

NUTRITION AND PSYCOLOGICAL DEVELOPMENT SPECULATIVE OVERVIEW

FRANCISCO COBOS

Harvard University, U.S.A.

A barriga llena, corazón contento.
(A Colombian adage)

The importance of malnutrition as one of the great scourges of the world today has been amply recognized. As early as 1960 the Director of UNICEF, Maurice Pate¹ suggested that 750 million children, out of the estimated one billion children in the world, were sick and hungry and would live a shortened life. It has also been pointed out that although many children with malnutrition die, the majority will survive and will live with the sequelae of such condition.

Recognizing that so much organic pain cannot but be accompanied by overwhelming psychological suffering, these facts should alert the human behavior scientists, obviously interested in the psychological welfare of children, to this statement of a problem of great and transcendental importance.

The present paper will attempt to focus attention on the role that in the past the behavior scientists have played in the attempts to solve the problems posited by the ways and means through which the nutritional status of an individual influences the development and functioning of his mental apparatus.

This will be accomplished by a review of the pertinent literature and by a rapid speculation on the concepts, both psychiatric and psychological, which may be of value in the understanding of the stated problem. Finally a brief note will be introduced as to the role and participation of the human behavior scientist in relation to the problem of malnutrition.

* * *

The relationship between the nutritional status and the psychological development and performance of the individual, has, prior to this century, been suspected of being one of causality. Sociocultural and economic changes fostered the appearance of efforts to clarify and understand such a relationship. These efforts are particularly outstanding in the American literature.

During the second decade of this century the importance of school performance brought to the fore the need to investigate the causal factors of poor psychological functioning, and among them the role of malnutrition.^{2 3}

Other cultural milieus, possibly under the same motivational forces, undertook the same line of research.⁴ In the following years the efforts were not only directed at observing variations of performance on psychological tests in human subjects^{5 6 7} but also certain other investigational lines were pursued: animal experimentation,^{8 9 10 11 12 13} relationship to school situation,^{14 15 16} and practical application of the available knowledge.^{17 18 19 20}

But the major impetus for the study of the influence of deviant nutrition on psychological development came some time after World War II. Doubtlessly, the devastation of war was an incentive to evaluate the role of famine and starvation on the psychological dynamics of the developing individual, as testified mainly by the works of Smith.^{25 26} The post-war period gave rise to new situations conducive to the focusing of scientific attention upon the underdeveloped areas of the world and its main health problem, namely malnutrition.

Followed by a period of intense study of malnutrition per se, the investigation of its relationships to mental functioning naturally ensued. As early as 1944 some findings in this respect were already being reported,²⁷ but the main body of work came with the initiation of publications by the Latin American groups.^{28 29 30} Research conducted in other geographical areas during this early post-war period is witness to the universal importance of the problem.³¹ However, the general trend in other locations was toward the assessment of damage to the central nervous system, secondary to deprivation of food,^{32 33 34 35 36} a trend which seems to continue up to the present time.³⁷

Within the past few years the outflow of scientific literature on this subject has greatly increased. Some of these new data pertain to the classical model of attempting to find causal parameters between malnutrition and mental functioning,^{38 39 40 41 42 43 44 45 46 47} others are related to socio-familial factors of the malnourished subjects^{48 49} others have been related to psychological characteristics of the target populations independently of the state of nutrition,^{50 51 52 53} still others reflect the interest of some authors on the effects of variations of the nutritional status upon the central nervous system functioning^{54 55} and finally, some are concerned with animal experimentation.^{56 57 58} It is highly relevant to note that most of the research mentioned, although mainly related to psychological matters, has been produced by nutrition-oriented groups. The role of the human behavior-oriented scientists has been rather minimal in the study of the effects of variations of nutrition on the psychological develop-

Nutrition and Psychological Development

ment and performance of the human subject, probably as a result of awareness of the importance of the problem.

Among the human behavior-oriented groups the trends have mainly been in two different directions. On one hand, child psychiatrists particularly have been interested in the psychopathology of children with failure to thrive or growth retardation,^{59 60} suggesting strong associations between emotional and social factors and the resultant failure to gain in height, one of the definitional parameters of malnutrition. Some works have been published relating the presence of hypopituitary states resulting from the impact of emotional events in the life of the child,⁶¹ simulating other types of malnutrition, with deficiencies in ACTH and growth hormone. These kinds of studies have emphasized the importance of emotional and in general psychological factors in obtaining normative levels of nutrition and physical growth,⁶² but have not focused on the psychic sequelae of malnutrition secondary to food deprivation.

