brain damage as an infant had a tendency to develop behavioral and learning disorders later in life. What is crucial is that although it may not be permanent, it does interfere with the child's learning and the child's adaption to society. Not only is growing up more difficult for a malnourished child but the child will probably do poorly in school (which will have certain repercussions for the child, family and community). The longer it takes the child to catch up, the more his chance for a fulfilling life will have been reduced.

Malnourished children are described by Lewin (1975) "these children as small in stature, lighter in weight, and had smaller heads than normal children. Behaviorally, they were disadvantaged, too; they did less well in formal tests of reading, writing and arithmetic, teachers found their school performances to be poorer, with more specific problems in classwork. Further, the previously malnourished children were less popular among their school mates."

Cognitive development can be affected adversely by diseases ushered by poor nutrition. Among these are:
1. **Kwashiorkor**: a nutritional disease associated with gross protein deficiency coupled with excessive intake of carbohydrates, almost always accompanied by other problems such as infectious diseases resulting from lowered resistance brought about by malnutrition.

2. **Marasmus**: is more damaging to early brain development than Kwashiorhor. Long thought of by psychologists in terms of sensory motor and perceptual deprivation, emotional neglects, the component of chronic malnutrition should not be overlooked. Insufficiency of food, along with contact, thus results in ravages of a shortage of calories and proteins.

3. **Anemia**: is brought about by malnutrition. As the child grows, his need for iron also grows. Anemia can affect the child's mental capacity and his ability to learn.

Birch (1970) and Schneour (1975) both gave similar lists of three secondary consequences of malnutrition on the developing child which can be no less devasting than the primary physical consequences.

1. **Loss of learning time**: a malnourished or ill child loses several months of life experience due to his inability to be responsive to his environment. He will lag behind normal children of the same age and environment.
2. Interference with learning during critical periods of development: Periods of learning when delayed, omitted, or missed may be irretrievable in unfavorable social circumstances.

3. Motivation and personality change: If a child becomes apathetic due to malnutrition, the mother and later teachers will respond to the child less favorably. This reduced the child's interaction with his environment. He then becomes isolated.

E. INVESTIGATIONS DONE ON ANIMALS AND OBSERVATIONS ON HUMANS

According to Adelle Davis (1972), "(i)f mothers (of experimental animals) are kept on an inadequate diet and/or offsprings have been poorly nourished, the brain cells are permanently damaged." Lewin's work on rats bears this out: Not only were brain cells permanently damaged but the number of minute nerve endings were reduced by 40% compared to normal rats.

Birch draws these conclusions from the work with experimental animals:

1. That just as the size and composition of the brain can be altered by various kinds and degrees of nutritional restrictions, so, too, does behavior appear to be affected by nutritional deprivation in young animals.

2. That animals raised on nutritionally inadequate diets may suffer from behavioral and learning difficulties, which
appear even on relatively crude measures and which may not persist after refeeding and rehabilitation; and

3. That when animals are maintained on a poor diet over several generations, the learning handicaps of the young may persist even after a generation of refeeding, mimicking a hereditary condition.

If it can be confirmed that these observations apply to humans as well as rats, then a consequence of malnutrition is that the effects of prenatal malnutrition can exist for at least two generations to stimulate the influence of hereditary, even though the proximate cause is environmental.

Smart and Smart (1973), in discussing the notion that the baby will get what he needs, regardless of what mother eats, claim based on animal experiments that this is not true. Animal experiments show that calorie and protein restrictions in the mother's diet drastically affect litter size, birth weight, growth patterns and behavior of offspring. When pregnant rats were deprived of zinc, 90% of their babies suffered from malnutrition, cleft lip, missing limbs, brain abnormalities, and curved spines. Analyses showed that the mothers had no loss of zinc; the babies did not deplete the mother's supply. They were unable to get the necessary zinc from the mother's diet.
Schneour (1975), Coffin (1974), and Davis (1972) agree that in our industrialized country, malnutrition occurs early as a consequence of the lack of breast feeding (all three acknowledge that a small percentage are allergic to mother's milk). Infant nutrition starts with milk. According to Schneour (1975), "There is a direct relationship between the rate of growth of an infant of a particular species and the amount of protein found in its mother's milk. ... A human infant doubles its birth weight in 180 days and human milk contains 1.6% protein. By contrast, cow's milk contains 3.8% protein for a doubling rate of 70 days."

