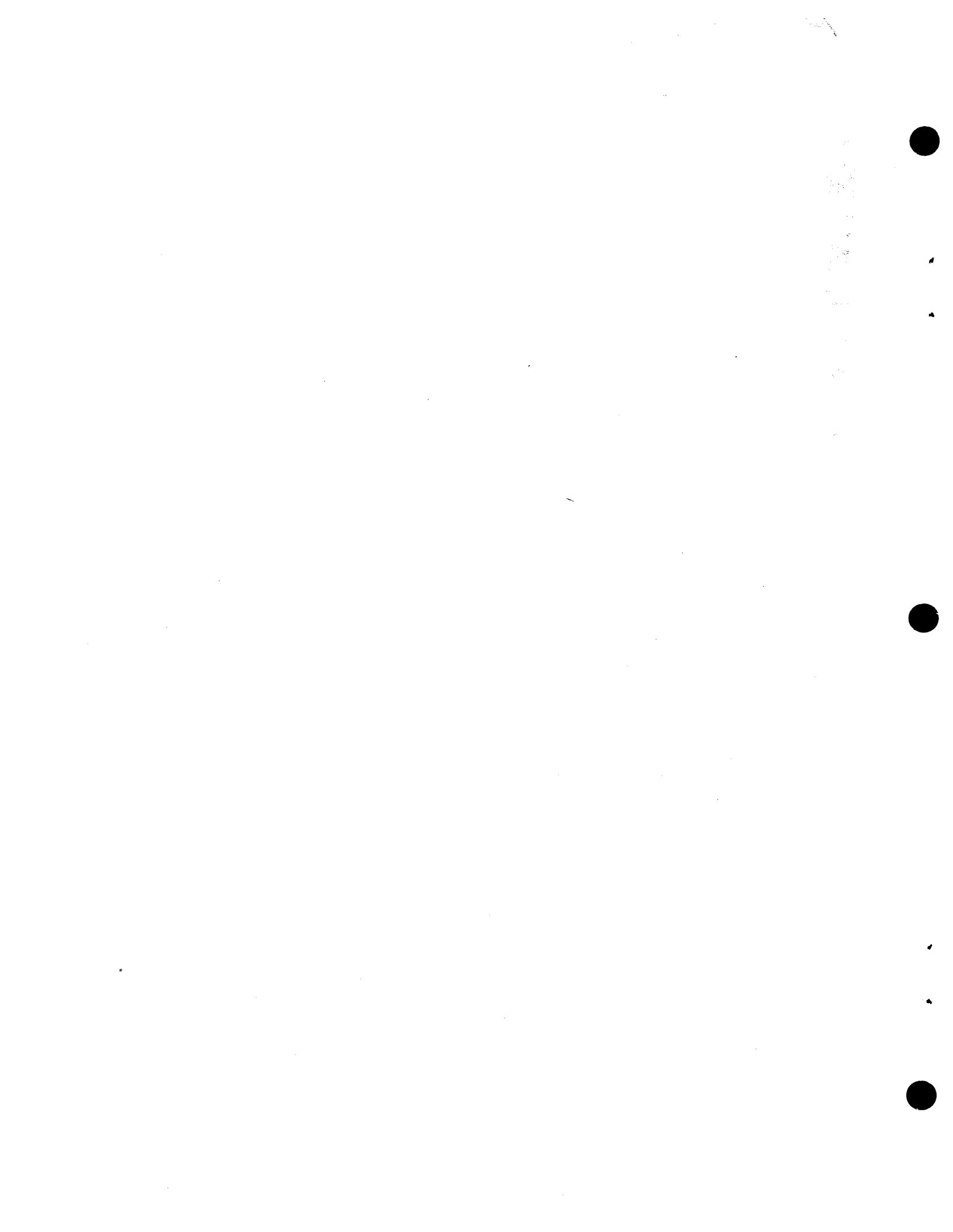


ROLE OF NUTRITION IN THE ACTUALIZATION OF THE
POTENTIALITIES OF THE CHILD: IMPLICATIONS AND
CHALLENGES FOR EARLY INTERVENTION PROGRAMMES