On the other hand, psychiatrists in general have also been interested in the already classical subject of deprivation as such, including mainly maternal and familial deprivation, which in some quarters are thought of as being at the root of the deprivation of food. Current interest can be dated from the works of Ribble and Spitz.^{63 64 65} The mainstream of the conceptual approach centered around the maternal deprivation^{66 67 68} although some authors have pointed out the role of "negative biological factors" in the etiology of the picture resulting from this kind of deprivation.^{69 70} Doubtlessly this interest corresponds to the swing toward the side of nurture in the nature-nurture controversy, in relation to factors affecting mental development. However, the precise role of nutrition has not been specifically considered by the theorists in the psychiatric field, except perhaps in relation to the organic effects of some specific nutritional deficiencies in the production of well known entities (pellagra, Korsakoff's syndrome, cretinism, etc.).

The psychologists have contributed to the study of the problem of the relationship of the nutritional state to mental functioning by many and different ways and means. First and mainly, they have provided the measuring instruments to assess variations in mental function. In this respect, literally thousands of instruments have been devised in an attempt to measure every possible measurable parameter of psychological activity.⁷¹ The majority of these instruments are under criticism from various viewpoints.^{72 73 74 75 76 77 78 79} Their descriptions have been amply reviewed,^{80 81 82} and some of them have been widely accepted as useful diagnostic adjuncts.⁸³ Most of the instruments used in the evaluation of the influences of nutrition have dealt with the concept of intelligence which by itself has been

the subject of much controversy.⁸⁴ The awareness of some of the shortcomings of the classical concept of I.Q. has inclined recent investigators to include other parameters or to undertake other approaches in their psychological batteries.^{38 41 42 85} In spite of the efforts to construct tests of intelligence isolated from social and cultural contexts⁸⁶ the results have not been satisfactory.⁸⁷ The problem seems to reside on the fact that the attempts have been directed to assess the content of mental structures, naturally determined by experience, rather than the organizational aspect of such structures. On the conceptual basis of the developmental theory of cognitive maturation,⁸⁸ some efforts have been made to devise psychological instruments able to give a more realistic picture of the cognitive development of children,^{89 90 91} which eventually may become the most useful way of investigating the primary influences that nutrition may exert in the development and function of the mental apparatus.

* * *

Among the wealth of conceptual structures of psychiatry, the psychoanalytic doctrine has always offered a rich variety of references, although most of them indirect, to nutrition. The fundamental concept of Instinctual Drives, initiated by Freud in 1905,⁹² which is obviously present at the root of the conceptualizations about feeding behavior and therefore in intimate relation to psychoanalytic ideas about nutrition, was one of the elements necessary to the construction of the theory of infantile sexuality. The initial stage of development, the "oral stage," or in the words of Fenichel, "more correctly intestinal,"⁹³ is that one during which most of the psychic energies are processed within the framework of the original need for food and nourishment. It is highly critical to realize that the "oral introjection" is simultaneously the executive of the "primary identification" which plays a great part in the process of building up the subsequent Ego, whose nature depends not only on the personality of the people around the child but more basically, in what is introjected through the mouth. It is a classical dictum in psychoanalytic theory that the limitation of the external world by oral incorporation is also the basis for that magical primitive mode of thinking, with which the human being initiates his psychological life.

Here it is to be emphasized that at the most primitive but most decisive stages of development, the food and therefore the possible nutritional state plays a capital role in determining the styles of future life.

The theme of the relationship between the actual incorporation of nutritional elements through the mouth, or its psychological de-

rivatives, and the development of the psychological structures, runs like a thread through the fabric of psychiatric theories. The obvious fact that total lack of introjectable elements would result in psychic and organic dead, would not retrain us to consider the possibility that minor degrees of deprivation of such elements would result not only in various levels of actual malnutrition but also in profound changes in the primitive organization of the intrapsychic life. The predictable chaotic disorganization of Ego structures would result in very severe psychopathology.

The next step worth considering, that the conceptual framework of the psychoanalytic doctrine offers to help to understand the intimate relationship between the nutrition of an individual and its total mental functioning, leads to the consideration of the Object Relation formation. Beyond that extreme of egocentric functioning of the first few days after birth, the mental development must proceed between the atmosphere of the relationship of the infant to other persons. The natural mother becomes, in the majority of the cases, the "First Object" insofar as that natural mother exerts the functions of motherhood. Brody⁶⁵ has emphasized the fact that in the mother-infant interaction, feeding takes a central position in that most things that a mother does with her infant, however unrelated in style they may be to each other, are related to her style of feeding behavior with him. From this point of view the maternal activity of feeding the infant serves better than other activities as a model of the mother's behavior toward the child. As a matter of fact, it is difficult to conceptualize the existence of motherhood without the feeding activity. It is not precocious to state here that it should be considered that, at this stage of development, lack of feeding (i.e. malnutrition) is equivalent to lack of motherhood. It is obvious that at these levels any attempt to discriminate between the isolated effects of malnutrition and the better known effects of maternal deprivation^{66 67} simply represents a misunderstanding since both of them integrate a common operational force.