F. THE EFFECTS OF CAFFEINE, ALCOHOL, TOBACCO AND DRUGS ON THE UNBORN CHILD

Most sources seem to agree that pregnant women should eliminate their use of caffeine, alcohol, tobacco and drugs. Caffeine is a commonly used substance found in cola beverages, chocolate, and many over the counter drugs as well as coffee and tea. According to Iber (1980), the ingestion of alcoholic beverages interferes with normal pregnancy; that the effects on the fetus are permanent, that whether they occur or not is a matter of the basic metabolism of both the pregnant woman, and the fetus, and, worst of all, that the deleterious effects of alcohol in pregnancy may be more prevalent in the western society than we now recognize.
In a recent study, birth defects were detected in the offspring of coffee drinking rats whose daily caffeine consumption was about 9 mg/kg of body weight — comparable to the amount in 5 or fewer cups of coffee for a woman.

Alcohol also may cause birth defects in the children of mothers who drink heavily during their pregnancy. Maternal consumption of 3 or more ounces of absolute alcohol per day is a major risk to the fetus. "Fetal alcohol syndrome" is recognized as including mental retardation, growth deficiencies, distinctive facial appearance and other malformations. There is evidence that even 'moderate' (regular daily use of 1 - 2 ounces of absolute alcohol or occasional binges) alcohol intake is detrimental during pregnancy and may increase the risk of congenital anomalies and low birth weight infants. It is also possible that consumption of low levels of alcohol can result in mental deficiencies and learning and behavior problems that are not obvious as fetal alcohol syndrome. Journal of Nutrition Education (1978).

Smoking has also proven to be a factor that increased the risk of spontaneous abortions, low birth weights and perinatal mortality in humans. According to Higgins, the birth weight of infants of mothers who smoked was 131 grams lighter despite the greater caloric and protein intake.
Drugs in mother's diets can also affect the infant's central nervous system, cardiovascular system (i.e.: rate rhythm), metabolic derangements (serum, glucose, sodium, potassium, phosphorus), dermatological problems, gastrointestinal and hematologic systems. According to the United States Department of Health, Education and Welfare (1977), "before implementation, drugs may appear in high concentrations in tubular fluid and lead to the death of the fertilized ovum. Drugs which cause an adverse effect during organogenesis may result in anatomic malformations. Drugs given beyond the period of organogenesis may effect the fetus and cause a functional disorder which isn't associated with any known anatomic malformation." If a drug use is prolonged an infant (and child) may suffer gastrointestinal tract diarrhea or dehydration. According to Walker (1979) aspirin can interfere with blood clotting in the baby as well as interfere or slow down the labor process. Other problems correlating drug use are accidental poising, overdosages and depletion of nutritional requirements.

G. IMPORTANCE OF TABOOS, SUPERSTITIONS AND CULTURAL CONDITIONING THAT MAY INFLUENCE DIETARY HABITS

What humans eat and drink may be based on physiological needs, cultural taboos, superstitions and conditioning. Some examples are:
A. In India and Asia (average annual income of $86.00 per person), a woman eats after her husband and children. Most Indians are vegetarian. This means it is difficult to receive appropriate quantities of protein.

B. Nigerian nursing mothers may not eat vegetables or fruit after delivery. They are not supposed to eat soup containing meat or fish.

C. The influence of cultural taboo is illustrated by the following example: in one culture, the only meat was owl meat. The pregnant women would not eat it for fear that it would keep the baby up.

D. While breast fed babies seem to have better advantages (nutritionally and emotionally) over bottle fed babies, the reasoning behind deciding to nurse or bottle feed is not always logical (don't want to fuss, bother, or get involved in something that nice people don't do). The abandonment of breast-feeding in underdeveloped countries by women influenced by advertising to feed formula and be more modern as resulted in many more infant deaths due to inability to continue buying expensive formula, watering it down and poor sterility control.

Lewin's discussion of a food supplementation program in Tezonteopan, Mexico, demonstrates the positive effects on parents of seeing their children's health improve through
supplementation. Tezonteopan is a low income, agricultural village in which nearly all families are chronically malnourished. The children born to women whose diets were supplemented during pregnancy and through the end of the children's second growth spurt (children two years old) were 8 percent heavier at birth than village children born before the program. The children exhibited superior language development when compared to other children of the same age in the village. At age one, the children of the well-fed women were said to be 3 times more active than their peers; at age two, they were 4 times more active. The parents responded to their children positively. They were very proud of their offspring.

