

6/1/75

PROJECT STATEMENT

Small Research Project

A. Statistical

Project Title: Effects of Environmental Enrichment on Subsequent Development of Malnourished Children.

New or Extension: New

Contractor: Health Sciences, Columbia University
630 West 168th Street
New York, New York 10032

Principal Investigator: Myron Winick, M.D., Director Institute of Human Nutrition, College of Physicians and Surgeons.

Duration: December 1, 1975 to December 1, 1976.

Estimated Cost: \$25,000

Project Manager: S. G. Kahn, TA/N

B. Narrative

I. Summary

This research project will explore the age at which environmental enrichment will be effective in the improvement of both physical growth and mental achievement of malnourished children..

This project will look at Korean children adopted by American families while they were between the ages of 3-6. A retrospective study will be made of selected groups of children to determine their physical and mental progress.

The research group who will conduct this study has successfully completed a related project where an earlier age group (2-3 years) was studied. It was found the adopted children in an improved environment recovered and performed better in mental testing than did their malnourished not adopted children. The basic question to be answered is can this result be achieved in children malnourished at older ages (3-6).

II. Research Purpose and Expected Products

a. The significance of this study is both the acquisition of fundamental knowledge and the evolving of a practical approach to intervention programs for

children who have been malnourished during the first year of life. Fundamentally the basic question to be answered is when the critical period for environmental enrichment occurs. This will help in indicating some of the mechanisms by which environmental enrichment works.

b. Specific products of this project will come from a retrospective data analysis of height, weight and I.Q. test scores of the studied children. The overall product will be additional information which is needed to design environmental intervention programs which will give the greatest return for investment in resources.

III. Significance and Rationale for the Research

a. As a result of AID's nutrition strategy efforts are being made to provide good nutrition to children up to the age of six. Since often limited resources and/or inadequate delivery mechanism exist within LDCs, intervention options and target age groups must be narrowed.

This study will build upon data gathered in another project, delineating the nutritional effects of environmental stimulation during the early (2-3) years of life. The present project will look at the ages 3 to 6 and attempt to determine if it is too late to have a positive effect with a program of environmental enrichment on previously malnourished children. This information, along with data from studies on earlier age groups, will be invaluable in determining which environmental intervention programs will give the greatest return for the available resources.

b. Numerous studies have demonstrated that malnutrition during the first years of life, when coupled with all of the other socioeconomic deprivation generally experienced by such children, results in retarded physical brain growth and mental development. What most other studies have not made clear, however, is the contribution of malnutrition relative to that of other social and cultural deprivations.

Observations have been made (primarily in studies of animals) that an enriched environment has counteracted the detrimental behavioral effects of early malnutrition in rats. In humans, whenever malnutrition has occurred in populations not deprived in other ways the effects on mental development has been much less marked. These observations have led to the hypothesis, the malnutrition and environmental deprivation act synergistically to isolate the infant from the normal stimulatory inputs necessary for normal development. Conversely they suggest that enriching the environment of children who were previously malnourished might result in improved development.

There was one research project that has tested this hypothesis, examined the current status of a group of Korean orphans (the test group malnourished in early life), who were adopted during early life by United States parents and, thus, had undergone a total change in environment. The children in this study were adopted by 2-3 years of age. The results demonstrated that severely malnourished

children can reach accepted normal values for height, weight, I.Q., and achievement when reared in an adopted environment in United States homes, i.e., their environment was enriched.

This project proposes to investigate an area where there has not been studies made, the age group of 3 to 6 years of age.

IV. Plan to Coordinate to Link Research Including Networks

The results of this project will complete the research necessary for pinpointing the critical period of environmental enrichment occurs. Thus information will have significant practical applications in the design of health delivery projects, feeding programs and numerous nutrition intervention schemes.

V. Plan to Facilitate Utilization of Research Results

The data generated by this project and the research results will be published in appropriate professional journals and presented to concerned groups. The outcome of this project, coupled with related research activities, is expected to be of great use to planners and LDC governments.