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It is heartening to note that present-day educators have re-discovered the importance of early intervention in a child's life.¹ Though it may be several decades before we obtain a systematic and scientific understanding of the critical biological, psychological and cultural determinants in the actualization of the child's potentialities, nevertheless, educators are beginning to direct their efforts toward formulating empirically supported, theoretical and conceptual framework from what is known to date about child growth and development for the purpose of generating preschool curricula and training programs.²

Even a cursory examination of the theoretical underpinnings of the major preschool programmes will confirm Ira Gordon's observation that "educators and psychologists do not have common sets of beliefs once they move past the broad generalizations contained in the transactional statement such as 'learning is a function of interaction between an organism and an environment [Gordon, I.J., 1971].' "

Theoretical Base for Intervention Programs and the
Anisa Theory of Development

Proponents of major early intervention programmes are coming to realize the power of a well-articulated theory of development and learning in that it offers an overarching framework for all educational planning, pinpointing goals and objectives, while at the same time giving direction to intervenors³ in their efforts to make educational

decisions on a day to day basis. Such a theory is indispensable as one moves from philosophy to practice, from levels of abstraction to levels of operation. "Theories of development," says Jerome Bruner, "are guides for understanding the perfectability of man as well as his vulnerability. They define man's place in nature and signal opportunities for changing his lot by aiding growth. A theory of development that specifies nothing but intervention is blind to culture. One that specifies nothing but intervention is blind to culture. One that specifies only intervention is blind to man's biological inheritance [Bruner, 1971]."

It is evident that the coherence and efficacy of any intervention programme to a large extent lies in the comprehensiveness of its theory of development and yet the available developmental theories are outcomes of piecemeal efforts, hastily conceived, incoherent and oftentimes mutually contradictory. Sorting out this dilemma requires a broader conceptual framework which will integrate purposefully all that is known about human growth and development. This broader framework can be found in a philosophy which contains the most comprehensive view of the nature of man. To be comprehensive in its scope a theory of development must emerge from such a philosophical base--one which explicates the nature of man, his purpose and potentialities, and how he comes to know, feel, and act. Consequently, when the Anisa model⁴ was being conceptualized, articulating such a theory became evident and therefore was the first order of business. Drawing heavily on Whiteheadian interpretation of the philosophy of organism, the Anisa model views man as a creature at the apex of creation whose reality essentially inheres in the

process of his becoming--translating his unlimited potentialities into actuality (Jordan & Shephard, 1972). From this philosophical base, the Anisa theory of development defines development (also education) as the process of translating potentiality into actuality--a process initiated and sustained by interaction of the organism with its environment. While a full explanation of the theory is beyond the scope of this paper, it would be pertinent to focus on a few unique aspects of the theory that are relevant to our discussion.

First is the healthy departure represented in the Anisa theory of development, from the age-old nature-nurture controversy in development without fallaciously dichotomizing development as being dependent on either heredity or environment. The Anisa approach concentrates on the more productive quest of understanding "how the expression of the genetic endowment presupposes environmental influences and why the nature of the environmental pressure cannot be understood apart from the genetic predisposition of the organism and the modification of the environment due to the organism's presence in it [Kalinowski & Jordan, 1973]."

Secondly, the theory recognizes two broad and mutually dependent and inextricably interwoven categories of potentialities--biological and psychological--and identifies nutrition as the key factor in the actualization of the biological potentialities and fixes learning as the fundamental factor in the development of the psychological potentialities.⁵

Role of Nutrition in Achieving Learning Competence

While the role of nutrition may be self-evident to researchers

in the bio-medical disciplines, it represents a major concept of consideration for those whose interests are either directly or indirectly related to the performance and behavior of the child. Until recently, psychologists have been parochially insular from the area of nutrition. Not only is proper nutrition essential for the maintenance of the biological integrity of the interacting organism but it also serves as a fundamental prerequisite for the actualization of the psychological potentialities. In other words, the possibilities of learning depend in the first place on the existence of a sound physical and neural base for it. Therefore, the integrity of the child as a biological organism on the one hand, and the characteristics of his environment on the other, define and determine his functional capacities. No intervention programme will be comprehensive if it concentrates merely on enriching and reconfiguring the intellectual, social and cultural environment without providing the optimum conditions in the micro-environment of the child for maintaining his biological integrity.