Through studies like this, it becomes evident how essential early nutritional programs are. In another study of two year old children who had been malnourished, the average IQ increased 18 points after their diets were dramatically improved. Dietary intervention did not result in an increase in IQ when the children reached four years of age. According to Shanklin (1979), this is consistent with the cessation of brain development at four years.

Like Shanklin (1979) many believe that "the highest priority in American education today should be the establishment of a national program of nutrition and early childhood education. ... We must ... prevent the occurrence of gratuit-
tous retardation, that is, of retardation that results, not from genetic malformation or other unavoidable causes, but rather from social neglect. In order to do this, we must understand the importance of nutrition, especially the nutrition of the fetus ... It is a gratuitous retardation, imposed on other children whose prenatal and early nutrition has been defective. Only a society that has lost its respect for human life and concern for the fulfillment of each individual can be indifferent to this retardation. If we are able to avoid such retardation we must insure that no mother, either through poverty or ignorance, malnourishes her children in utero.11

Having reviewed the literature which underscores the crucial role played by nutrition in maternal and child life, I have developed a project to provide a series of three nutrition classes to the parents at Julia Ann Singer Preschool Psychiatric Center, Cedars-Sinai Mental Health Center.

My goals are threefold: To provide parents with nutritional awareness; to provide parents with ideas for using nutrition to enhance their child's learning; and through food preparation enhancing pleasurable interactions with their children.
PART II

THE FOUR SESSION PLANS
A. THE FAMILIES SERVED

The children that attend Julia Ann Singer Preschool Center have various problems (i.e.: learning disabilities, mental retardation, autism, social problems, emotional problems, or behavioral problems). At present there are twelve children between the ages of four and six years old in the program.

The parents are an integral part of the Julia Ann Singer program. They are involved in the classroom (i.e.: teaching, planning); they assist in developing their child's program in the learning disabilities conferences and parent conferences; also they attend parent meetings. The parent meetings are used in many ways: as a support group; as a place to socialize; and as an opportunity to share information. Both mothers and fathers attend these meetings. The parent meetings are held every Friday morning from 11:30-12:45. The nutritional awareness program will be presented during these meetings.

The families vary in many ways. Each family has one to three children. The parent's occupations vary from white to blue collar workers and their incomes range from high to low. The families are Caucasian, Spanish, Black, and Chinese. The mother's ages range from 26-39 years old. The children in the program weighed at birth, between 5 pounds, 6 ounces and 7 pounds, 10 ounces.
B. THE FIRST SESSION

The first session was used to explain the program and to gather information regarding the parents' needs. The parents had been briefly informed about the program and were expecting the presentation.

I discussed the program and gave suggestions of the types of topics they could select to discuss during the next sessions. Topics given were: The importance of nutrition for the young child; nutrition's role developmentally; nutrition used as a vehicle to provide a positive experience with an adult; nurturing that could be obtained through nutrition; the variety of concepts a child could obtain; ways to help children eat successfully; appropriate portions; encouraging the child to be part of planning the meals; eating in an inviting environment. I also offered to provide information on food supplementation programs.

The discussion with the parents revealed that their needs ranged from practical ones such as "How do I make my child eat his lunch?" To wanting to know about the information that I had acquired for this project. The differences in their needs were anticipated due to the differences in their educational, cultural, and socio-economic backgrounds.

It was clear that the general area of nutrition was of great interest. The topics the group centered around were:
1) How to develop good eating habits; 2) adapting to the needs of the developmentally delayed child, and 3) ideas for using nutrition to enhance the child's learning.

C. THE SECOND AND THIRD SESSION MATERIALS

The second and third sessions consisted of the presentation of the information, handouts, pamphlets, sample menus for pregnant women and children, bibliographies, and books were attractively displayed and available for perusal and borrowing. Below is a list of topics and points which I abstracted for my own use in leading the discussion sessions.

I. NUTRITION: GROWTH AND DEVELOPMENT

A. The most rapid and critical period of brain growth in humans begins 9 months before birth and continues into the second year.

B. Malnourished children have been reported to perform less well on a variety of intelligence tests than those who are well nourished. During rehabilitation those children malnourished during early infancy appear to be less able to recover any nutritionally induced intellectual deficits than are those malnourished in later life. The length of the period of deprivation appears also to influence the child's ability to catch up. Children malnourished for less than 4 months have been found to be less handicapped than those subjected to deprivation for longer periods.
II. ENERGY AND ENERGY-PRODUCING NUTRIENTS

A. Children must consume sufficient energy and protein of high quality in their diets to facilitate acceptable growth. Energy generated from the metabolism of fats, carbohydrates, and proteins provides the fuel that supports the maintenance of bodily functions and covers the cost of activity and growth. Protein provides amino acids for the synthesis of new tissues and nitrogen for the maturation of existing tissue in early childhood.