This kind of statement has been dealt with by Spitz⁹⁵ when in describing the clinical entities of the Primary Overt Rejections he suggests that attempts to feed the infant are unsuccessful in these entities, resulting in the clinical picture described by Ribble⁹⁶ in which the child becomes comatose, dyspneic, with extreme pallor and reduced sensitivity, ending usually in death. Spitz assumes that it is highly likely in these archaic reactions that even when the danger to life has been overcome, other perhaps less critical, psychosomatic sequelae will appear. Again, the effort to categorize such sequelae as a result of malnutrition or maternal deprivation is evidently futile. Bowlby has been particularly interested in stressing

the need of the child for a certain degree of reliability and continuity in his relationships with the external Objects and the pathology resulting from the disruption of such bipolarity.⁹⁷

Although in the ensuing periods other developments occur, the basic intertwining of the feeding acts with the maternal function, and the relationship of the mother to the child, as catalyst of the further development of the mental apparatus, remain acting through different forms and under diverse disguise in the manner that water is implicit in ice and hydrogen and oxygen are implicit in water. This is mainly because when we refer to the mother we recognize that the "agent of care" is the essential concept and that care has the primary connotation of provision of nutritional elements.⁹⁸

This has been well recognized by Winnicott⁹⁹ when he remarks that the main feature of infancy is dependency, and further states that at this level of development physiology and psychology have not yet become distinct and separate. As a matter of fact the lack of distinction between organic and mental activity explains the answer to the often raised question that under some conditions the mother may fail to properly nourish her child as a result of her ignorance of the nutritional values of food and not as a consequence of deficient motherhood. The fact is that it has been assumed that preventing the appearance of the hunger sensation, as such, is the task of motherhood, as far as the feeding sensation is concerned. Evidently this is a very important component but it only represents the satiation of the form that the instinctual drive takes and not the drive itself. The physiological needs, manifested as instinctual drives, are here indistinguishable of the psychological ones and there is no doubt that even if the child is not experiencing frustration of his hunger feelings, his progressive physiological deterioration is equivalent to psychic derangement as a consequence of the maternal unconscious factors that affect the efficiency of motherhood.

Further ahead along the developmental road this state of "dependency," implicit in the fact that the infant must be "taken care of," that he is not yet a member but an object of possession, establishes a set of necessary conditions for the "depended upon" member of the oncoming new dyad: the family. These necessary conditions center on the fact that the family, in order to function optimally as such, must be dependable, mainly in terms of the basic biological needs, i.e. nutrition. Here again we may focus upon the failure of the family to interact with the child optimally and we may conceptualize a set of hierarchies of levels of failure. Doubtlessly, high in such hierarchy will be found the failure to provide nutritional elements in order to attain an adaptive level of biological functioning.

Once again it seems within the line of logical thinking to assume that nutritional deficiencies basically represent a failure of the family structure to fulfill one of its main functions as counterpart of the child in the developmental dialogue. The impact of such family failure upon the developmental lines and upon the total psychological dynamism cannot be separated from the psychological results of mere food deprivation.

Finally, and outside the strictly psychiatric domain, the society to which the individual malnourished child belongs, forms the third level of developmental bipolarities, and what has been said of the mother and the family may be applicable to the social parameter. The presence of food deprivation in a given individual necessarily implies a breach of function of the containing social milieu. Such a breach will not only carry with it the effects of the lack of food, but also the effects of the lack of society's optimal interaction with the individual. The psychological sequelae of such state of matters will be contingent upon the deprivation of societal optimal function as much as upon the absence of nutrients.

The preceding speculations are found in a summarized and different way in a paper by Piaget¹⁰⁰ in which he quotes Claparede's demonstration¹⁰¹ that a need is always a manifestation of disequilibrium, and that when something either outside ourselves or within us (physically or mentally) is changed, behavior has to be adjusted as a function of this change. Evidently these new ways of equilibration, products of the insatisfaction of the need for food, determine particular behaviors, which are not present when such a need has been satisfied. We are taking here the term "behavior" with the broadness that Piaget imparts to it, including the basal situation for the progression to higher levels of equilibration. This implies that since in the initial phases of the construction of the mental apparatus, the successive mental structures that engender development can be considered as so many progressive forms of equilibrium each of which is an advance upon its predecessors, the total process of development will proceed along lines different from those which are followed by the normative events.

Some pragmatic insight as to the validity of these types of hypothesis could be attempted by comparing the long range effects of malnutrition upon the function of the mental apparatus with the better known effects of different types of maternal deprivation, were it not for the fact of the intricate complexity of this concept of maternal deprivation, as pointed out by Yarrow.¹⁰² A great variety of events and environmental circumstances precede, occur concomitantly and follow the failure of the function of motherhood. The major theoretical issues so considered are: the appropriateness of

sensorial and perceptual simulation, the concept of environmental contingencies, the critical period hypothesis, the understanding of constitutional differences, the selective response of the developing organism, the timing of the trauma along the developmental staging, etc. Some of these complexities have been explored, but not so those pertaining to the deprivation of food.