While a comprehensive review of the research in the biomedical sciences related to the deleterious effect of malnutrition on the growth, development and performance of the human organism would be beyond the present scope, I would like to enumerate briefly some of the findings that are relevant to education.⁶ It has been established that there are certain periods of vulnerability in the early development of the human organism during which the presence or lack of a developmental modifier causes a significant alteration in the course of normal development. During periods of rapid growth, the organism is particularly vulnerable to nutritional injury. In fact, there are strong evidences that

that critical periods which ultimately determine the full expression of the human potentialities extend over a time continuum starting at conception and going well beyond the preschool years. The effects of inadequate nutrition on the growth and mental development depend to a large extent on the point in the continuum at which the deprivation occurs, the severity and duration of the deprivation and the nutrient of which the organism is deprived. Considering all the developmental influences that man experiences, those that occur during the very early years of life, have the most profound effect. This early period of susceptibility definitely includes the pre- and post-natal life because the human body and the brain are incompletely differentiated at the time of birth and they develop as the infant responds to environmental stimuli. During this period, the central nervous system is on a different time scale from the growth of the rest of the body as a whole. The brain grows most rapidly pre- and post-natally.

No educator would deny the need for a sound intersensory integration for the acquisition of early sensory-motor and manipulative skills which are fundamental prerequisites for cognitive, language and socio-emotional development. Poor intersensory integration was one of the most common symptoms found in children suffering from protein calorie malnutrition during the early years of life in longitudinal studies conducted in countries where protein calorie malnutrition is endemic (Cravioto, 1966). Poor intersensory integration also affects the maturation of the modalities of perception--visual, auditory and kinesthetic--all of which are heavily implicated in achieving reading and writing skills. If maturation of these modalities is uneven due

to early malnutrition, children come to school with a specific modality deficit for learning to read and write. To this extent, poor intersensory integration is a suppressor of the psychological potentialities.


Even though there is research evidence to indicate the extraordinary plasticity and malleability of the human infant and his capacity to learn, one should not take for granted this resiliency exhibited during the early years of development. An example may be cited from the contributions of developmental neurobiology to our understanding of language development. Lennenberg indicates that there may be a critical period for language acquisition related to brain growth.

A survey of children with a variety of handicaps shows that their grasp of how language works ^{is} ~~if~~ intimately related to their general cognitive growth which, in turn, is partly dependent on physical maturation and partly on opportunities to interact with a stimulus rich environment . . . major milestones for language development are highly correlated with physical development Neurological material strongly suggests that something happens in the brain during the early years that changes the propensity for language acquisition. We do not know the factors involved, but it is interesting that the critical period coincides with the time at which the human brain reaches its final state of maturity in terms of structure, function, and biochemistry [Lennenberg, 1969].

Apparently the maturation of the brain signals a decrease in the plasticity of the human organism and locks certain functions into space.

Whatever its ultimate effect on the condition of the brain, malnutrition interferes with the child's motivation, ability to concentrate and his ability to learn. One of the most palpable clinical manifestations of severe early malnutrition found in children is a striking combination of apathy, irritability, extreme nervous tension, and listlessness. This apathy inhibits volitional competence as the child does very little as a result of his own will or intention. Apathy itself is a sign of lack of motivation. Unresponsiveness on the part of the child characterizes his relation to people as well as objects. When his relationship with other people is affected, his development of moral competence may also be affected. This ultimately leads to impairment of all other competencies, the consequences of which are reflected later on in the child's attitude and values system.

Thus evidence is fast accumulating in support of the view that the effects of undernutrition on performance interfere with the development of the central nervous system or operate through a series of indirect effects that would include a) a loss of learning time, b) an interference with learning during critical periods of development, and c) the changes in the individual's motivation and personality. These findings represent a major contribution to the resources for the planners of intervention programmes. The intense concern with the performance of the central nervous system--intelligence, memory, learning and behavior--ranks among the major challenges faced by psychologists and educators of today. Even after an adequate structure of the central



nervous system has been established, nutritional deficiencies during the subsequent years can severely impair the neurophysiological bases for learning and behavior. Learning competence is the conscious ability to differentiate and integrate experiences which are necessarily mediated through the central nervous system. Impaired functioning of this system at any time for any reason will affect learning competence. Learning deficits and abnormal behavior may also result from brain dysfunction due to genetic and congenital defects.⁷

Emotional Disturbances

We label a child emotionally disturbed when his reactions to life situations are so personally unrewarding and so inappropriate as to be unacceptable to his peers and adults (Pates, 1963). In an educational setting the child who is emotionally disturbed usually disrupts the class, places undue pressure on the teacher, and elicits the kinds of responses from others that further his own emotional disturbance in that process. Emotional handicap, however, has its origins in certain physiological deficiencies and/or psychological maladjustments and there is no one cause of childhood emotional problems.