VI. MANagement Considerations

The principal investigator will be Myron Winick, M.D., Director of Institute of Human Nutrition, at Columbia. This will entail no subgrants nor will other institutions be responsible for parts of this research project.

Office space within the Institute of Human Nutrition is available for this study. The Institute has a small computer to handle some of the data. The computer at the University Computer Center is also available if necessary.

VII VII. Research Project Design and Methods

a. The Experimental Design:

The study will be conducted by examining records of a cohort of Korean orphans. There will be four groups of children studied:

Group 1. Children well nourished for the entire life, but not adopted until age 3-6.

Group 2. Children severely malnourished during the first year of life, but not adopted until age 3-6.

Group 3. Children well nourished during their entire life but never adopted.

Group 4. Children malnourished during the first year of life and subsequently rehabilitated but not adopted.

Medical and school records as well as a "checks list questionnaire" sent to parents will be utilized by the researcher to make a retrospective study of the children. Researchers will evaluate the children's progress in terms of height, weight, (using expected achievement for both Korean and American norms), and I.Q. test scores (taken from equivalent achievement test scores). From I.Q. scores achievement will be ascertained for, one, chronological age (from I.Q. test scores) and two, grade age (from achievement scores).

Children in groups 3 and 4 will be compared (from present records at the cooperating Holt Adoption Agency) for height, weight and mental performance.

All children in this study will conform to the following criteria:

1. Complete data for height, weight, date of birth, and physical examination at the time of admission to Holt Adoption Service Care in Korea must be available in their records.
2. The child must have been full term at birth.
3. Physician examination must have revealed no physical defect or chronic illness at time of initial contact.
4. The child must have been followed at least six years and must be currently in school (grade 1-8).
5. The child must be female, this done to eliminate sex differences and because many more female infants were abandoned than males, thus leaving a larger adoptive sample to choose from.

Only children whose height and weight are in the same percentile will be included in this study.

An initial letter from the Holt Adoption Agency will alert parents of the adopted children as to the general objectives of the study and asking for their cooperation a later letter will be sent to explain the research objectives in more detail and requesting permission to contact the child's school. Where possible, the parents will be contacted by phone so that any questions about the study can be answered.

b. Research objectives:

The previous study conducted by this research group (evaluating achievement of children adopted by American families by 2-3 years of age, showed that all children studied exceed both height and weight for comparable children in Korea. The previously malnourished children, however, showed a small but significant deficit in height when compared to the well nourished group. Also, it was shown that all the children had an above normal I.Q., the well nourished group was however, significantly above the children who were previously malnourished: 116 as apposed to 102.

This previous study demonstrates that recovery from early malnutrition, although not complete is of much greater magnitude than available data had suggested. From a practical stand-point it suggested that early intervention with a program of environmental enrichment will result in an enormous amount of improvement in both physical growth and mental achievement.

The basic question that the past study looked at and that this proposed investigation attempts to answer, "How soon must environmental stimulation begin to have a positive effect upon previously malnourished children?" This is both a fundamental and a practical question, if this is known intervention strategies can be more judiciously targeted.

Data resulting from the study of groups 1 and 2 of this research project will attempt to answer whether delay in adoption (environmental enrichment) until 3-6 years of age effects the outcome of the malnourished and/or the well-nourished group, and, if so, what is the magnitude of the effect on both groups. The data from groups 3 and 4 will indicate whether an institutional environment with adequate nutrition is sufficient for these children to develop properly, when compared to groups 1 and 2.