B. The contribution of physical activity to total energy expenditure is quite variable among children and in individual children from day to day. At all ages, activity patterns among children show wide ranges both in the time spent in the various activities and the intensity of the activities. Some infants, for example, may be quite cuddly, cuddly, and satisfied to explore their environment with their eyes, while others may expend more energy crying, kicking, and in physical movement to see the world around them. Some older children may engage in such sedentary activities as looking at books or watching television, while their peers, may be engaged in physical activities that demand running, jumping and general body movements.
C. Children whose protein intakes will be a matter of concern: children with multiple allergies who have learned to control parents by refusing all protein-rich foods have been known to experience catch-up growth when their parents learned to reinforce their acceptance of the meats and soy milk to which they had no allergic reactions. Children hypersensitive in the oral area frequently refuse all meat and eggs and will consume very limited amounts of mild and dairy products if unlimited amounts of carbohydrates such as starches and sugars are available to them. Limited financial resources restrict the amounts of high quality protein parents can purchase for their children. Without very careful planning the quality of a child's protein intake may be compromised.

III. VITAMINS AND MINERALS

A. Vitamin supplements, especially those that are colored and sugar coated (if used at all) should be stored in places inaccessible to young children.

B. Iron deficiency is the most common nutritional deficiency in North America. It occurs most frequently in 4 to 24-month old infants, in adolescent males, and in females during their childbearing years. It may result from inadequate iron intakes, impaired absorption, a large hemorrhage or repeated small hemorrhages. Suggestions have been made that children with iron deficiency may
display behavioral changes, including reduced motivation to persist in intellectually challenging tasks. Shortened attention spans and diminished intellectual performance may also result.

IV. THE DEVELOPMENT OF FOOD PATTERNS IN YOUNG CHILDREN

A. What happens during the first year of life as well as during the preschool years is of paramount importance. Food patterns begin to be formed from the day of an infant's birth. During the first 5 or 6 years of life it is undoubtedly easier to learn to like all foods than it will be later.

B. Goals for the development of food patterns:

1. Keep eating pleasurable.

2. Children should be able to eat in a matter of fact way a sufficient quantity of the foods that are given to them, just as they take care of other daily needs. The preschool child who truly enjoys most foods but is able to eat without fuss those he doesn't especially like will be fortunate later.

3. Children should be able to manage the feeding process independently and with dispatch without either unnecessary dawdling or too hurried eating.

4. Children should be willing to try new foods in small portions the first time they are served to them and
to try them again and again until they like or at least willingly accept them.

C. Prevention of obesity should begin early in infancy.
Giving the infant from birth the privilege of deciding and asserting that he or she has had enough food is well on the way to solving this problem. It is necessary that food that produces the growth of good body tissues must be provided so that more than calorie satiety is provided.

D. An adult can learn what foods the child likes by observing while he is eating.

E. Cultural patterns:
A respect for differences in food patterns influences the way an individual views himself or herself as a worthwhile being.

F. The size of the child's portions should be small so that the child can accomplish the goal that has been set. The child can ask for a second helping. If the child is unable to eat what is given, allowing the child to set his, or her own limit shows respect for him/or her. The child can still feel successful.

G. Setting limits in helping a child develop desirable food patterns.
1. The kinds of food available to the preschool child in the home are what is purchased and provided. Parents are really in command of what comes in the house. If potato chips are brought in the house it is very likely that the child will want to eat them.

2. Some people may have to change their own food habits. Some adults do not want to pass on their food habits to their children.

H. Difficulties in the formation of good food habits and ways of avoiding them.

1. Introduce new textures and flavors gradually.

2. Enlarging the child's experience with as many individual foods in as many different forms as possible.

3. Feeding individual foods and not mixtures so that the infant may learn to appreciate foods for their own flavors and textures.

4. Observing at what time of day the infant takes the new food most easily and giving it then.

5. Being patient with the first efforts and allowing the infant to learn to feed himself or herself; offering help when this infant becomes too tired to finish the process easily.