Advances in biochemical psychiatry, neurology and physiological psychology have illumined our appreciation of the critical role of the central nervous system. Current or antecedent nutritional injury, can cause many behavioral abberations. Pyridoxine deficiency causes severe irritability and uncontrolled convulsive seizures (Coursin, 1966). Malnutrition during the formative periods of the central nervous system can cause maturational lag in neural development resulting in lack of cortical control due to a corresponding delay in maturation and improper

functioning ~~functioning~~ of the endocrine system and the neural mechanisms that control emotions. ↓ *

Often "psychological malnutrition," called the psychologists' "marasmus," is due to an imbalance in the "psychological nutrients," e.g., acceptance, affection, approval, attention, protection, control and guidance. A complex matrix of behavioral disturbances which emotionally handicapped children exhibit, whether they are autistic, schizophrenic, hyperkinetic, include any or all of the following characteristics: short attention span, disordered behavior, emotional lability, social incompetence, defective work habits, impulsiveness, and specific learning disorders. The differences between normal and hyperkinetic children or neurotic children are continuous. The distinction is in terms of the severity of the symptoms such as aggression, excessive activity, withdrawal, fear, and stuttering. The use of tranquilizers to change the behavior and emotional state of the child is at best only treatment of the symptom and therefore very short-sighted. This is only temporary and the children later on withdraw to an inner world of their own. Participating in later life in the normal activities of a socially responsible citizen, including parenthood becomes difficult for drug abusers and eventually they fill reform schools, mental institutions and prisons.

Based on experiences working with disadvantaged children and their families, many educators have taken the stand that environmental inadequacy is the primary factor contributing to intellectual deficiency, behavioral abnormalities and the resultant inability of the child to cope with the increasing complexities of the society. Such a stand is stark evidence of the growing gulf in the interdisciplinary understanding

between biomedical and the behavioral sciences. Biochemistry and molecules do not dictate all behavior and we need to realize that biochemical changes may be a result of behavior as well as the cause of behavior. Developmental deficits and behavioral abnormalities may have genetic bases and nongenetic or environmental bases--physiological and psychological--and all possible combinations of these factors. Planners of intervention programmes, in their efforts to facilitate optimum growth and development in children, should not overlook the existence of contributing biomedical factors although less well defined than the environmental ones but which have already been determined to be of immense importance in releasing the child's potentialities.

Key Points of Intervention

The role of parents in facilitating the child's development has assumed a key emphasis in intervention programmes. There are many schools of thought as to the choice point of intervention in the self-perpetuating parent-child interacting cycle. Many feel that in early intervention programmes it is advisable to work with parents during the first two years of life, starting from six months of the child's life. Gordon (1968), Weikart (1969), and Nimnitch (1970) are among those who have advocated and implemented parent education and/or home visits in early intervention programmes. In the Anisa framework, the mother-to-be, the fetus and the infant and the preschool child assume central positions in the overall scheme of educational planning. The child is viewed as a part of an ecological system in which he is always experiencing some form of interaction with the environment. Some interactions can be stimulating and supporting and thus provide the requisite conditions for

optimal growth and development while others can be suppressive of the innate potential. During the child's formative years the most significant and immediate change agent is the mother--a key element in the basic ecological system. Hence intervention is planned to include the mother as well as the unborn child. The role of the mother in the child's ecological system can hardly be over-estimated. Her role may be the crucial variable in the operational definition of the term disadvantaged (Miller & Camp, 1972). Mother's apathy, ignorance and emotional immaturity, whether she be in Guatemala or Long Island, New York, is the ubiquitous contributing factor in the etiology of emotional aberrations, learning difficulties and other handicaps in children.