VII. Overall Cost Estimates:

Budget projections for this project are:

<u>Personnel</u>	<u>%Level of Effort</u>	<u>Amount Requested</u>
M. Winick, Principal Investigator	5%	\$ 0
G. Solimano, Director, Div. of Community Nutrition	15%	\$ 4,900
R. Harris, Associate Professor of Pediatrics	5%	\$ 3,630
M. Nelson, Research Worker	50%	\$ 5,800
Graduate Research Assistant	100%	\$ 4,176
Secretary	25%	\$ 2,900
Total Salaries and Fringe Costs		\$21,406

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Office Supplies	\$ 2,000
Telephone and Postage	994
Domestic Travel (approximately for trips by above staff to attend scientific meetings relating to this study.	600
	<hr/>
Total budget	\$25,000

The project will cover a period of 12 months.

IX. General Appraisal:

JUN 9 1975

Columbia University
College of Physicians and Surgeons
INSTITUTE OF HUMAN NUTRITION
OFFICE OF THE DIRECTOR

511 WEST 166th STREET
NEW YORK, N. Y. 10032
212-568-6162

June 4, 1975

Dr. Irwin Hornstein, Research Officer,
Office of Nutrition, Bureau of Technical Assistance,
A.I.D., Dept. of State
Washington, D. C. 20523

Re: AID Proposal

Dear Dr. Hornstein:

In response to our telephone conversation I am enclosing the outline and budget for our proposed project. The outline is prepared in the same way as our original application for the first phase of this project.

I am also enclosing a copy of the paper submitted to Science so that details of the methods that we intend to employ are available to you. If you need any further information please contact me.

Very Sincerely,



Myron Winick, M.D.,
Director,
Institute of Human Nutrition.

mw:sss
encls.

The enclosures are informal; the formal application will follow from our Grants and Contracts Office.

Environmental Enrichment on Subsequent Development of Malnourished Children

II. Late Adoption

Introduction and specific aims

We have recently completed the first phase of a study examining the effects of early environmental enrichment in previously well nourished and malnourished children. The study was conducted by examining records of a cohort of Korean orphans and dividing them into three groups. Group one; severely malnourished in the first year of life. Group two; moderately malnourished in the first year of life. Group three; well nourished in the first year of life.

All children were adopted by 18 months into families in the United States. Examination of current health and school records was undertaken and the following results found:

1. All children exceeded both height and weight for comparable children in Korea. The previously malnourished children still showed a small but significant deficit in height when compared to the well nourished group.

2. Malnourished children had an average I. Q. of 102. The well nourished group had an average I. Q. of 116 and the difference was significant.

3. Malnourished children were achieving at stanine level 5; well nourished children significantly above this. Details of this study are enclosed in a paper recently submitted to Science.

The study demonstrates that recovery although not complete is much greater than previous data would have suggested. From a practical standpoint it suggests that early intervention with a program of environmental enrichment will result in an enormous amount of improvement in both physical growth and mental achievement. How soon must such stimulation begin? This is, of course, a practical as well as a fundamental question. We

knew when the critical period for intervention occurs we could better plan an intervention strategy. The present proposal seeks to answer this question and in addition to examine the type of intervention which is necessary.

Plan of action

The study would be conducted in exactly the same manner as the previous one except that different groups of children would be included.

Group I. Children well nourished for their entire lives, but not adopted until age 3 - 6.

Group II. Children severely malnourished during the first year of life (same criteria as previously) but not adopted until age 3 - 6.

Group III. Children well nourished during their entire life but never adopted.

Group IV. Children malnourished during the first year of life and subsequently rehabilitated but not adopted.

Children in groups I and II would be followed in exactly the same way as in the previous study and their present height, weight, I. Q. and achievement stanines ascertained. When these data are compared with the data in the first study it should be possible to learn:

1. Whether delay in adoption adversely affects the outcome in the well nourished and/or the malnourished group.

2. If so, what is the magnitude of this adverse affect and is it greater in children who were previously malnourished.

Children in groups III and IV would be compared (from present records at the orphanage) for height, weight, and mental performance. The data derived should tell us whether an institutional

environment with adequate nutrition is sufficient for these children to develop properly (when compared to group I and II and the children in the previous study). If not, is the adverse affect greater in the previously malnourished child?