Similar conceptualization can be advanced for the interaction of the child with his family and his society. The complexities here, in relation to familial and societal deprivation as contrasted to the deprivation of food, are even more difficult to discriminate and their exploration awaits further investigation.

* * *

These psychiatric, psychological and developmental approaches and avenues of exploration are added to the already present possibility, suggested by animal studies, of direct and organic damage to the central nervous system and to the less well known of the effects of diet on mental illness.¹⁰⁵ All these data indicate that the effects of deviations of nutrition may have multiple causality ways to interact and influence the development and optimal functioning of the mental apparatus.

The exploration of this recognized problem acquires high priority in those geographical areas in which malnutrition plays an important role in diminishing the adaptive power of the population, thus being operative in maintaining low levels of sociocultural development, which in turn may foster conditions conducive to malnutrition. The treatment of such a vicious circle urgently requires the cooperation of the human behavior disciplines and represents in the last instance the perfect example of interdisciplinary therapeutic intervention in the best humanistic tradition.

BIBLIOGRAPHY

- ¹Pate, M., "UNICEF Goals in Maternal and Child Health." *Am. J. Pub. Health*, 50, Part II, 8, 1960.
- ²Benedict, F. G., Miles, W. R., and Smith, H. M., "Human Vitality and Efficiency under Prolonged Restricted Diet." *Carnegie Inst. of Washington. Pub. No. 20*, 1919.
- ³David, H. L., "Relations of Mental Retardation to Nutrition." *Hosp. Soc. Service*, 6:92, 1922.
- ⁴Blanton, S., "Mental and Nervous Changes in the Children of the Volksschulen of Trier, Germany, Caused by Malnutrition." *Nen. Hyg.*, 3:343, 1919.
- ⁵Halck, H. G., "Diet and Efficiency." Chicago, Ill., The University of Chicago Press, 1929.
- ⁷Nicholls, E. E., "Performance in Certain Mental Tests of Children Classified as Underweight and Normal." *J. Comp. Psychol.*, 3:147, 1923.
- ⁷Smith, A. G. and Field, A. M., "A Study on the Effect of Nutrition on Mental Growth." *J. Home Econ.*, 18:686, 1925.
- ⁸Anderson, J. E. and Smith, A. H., "Effects of Quantitative and Qualitative Stunting upon Maze Learning in the White Rat." *J. Comp. Psychol.*, 5: 337, 1926.