Even though we have no true anti-natal or post-natal norms, this should not be taken as an excuse to be indifferent in providing the adequate environmental conditions for the developing fetus and the infant. The adequacy is largely determined by the mother's physical, psychological and emotional status during the successive phases of motherhood. From our knowledge of intrauterine development and pre-natal studies we can safely conclude that the environmental influences--biological, psychological and cultural--begin to operate from the moment of conception (Montague, 1962). Of these influences, malnutrition is the most detrimental. The total environment of the newborn child is extremely restricted and the radius of the physical environment is very small. The social environment in the life of a normal infant is restricted to practically one, single person--the infant's mother or her substitute. This limitation of the infant's habitat and of its social contacts permits one to have close control over the psychological factors that are also operative during the early part of the child's

life. The pivot of all development in this circumscribed environment is the quality of the mother-child relation during the early stages of the growth. Therefore, this relationship becomes central to the ecological factor in the growth and development of the child. It is clear that proponents of preventive medicine and preventive psychiatry should invest a major portion of their resources in understanding the ecological factors that are in play during this period.

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In sum, the Anisa model holds that human potentialities, whether biological or psychological, can be actualized only to the extent the circumstances in the environment favor their phenotypic expression; and that the key strategy in any intervention programme should be to insure sound nutritional and psychological and emotional states of the mother at least a year prior to conception and during the pre- and post-natal growth of the child. According to the World Health Organization, "maternity care in the wider sense begins much earlier in measures to promote the health and well-being of the young people who are potential parents, and to help them to develop the right approach to family life and to the place of the family in the community." The statement goes on to add that objectives of such measures should be to insure "that every child wherever possible, lives and grows up in a family unit, with love and security in healthy surroundings, receive adequate nourishment, health supervision, and efficient medical attention and is taught the elements of healthy living. [WHO, 1969]."

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The ultimate dream of any intervention programme should be prevention. The Anisa model makes provision for intervening in the anticipated life of a child a year or so before his conception by

insuring that the nutritional status of both the mother and father is adequate to maximize the likelihood of conceiving a fully-functioning, healthy child. Since the provision of adequate nutrition remains important throughout life, the model provides for collaborative efforts among community, school and home to maintain an optimum nutritional status in all students and staff.)

No major breakthrough in education can come about unless there is a high degree of integration and application of the vast body of research from several disciplines that have contributed to our understanding of human growth and development. "All systems of education and of research," observes Rene Dubos, "have been organized on an analytic pattern. What science has been successful at, by remaining for 350 years faithful to the Cartesian doctrine, is to take any kind of problem and dissociate it into its components. This is what universities are organized to do both research and training [Dubos, 1967]."

Anisa is a mission-oriented institution that has been precisely designed to provide the kind of integration sorely needed for research and action, and has provided a blueprint for a system of education for man to be able to actualize his full range of potentialities.

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FOOTNOTES

1. Since the inception of Head Start Projects during the summer of 1965 preschool education has become a major component of publicly supported educational venture in this country.
2. A survey conducted in 1972 revealed over 200 preschool curricula in existence in various stages of conception and implementation in this country alone. For an excellent review of the theoretical bases of some major intervention programs, see Preschool in Action, R. Parker (ed), Boston: Allyn & Bacon, 1972.
3. From the ANISA point of view an intervenor is one who is involved in aiding the actualization of the child's potential, e.g., the parent, teacher, aide, support staff, school administrator, curriculum specialist.
4. For a comprehensive overview of the ANISA model, see Young Children, 26, 5, June 1973.
5. The psychological potentialities are categorized as psycho-motor, perceptual, cognitive, affective and volitional.
6. See position paper of the Food and Nutrition Board entitled The Relationship of Nutrition to Brain Development, National Academy of Sciences/ National Research Council, Washington, D. C., June 1973.
7. Besides the inborn error of metabolism, phenylketonuria, recent researches have raised the possibility that certain other kinds of congenital faulty metabolism may cause language and speech disorders. Histidenemia, a condition where there is an abnormal metabolism of one of the essential amino acids, histidine, results in two problems: one in articulation and the other in language, due to the inability of the tongue to perform certain movements hitherto considered an orthodontic problem (Witkop, C.J., & Henry, F.W., 1963).



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