6. Securing the entire family's cooperation.
7. Being understanding of the infants effort in each new feeding process

I. Suggestions for setting up an environment to foster desirable patterns of eating.

1. Physical comfort to a child: appropriate tables and chairs; as well as suitable implements for eating.
2. Calm environment to eat.
3. Simplicity in menu.
4. It is suggested that a very small portion of a new food be introduced with a familiar and popular food. It a child only looks at the new food or just feels or smells it at first, this is a part of learning to accept it.
5. The foods should be well prepared, attractive in color, flavor and texture, and easy to manipulate. Many foods can be eaten with fingers. Spooning is tiring.

J. Common problems.

1. Sweet foods used as a reward or as a special treat reinforce the child's desire for sweets.
2. Foods that fathers dislike are not prepared as often as other foods. These foods become unfamiliar to the children and they tend to refuse them when they are served at a later time.
3. Parents concerned about children's food intake sometimes nag, urge, or even try to force their children to consume what they consider to be the appropriate kind or amount of food. The child soon learns that he or she can control many aspects of his or her parents' behavior by refusing to eat.

4. Young children are often unable to separate commercials from the program and frequently explain them as part of the program.

V. SPECIAL CONCERNS OF DIETARY INTAKE DURING INFANCY AND CHILDHOOD.

A. Many have suggested that bottlefed infants are more likely to be overfed than are breast fed infants, since parents have visual recognition of milk intakes and may encourage infants to empty their bottles.

B. Allergic responses to food result in a variety of symptoms that include diarrhea, vomiting, eczema, malabsorption, abdominal pain, irritability, and hyperactivity. Symptoms are not specific for any food or for allergies alone. They mimic those of other clinical conditions. Reactions may occur immediately after a food is eaten (within 4 hours) or may be delayed occurring within 4 to seventy-two hours.

VI. ADAPTING TO THE NEEDS OF THE DEVELOPMENTALLY DELAYED CHILD.

1. For the child with food allergies awareness of matter of fact attitudes toward eating. Respecting the child's autonomy
without giving him/or her undue control.

2. Being aware of why some children may overeat: Attention from adults; boredom; contact with others; inability or unwillingness for the child to get involved in other activities.

3. Some children undereat which may produce complications (i.e. iron deficiency). Observing the child's eating pattern may be beneficial: Is the food difficult for the child to chew? Many children with speech and language problems have a difficult time chewing foods for the muscles in their mouth are not developed; is the environment inviting? How is the food presented? Is the experience of eating pleasurable? Has the child been involved in the production of the meal?

4. Abnormal motor patterns can affect a child's ability to consume food. The child lacking a neat pincer grasp and poor eye hand coordination would have a difficult time to feed him/or herself. Providing easy foods to manipulate would build the child's self esteem and confidence.

5. Inability or unwillingness of the child to finger feed and/or self feed. If it is the child's inability to feed him/or herself providing easier foods to manipulate may be beneficial, if it is unwillingness respecting the child's choice without giving the child undue control and preventing a power struggle
6. If the child has a limited attention span at mealtime observe if the child is sitting for an inappropriate length of time; is the child hungry? Is the child participating in the conversation during mealtime? Is the child bored? Does the child enjoy the food? Does the child feel like he/or she is part of the family activity? Is the child sitting alone during mealtime?

7. Disruptive behavior at mealtime may be the child's way of getting the family's attention. When the disruptive behavior occurs is the child sent away from the table? Does it seem as if the child wants to leave the table? Does the child stay at the table and continue to receive negative attention from the disruptive behavior?

VII. IDEAS FOR USING NUTRITION TO ENHANCE THE CHILD'S LEARNING

1. Having great fun is of value in itself.

2. Feeling of communion. The act of cooking together in order to eat together.

3. Children learn to give and take, to share tasks, to wait a turn which they know will come. Their rights are considered, but so also are the rights of others.

4. They begin to learn to postpone gratification, to learn that it is worthwhile to work on a recipe and wait for its completion.

5. Brings a child closer to the beginnings of the product and cognitive understanding of it.
6. As child participates in a cooking project, they feel good about themselves. These feelings go toward the making of a healthy self-concept.

7. The senses of touching, smelling, tasting are sharpened and refined by cooking experiences.

8. Language expands: Ingredients are identified and their use explained; articulation of ideas.

9. They observe the minor miracle of the end product being more than and very different from the sum of its parts (a basic scientific concept).