Nutrition and Psychological Development

- ⁹Anderson, J. E. and Smith, A. H., "Relation of Performance to Age and Nutritive Condition in the White Rat." *J. Comp. Psychol.*, 13:409, 1932.
- ¹⁰Franck, M., "The Effects of Rickets-producing Diet on the Learning Abilities of White Rats." *J. Comp. Psychol.*, 13:78, 1932.
- ¹¹Maurer, S. and Tsai, L., "Vitamin B Deficiency in Nursing Young Rats and Learning Ability." *Science*, 70:456, 1929.
- ¹²Ruch, F. L., "The Effect of Inanition upon Maze Learning in the White Rat." *J. Comp. Psychol.*, 14:321, 1932.
- ¹³Tang, Y., Chin, K., and Tsang, Y. H., "The Effect of a Vegetarian Diet on the Learning Ability of the Albino Rat." *Contribu. Nat. Res. Inst. Psychol. Acad. Sinica.*, 1:21, 1932.
- ¹⁴Bliss, D. C., "Malnutrition, a School Problem." *Elem. Sch. J.*, 3:298, 1921.
- ¹⁵Editorial: "The Health and the Intelligence and Physique of School Children." *Brit. Med. J.*, 1923.
- ¹⁶Stalnake, E. M., "Comparison of Certain Mental and Physical Measurements of School Children and College Students." *J. Comp. Psychol.*, 3:181, 1923.
- ¹⁷Dennett, R. H., "Routine Use of the Vitamin B Factor in Infant Feeding." *J. Am. Med. Assn.*, 92:769, 1929.
- ¹⁸Editorial, "Diet and Intelligence." *Am. Med.*, 37:109, 1931.
- ¹⁹Levine, V. E., "The Importance of Nutrition in Child Hygiene." *Scient. Mo.*, 28:554, 1929.
- ²⁰Maurer, S., and Hanke, M. T., "Diet, Health and Intelligence." *Ill. Health Quart.*, 3:214, 1931.
- ²¹Fritz, M. F., "The Effect of Diet on Intelligence and Learning." *Psychol. Bull.*, 32:355, 1935.
- ²²Seymour, A. H. and Whitaker, J. E. F., "An Experiment on Nutrition." *Occupational Psychol.*, 12:215, 1938.
- ²³Jones, J. E., "Relationships in Physical and Mental Development." *Rev. Educ. Res.*, 9:91, 1939.
- ²⁴Jones, H. E., "Mental and Physical Development." *Rev. Educ. Res.*, 9:1, 1939.
- ²⁵Smith, C. A., "Effects of Maternal Undernutrition upon the Newborn Infant in Holland." *J. of Peds.*, 30:233, 1947.
- ²⁶Smith, C. A., "The Effects of Wartime Starvation in Holland on Pregnancy and its Product." *Am. J. Obstet. Gynec.*, 55:599, 1947.
- ²⁷Hugelmass, I. N., Paul, L. E., and Samuel, E. L., "Nutritional Improvement of Mentality." *Am. J. Med. Sci.*, 203:631, 1944.
- ²⁸Gómez, F., Velasco, J., Ramos-Galvan, R., Craviota, J., and Frenk, S., "Estudios Sobre Niños Desnutridos. XVII. Manifestaciones Psicológicas." *Bol. Med. Hospital Inf. México*, 11:631, 1954.
- ²⁹Robles, B., Ramos-Galvan, R., and Craviota, J., "Valoración de la conducta del niño con desnutrición avanzada y de sus modificaciones durante la recuperación." *Bol. Med. Hospital Inf. México*, 16:317, 1959.
- ³⁰Barrera-Moncada, J., "Estudios sobre alteraciones del crecimiento y del desarrollo psicológico del Síndrome Pluricarenal (Kwashiorkor)." Caracas, Editora Grafos, 1963.
- ³¹Kubala, A. L., and Katz, M. M., "Nutritional Factors in Psychological Test Behavior." *J. Genet. Psychol.*, 96:343, 1960.
- ³²Coursin, D. B., "Effects of Undernutrition on Central Nervous System Function." *Nutr. Rev.*, 23:65, 23:55, 1965.
- ³³Engel, R., "Abnormal Brain Wave Patterns in Kwashiorkor." *E. E. G. Clin. Neurophysical.*, 8:499, 1956.
- ³⁴Stoch, M. D. and Smythe, P. M., "Does Undernutrition During Infancy Inhibit Brain Growth and Subsequent Intellectual Development?" *Arch. Dis. Child.*, 38:550, 1963.
- ³⁵Chandra, R. K., "Nutrition and Brain Development." *J. Trop. Peds.*, 10:38, 1964.
- ³⁶Nelson, J. K., and Dean, R. F. A., "The Electroencephalogram in African Children: Effects of Kwashiorkor and Note on the Newborn." *Bull. WHO*, 21:779, 1959.