Since all the records are available to us and since we have worked out procedures for following up these children, I would feel that the study could be completed in 12 months.

Facilities Available

The Institute of Human Nutrition maintains an administrative building with approximately 7,500 square feet of office and classroom space. Office space is available within this building for this study. In addition, the Institute has a small computer which could be programmed to handle some of these data. The University Computer Center is also available if necessary.

Significance

The significance of this study is both the acquisition of fundamental knowledge and the evolving of a practical approach to intervention programs for children who have been malnourished during the first year of life. Fundamentally we would like to learn when the critical period of environmental enrichment occurs. This may help in elucidating some of the mechanisms by which environmental enrichment works. Practically we need this information to design environmental intervention programs which will give the greatest return for our investment of human resources.

<u>Salaries:</u>	<u>Budget</u>	<u>% Time</u>	<u>Salary</u>	<u>Fringe</u>	<u>Total</u>
M. Winick, Principal Investigator		5%	0	0	0
G. Solimano, Director, Div. of Community Nutrition		20%	5,000	1,000	6,000
R. Harris, Associate Prof. of Pediatrics		5%	3,000	600	3,600
M. Nelson, Research Worker		50%	5,000	750	5,750
Graduate Student		100%	2,500	375	2,875
Secretary		25%	2,500	375	<u>2,875</u>
Total Salaries					21,100
Office Supplies					2,000
Telephone					1,000
Domestic Travel					<u>900</u>
Total Budget					\$ 25,000
Indirect Cost Allowance 31% Total Direct Costs					<u>7,750</u>
					\$ 32,750

CONTRACT PROPOSAL
SUMMARY DATA SHEET

Dr. Irwin Hornstein, Res. Officer, Off. of Nutr. AID,
Dept. of State, Wash. D. C. 20523

Proposal Designation: RFP Number Modification to AID Contract
Title Environmental Enrichment on Subsequent Development
of Malnourished Children. II. Late Adoption.

Name of Offeror: Health Sciences
Columbia University
630 West 168th Street
New York, New York 10032

Total estimated time required to complete project: 1 yr.

Total estimated costs: One Year Only
First Year: \$25,000 + 31% I.C.A.7,750. = \$32,750.
Second Year: ----- (etc.)
TOTAL: \$32,750.

Type of Contract Proposed:
Cost-Reimbursement X

Principal Investigator and Senior Scientists:			
Name	Telephone number	% Effort	Social Security Number
Myron Winick, M. D.	212-568-6162	5%	057 - 28 - 7954
G. Solimano	" " "	15%	888-00-7053
R. Harri	" 579-1885	5%	095-26-0667

Myron Winick

Individual authorized to negotiate:
Frederick B. Putney, Ph.D.
Assistant Vice President for
Health Sciences Administration
Telephone Number: 212-579-4148

Individual authorized to execute and sign contracts:
Mr. James Lewis
Director, Office of Projects and Grants
Telephone Number: 212-280-3023

~~Subcontractor Information:
(Furnish name and location of organization, description of
services, basis for selection, responsible person employed
by subcontractor and cost information.)~~

This proposal is firm for a period of 120 days from the date on which
it is received by the Government.

Signature of Official Authorized to Bind Offeror:
Frederick B. Putney
Frederick B. Putney, Ph.D.
Date 6/18/75

AID 1250-1X
(7-71)

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DEPARTMENT OF STATE
AGENCY FOR
INTERNATIONAL DEVELOPMENT

PROJECT IMPLEMENTATION
ORDER/TECHNICAL
SERVICES

1. Cooperating Country
Worldwide

2. PIO/T No.
931-17-560-350-73

4. Project/Activity No. and Title
KPA #24 FY76
Effects of Environmental Enrichment on
Subsequent Development of Malnourished
Children II