10. The preparation of food stimulates their curiosity, sharpens their powers of observation and increases their awareness of the world around them.

11. Cooking stimulates social development; the ability to relate to the person they are working with.

12. Mathematical concepts—the children are introduced to relative sizes and proportions.

13. Cooking is a natural part of many science experiments (i.e. to grow a carrot and then to eat it; for the child to gather chicken eggs and then to eat them).


15. Children learn the importance of following rules of safety and sanitation.
16. Children will participate in the eating and have greater interest in the eating for having taken part in the preparation.
PART III

EVALUATION OF THE PROGRAM
A. THE FOURTH SESSION - SUMMARY AND EVALUATION

The session centered around whether nutritional awareness information and discussion had changed any family interactions. The evaluation form presented below was filled out by each participant. The value of the program for the parents was evidenced by their appreciation of diet, awareness of how nutrition can enhance their child's learning, and reports of pleasurable experiences with their child when the child is involved in food planning and preparation.

Of least interest to the parents were some of the side questions that were asked. One mother in particular had asked the majority of these questions. It became apparent that this mother is having limit-setting problems with food as well as in other areas.

Suggestions for the next group of sessions were to take more time to cover in greater depth and breadth the areas of menu planning and categories of food.

Typical of the comments include: enjoyment of the information about nutrition; realization of the direct causal relationship between the eating environment and eating enjoyment; comfort in knowing that other parents had similar problems and concerns; enjoyment of the open and informal atmosphere; freedom to ask questions or to participate in the discussions; and sorrow when the sessions ended.
EVALUATION FORM

1. What information in these sessions was most useful or helpful to you?

________________________________________________________

________________________________________________________

________________________________________________________

2. What was least valuable?

________________________________________________________

________________________________________________________

________________________________________________________

3. How satisfied were you with the balance of information presented by the leader and participation of the group?

1. _____ Very satisfied 2. _____ Satisfied 3. _____ Not satisfied

If you chose 3, please explain what improvements could be made.

________________________________________________________

________________________________________________________

4. What suggestions can you offer to the leader for a repeat of these sessions?

________________________________________________________

________________________________________________________

________________________________________________________

5. Other comments.

________________________________________________________

________________________________________________________

________________________________________________________
B. SUMMARY OF THE PROGRAM

It appears from the interest shown by the parents and the favorable reception given this program that the nutritional awareness program did serve parents' needs for information, discussion of feeding habits and problems and exploring ways to interact positively with their children. This last point must be underscored because for many parents of children in special education this avenue of nutrition is one of the remaining important few in which positive non critical interaction with their children is open.
APPENDIX

SAMPLE EVALUATION FORMS BY PARENTS PARTICIPATING IN THE PROGRAM
EVALUATION FORM

1. What information in these sessions was most useful or helpful to you?
   Nutritional information and the relation between the eating environment, eating enjoyment and nutrition.

2. What was least valuable?
   Everything was of interest.

3. How satisfied were you with the balance of information presented by the leader and participation of the group?
   If you chose 3, please explain what improvements could be made.

4. What suggestions can you offer to the leader for a repeat of these sessions?

5. Other comments.

   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
EVALUATION FORM

1. What information in these sessions was most useful or helpful to you?
   
   [Handwritten response:]
   
   2. What was least valuable?
   
   [Handwritten response:]
   
   3. How satisfied were you with the balance of information presented by the leader and participation of the group?
   
   1. ____ Very satisfied 2. ____ Satisfied 3. ____ Not satisfied
   
   If you chose 3, please explain what improvements could be made.
   
   [Handwritten response:]
   
   4. What suggestions can you offer to the leader for a repeat of these sessions?
   
   [Handwritten response:]
   
   5. Other comments.
   
   [Handwritten response:]
   
   [Handwritten signature:]
   
   [Date: 47]
EVALUATION FORM

1. What information in these sessions was most useful or helpful to you?

- How certain foods affect children's behavior
- Physical activity

2. What was least valuable?

- Was all valuable

3. How satisfied were you with the balance of information presented by the leader and participation of the group?

1. ___ Very satisfied 2. ___ Satisfied 3. ___ Not Satisfied

If you chose 3, please explain what improvements could be made.

4. What suggestions can you offer to the leader for a repeat of these sessions?

- Nutrition is more important than physical activity
- Need more exercises

5. Other comments.

- The activities were well-balanced, and different levels were presented.
- We all learned new things and strengthened our relationships.
- Could improve nutrition and activities.

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