Revista Interamericana de Psicología

- ²⁷Stoch, M. B., and Smythe, P. M., "The Effect of Undernutrition During Infancy and Subsequent Brain Growth and Intellectual Development." *South African Med. J.*, 1027, Oct. 1967.
- ²⁸Cravioto, J., and Robles, B., "The Influence of Protein-Calorie Malnutrition in Psychological Test Behavior." *Proc. Swedish Nut. Foundation. A symposium on mild-moderate forms of protein-calorie malnutrition, Bastad and Gothenburg*, p. 115, 1962.
- ²⁹Wud do Leon, E., De Licardie, E., and Cravioto, J., "Operación Nimiquipalg. VI. Desarrollo psicomotor del niño en una población rural de Guatemala perteneciente al grupo Cakchiquel." *Guatemala Pediatría*, 4:92, 1964.
- ³⁰Cravioto, J., "Malnutrition and Behavioral Development in the Preschool Child." Washington, D. C., Dec. 7-11, 1964.
- ³¹Cravioto, J., and Robles, B., "Evolution of Adaptive and Motor Behavior During Rehabilitation from Kwashiorkor." *A. J. of Orthopsychiat.*, 35:446, 1965.
- ³²Cravioto, J., De Licardie, E., and Birch, H. G., "Growth and Neurointegrative Development: An Experiment and Ecologic Study." *Ped.*, 38:319 (Suplem.), 1966.
- ³³Ramos-Galvan, R., "Aplicaciones de la prueba de Goodenough a escolares mexicanos de distintos grupos socioculturales y diversos estados de nutrición." *Bol. Med. Hospital Inf. México*, 21:137, 1964.
- ³⁴Espiroso-Gaona, C., Perez-Ortiz, B., and Ramos-Galvan, R., "Aplicación de la prueba de Goodenough a escolares mexicanos de distintos grupos socioculturales y de diversos estados de nutrición. c) Nuevos estudios en Tlatizapan." *Bol. Med. Hospital Inf. México*, 21:173, 1964.
- ³⁵Diaz-Bolio, J. E., "Influencia de la nutrición en el desarrollo puberal de un grupo de adolescentes del sexo femenino de la ciudad de Merida, Yucatan." *Bol. Med. Hospital Inf. México*, 1:119, 1965.
- ³⁶Feria, C. A., and Ramos-Galvan, R., "Influencia de la nutrición en el desarrollo puberal de adolescentes del sexo masculino de la ciudad de México." *Bol. Med. Hospital Inf. México*, 23:97, 1966.
- ³⁷Cravioto, J., "Application of newer knowledge of nutrition on physical and mental growth and development." *Am. J. Pub. Health*, 53:1805, 1963.
- ³⁸Viniegra, C. A., Mariscal, A. C., and Ramos-Galvan, R., "La dinámica familiar en los desnutridos. a) Edad de los progenitores." *Bol. Med. Hospital Inf. México*, 23:471, 1966.
- ³⁹Olmedo, M., Urdapilleta, D., Ramos-Galvan, R., and Lubezski, M., "Dinámica familiar de los desnutridos. b) Estudios de la afectividad en las madres." *Bol. Med. Hospital Inf. México*, 24:43, 1967.
- ⁴⁰Geber, M., and Dean, R. F. A., "Gesell Tests on African Children." *Peds.*, 20: 1055, 1957.
- ⁴¹Kagan, J., and Moss, H. A., "Parental Correlates of Child's I.Q. and Height: Cross Validation of the Berkeley Growth Study Results." *Child. Devel.*, 30: 325, 1959.
- ⁴²Robles, B., Cravioto, J., Rivera, L., Vilchez, A., Santibanz, E., Vega, L., and Perez-Navarrete, J. L., "Influencia de ciertos factores ecológicos sobre la conducta del niño en el medio rural mexicano." IX Reunion Mexican Society for Pediatric Research. Cuervavaca, México, 1959.
- ⁴³Lesser, G. S., Fifer, G., and Clark, D. H., "Mental Abilities of Children from Different Social Classes and Cultural Groups. Monog. of the Soc. for Res. in Child. Devel.", 30:102, 1965.
- ⁴⁴Brozok, J., "Soviet Studies on Nutrition and Higher Nervous Activity." *Ann. of the N. Y. Acad. of Sci.*, 93:665, 1962.
- ⁴⁵Andriyasov, A. N., and Makarychev, A. I., "Significance of Dietary Protein for the Functioning of the Central Nervous System: a Review of the Literature." *Voprosi Pitaniya*, 19 (5):8, 1957.
- ⁴⁶Cowley, J. J., and Grisel, R. D., "The Development of Second Generation Low Protein Rats." *J. Genet. Psychol.*, 103:233, 1963.

Nutrition and Psychological Development

- ⁵⁷Plat, B. S., Panpiglioni, G., and Stewart, R. C. C., "Experimental Protein-Calorie Deficiency. Clinical, Electroencephalogram and Neuropathological Changes in Pigs." *Devel. Med. Child. Neurol.*, 7:9, 1965.
- ⁵⁸Widdowson, E. M., and McCance, R. A., "The Effect of Finite Periods of Undernutrition at Different Ages on the Composition and Subsequent Development of the Rat." *Proc. Roy. Soc. S. B.*, 158:329, 1963.
- ⁵⁹Leonard, M. E., et al., "Failure to Thrive in Infants." *Am. J. Dis. Child.*, 3: 600, 1966.
- ⁶⁰Faigenbaum, D., Fishhoff, J., and Weiss, H., "The Clinical Study of Children who Fail to Thrive: An Approach to Better Understanding and Appropriate Intervention." Paper presented to Am. Orthopsychiat. Ass. Conf., Washington, D. C., 1967.
- ⁶¹Powell, G. F., Brasel, J. A., and Blizzard, R. M., "Emotional Deprivation and Growth Retardation Simulating Idiopathic Hypopituitarism, I and II." *New Eng. J. Med.*, 276:1271, 1967.
- ⁶²Talbot, N. B., "Has Psychological Malnutrition Taken the Place of Rickets and Scurvy in Contemporary Pediatric Practice?" *Peds.*, 31:909, 1963.
- ⁶³Ribble, M., "Rights of Infants." New York, Columbia University Press, 1943.
- ⁶⁴Spitz, R. A., and Wolff, K., "Anaclitic Depression." *The Psychoanal. Study of the Child*, 2:313, 1946.
- ⁶⁵Spitz, R. A., "Hospitalism." *The Psychoanal. Study of the Child*, 2:113, 1946.
- ⁶⁶Ainsworth, M., "The Effects of Maternal Deprivation: A Review of Findings and Controversy in a Context of Research Strategy." *Deprivation of Maternal Care*. WHO, Geneva, pp. 97-159, 1962.
- ⁶⁷Casler, L., "Maternal Deprivation: A Critical Review of the Literature." *Monog. of the Soc. for Res. in Child Devel.*, Yellow Springs, Ohio, Antioch Press, 1961.
- ⁶⁸Yarrow, L. J., "Toward an Empirical and Conceptual Reevaluation." *Psychol. Bull.*, 58:459, 1961.
- ⁶⁹Orlansky, H., "Infant Care and Personality." *Psychol. Bull.*, 46:1, 1949.
- ⁷⁰Pinneau, H., "The Infantile Disorders of Hospitalism and Anaclitic Depression." *Psychol. Bull.*, 52:1100, 1955.
- ⁷¹Buros, O. K., "Mental Measurement Yearbooks." Highland Park, N. J., Gryphon Press, 1938 to 1967.
- ⁷²Meehl, P. E., "Clinical vs. Statistical Prediction." Minneapolis, Minn., University of Minn. Press, 1954.
- ⁷³Meehl, P. E. and Rosen, A., "Antecedent Probability and the Efficiency of Psychometric Signs, Patterns or Cutting Scores." *Psychol. Bull.* 52:194, 1955.
- ⁷⁴Klineberg, O., "Negro-white Differences in Intelligence Test Performance: A New Outlook at an Old Problem." *Am. Psychologist*, 18:198, 1963.
- ⁷⁵Honzik, M. P., Macfarlane, J. W., and Allen, L., "The Stability of Mental Test Performance Between Two and Eighteen Years." *J. Exp. Ed.*, 17:309, 1948.
- ⁷⁶Masling, J., "The Effects of Cold and Warm Interaction on the Administration and Scoring of an Intelligence Test." *J. Consul. Psychol.*, 23:336, 1959.
- ⁷⁷Masling, J., "The Influence of Situational and Interpersonal Variables in Projective Testing." *Psychol. Bull.*, 57:65, 1960.
- ⁷⁸Sarason, S. B., "The Clinical Interaction with Special Reference to the Rorschach." New York: Harper and Row, 1954.
- ⁷⁹Sarason, S. B., Davidson, K. S., Lightfall, F. F., Waite, R. R., and Ruebuch, B. K., "Anxiety in Elementary School Children." New York: Wiley and Son, 1960.
- ⁸⁰Mussen, P. A. (Ed.), "Handbook of Research in Child Development." New York: Wiley and Son, 1960.
- ⁸¹Anastasi, A., "Psychological Testing." New York: Macmillan, 1954.
- ⁸²Levine, M., "Psychological Testing of Children." In: Hoffman and Hoffman, "Review of Child Development Research." New York: Russell Sage Foundation. 2:257, 1966.

Revista Interamericana de Psicología

- ⁸³Littell, W. M., "The Weschler Intelligence Scale for Children: Review of a Decade of Research." *Psychol. Bull.*, 57:131, 1960.
- ⁸⁴Spiker, C. C. and McCandles, B. A., "The Concept of Intelligence and the Philosophy of Sciences." *Psychol. Rev.*, 61:255, 1954.
- ⁸⁵Klein, R., et al., "Estudio Ecológico del desarrollo humano en áreas rurales de Latinoamérica." Symposium presented to the XII Interamerican Congress of Psychology. México, Dec. 1967.
- ⁸⁶Davis, A. and Eells, K., "Davis-Eells Test of General Intelligence or Problem Solving Ability." New York: World Books, 1953.
- ⁸⁷Masland, R. L., Sarason, S. B., and Gladwin, T., "Mental Subnormality: Biological, Psychological and Cultural Factors." New York: Basic Books, 1958.
- ⁸⁸Flavell, J. K., "The Developmental Psychology of Jean Piaget." Princeton, N. J.: Van Nostrand Co., 1963.
- ⁸⁹Larondeau, M. and Pinard A., "Causal Thinking in the Child." New York: International Universities Press, 1962.
- ⁹⁰Gouin-Decarie, T., "Intelligence and Affectivity in Early Childhood." New York: International Universities Press, 1965.
- ⁹¹Almy, M., Chittenden, E., and Miller, P., "Young Children's Thinking." New York: Teachers College Press, 1967.
- ⁹²Freud, S., "Three Essays on the Theory of Sexuality." London: Hogarth Press. Standard Edition, 7:122, 1960.
- ⁹³Fenichel, O., "The Psychoanalytic Theory of Neuroses." New York: Norton and Co., p. 62, 1945.
- ⁹⁴Brody, S., "Patterns of Mothering." New York: International Universities Press, 1956.
- ⁹⁵Spitz, R. A., "The First Year of Life." New York: International Universities Press, p. 210, 1965.
- ⁹⁶Ribble, M. A., "Clinical Studies of Instinctive Reactions in Newborn Babies." *Am. J. Psychiat.*, 95, 1938.
- ⁹⁷Bowlby, J., "Maternal Care and Mental Health." World Health Org., Geneva, 1951.
- ⁹⁸Parsons, T. and Bales, R. F., "Family, Socialization and Inter-Action Process." Glencoe, Ill.: The Free Press, 1955.
- ⁹⁹Winnicott, D. W., "Maturation Processes and the Facilitating Environment." New York: International Universities Press, 1965.
- ¹⁰⁰Piaget, J., "Six Psychological Studies." New York: Random House, p. 6, 1967.
- ¹⁰¹Claparade, E., "Le développement mental." Neuchatel: Delachaux et Niestle, 1951.
- ¹⁰²Yarrow, L. J., "Maternal Deprivation," in Friedman, A. M., and Kaplan, H. I., *Comprehensive Textbook of Psychiatry*. Baltimore: The Williams and Wilkins Co., 1967.
- ¹⁰³Berlet, H. H., Bull, D., Himwich, H. E., Kohl, H., Matsumoto, K., Pscheid, G. R., Spaide, J., Tourlentes, T. T., and Valverde, J. M., "Effect of Diet on Schizophrenic Behavior," in Hoch, P. H. and Zubin, J. (Eds.), *Psychopathology of Schizophrenia*, New York: Grune and Stratton, Inc., 1966.

ABSTRACT

After pointing out the importance of malnutrition as a cause of physical and psychological devastation, this paper presents a review of the literature on the role that behavioral scientists have played in the study of the psychological and developmental aspects of such scourge. This review is presented in chronological order and from a critical point of view.

In its second part it presents a psychoanalytic glimpse of some of the many avenues through which malnutrition and the deprivation of food can alter the normative course of development. The integral

Nutrition and Psychological Development

part that feeding plays in mothering and maternal behavior and the difficulty of separating the effects of maternal deprivation from those of deprivation of food in early life, are stressed. Some emphasis is placed on the similar situation posited by deprivation of familial and societal function versus deprivation of food.

An explanation is offered in terms of Piaget's psychology of the possible deviation of behavior secondary to malnutrition.

A rapid enumeration of the many parameters influencing the relationship between poor nutrition and psychological function is undertaken, and finally, the need for active participation of the behavioral scientist in the study and solution of the problem is considered

RESUMEN

Inicialmente este trabajo menciona la importancia que la desnutrición tiene como causa de devastación física y psicológica, lo cual es seguido de una revisión de la literatura concerniente al papel que han tenido los científicos interesados en la conducta humana y en la investigación de los aspectos psicológicos y desarrollacionales de esta entidad.

Esta revisión se presenta en orden cronológico y con un punto de vista eminentemente crítico.

En la segunda parte se ofrece una visión psicoanalítica de algunas de las muy diversas maneras como la desnutrición y la carencia de alimentos pueden alterar los aspectos normativos del desarrollo. Se hace especial hincapié en la consideración de la alimentación del infante como parte integral de la función materna y se pone de presente la dificultad en separar los efectos de la privación materna de quéellos que en edades tempranas resultan de la falta de nutrientes. Se le da igual importancia al problema planteado por la privación familiar y social vs. la privación alimenticia.

Se ofrece una explicación de las posibles alteraciones del desarrollo secundario de la desnutrición, basados en la psicología de Piaget.

Rápidamente se enumeran algunos de los muy numerosos parámetros que pueden influir en la relación entre la desnutrición y el funcionamiento psicológico, y finalmente se considera la necesidad de que los científicos interesados en la conducta participen activamente en el estudio y en la resolución de este problema.

RESUMO

Depois de indicar a importância da subnutrição como causa de devastação física e psicológica, este trabalho apresenta uma resenha da literatura relativa ao papel dos cientistas do comportamento no estudo dos aspectos psicológicos e evolucionários de tal flagelo. Esta

resenta é apresentada em ordem cronológica e de um ponto de vista crítico.

A segunda parte apresenta uma vista psicanalítica de algumas de muitas avenidas através das quais subnutrição e privação alimentar podem alterar o curso normativo do desenvolvimento.

O importante papel desempenhado pela alimentação relativamente ao comportamento maternal e a dificuldade de separar os efeitos de privação maternal daqueles associados a privação alimentar, na infância, são acentuados. Indica-se também a similaridade proposta em relação à privação de função familiar e social quando comparada à privação alimentar.

Uma possível explicação é proposta em termos da posição adotada por Piaget quanto a possíveis desvios comportamentais em função de subnutrição.

Vários parâmetros que influenciam a relação entre subnutrição e a função psicológica são enumerados, e finalmente, a necessidade da participação do cientista do comportamento no estudo e solução do problema é considerada.