Page 1 of Pages 2

3. Original
Amendment No. _____

PIO/T

DISTRIBUTION

5. Appropriation Symbol
72-11X1026

6.A. Allotment Symbol and Charge
426-31-009-00-22-61

6.B. Funds Allotted to:
 A.I.D. W Mission

7. Obligation Status
 Administrative Reservation Implementing Document

8. Funding Period (Mo., Day, Yr.)
From 12/1/75 To 12/31/76

9.A. Services Start (Mo., Day, Yr.)
Between 12/15/75 and 12/30/75

9.B. Completion date of Services
(Mo., Day, Yr.) 1/31/77

10.A. Type of Action
 A.I.D. Contract Cooperating Country Contract Participating Agency Service Agreement Other

10.B. Authorized Agent
AID/W

Estimated Financing		(1) Previous Total	(2) Increase	(3) Decrease	(4) Total to Date
11. Maximum A.I.D. Financing	A. Dollars		25,000		25,000
	B. U.S.-Owned Local Currency				
12. Cooperating Country Contributions	A. Counterpart				
	B. Other				

13. Mission
References

14. Instructions to Authorized Agent

The purpose of this PIO/T is to authorize AID/W to enter into a contract with Columbia University to support research as outlined in the attached project statement and is to provide FY 1976 funding for the project. Previous PIO/Ts and the Project Statement to the predecessor project are attached.

15. Clearances - Show Office Symbol, Signature and Date for all Necessary Clearances.

A. The specifications in the scope of work are technically adequate TA/N Harold L. Rice TA/N Irwin Hornstein	B. Funds for the services requested are available TA/RIG, M. Rechcigl
C. The scope of work lies within the purview of the initiating and approved Agency Programs TA/N Martin J. Forman	D. TA/PPU E. McLeod
E. TA/N, Amy Pound	F. TA/PPU, Mary Mozynsky

16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to

Signature and date: _____
Title: _____

17. For the Agency for International Development

Signature: John Gunning
Title: Chief, TA/PM

18. Date of Signature

AID 1350-1X (9-70)	Cooperating Country Worldwide	PIO/T No. 931-17-560-550-73	Page 2 of 2	Pages 4
PIO/T	Project/Activity No. and Title Effects of Environmental Enrichment on Subsequent Development of Malnourished Children II			

SCOPE OF WORK

19. Scope of Technical Services

A. Objective for which the Technical Services are to be Used

To determine if there is a critical age for introducing environmental enrichment to children who have been malnourished in early childhood.

B. Description

Previous work on the above objective on the enrichment of environment beginning at age 2-3 year established that mental and physical development exceeded that of children remaining in the deprived environment.

The present project will collect and examine similar data on the older age group 3-6 (See attached PIO/Ts and Project Statement for AID/csd-3679.)

C. Technicians

(1) (a) <u>Number</u>	(b) <u>Specialized Field</u>	(c) <u>Grade and/or Salary</u>	(d) <u>Duration of Assignment (Man-Months)</u>
	M. Winick, Principal Investigator	\$ 0	12 months
	G. Solimano, Director Div. of Community Nutrition	\$4,900	
	R. Harris, Associate Professor of Pediatrics	\$3,630	
	M. Nelson, Research Worker	\$5,800	
	Graduate Research Assistant	\$4,176	
	Secretary	\$2,900	
(3) Language requirements			

(4) Access to Classified Information

Not Required

(5) Dependents Will Will Not Be Permitted to Accompany Technician

D. Financing of Technical Services

(1) By AID - \$ 25,000

(2) By Cooperating Country -

AID 1350-1X (B-70)	Cooperating Country Worldwide	PIO T No. 931-17-560-550-73	Page 3 of 4 Pages
PIO/T	Project Activity No. and Title Effects of Environmental Enrichment on Subsequent Development of Malnourished Children II		

20. Equipment and Supplies (Related to the services described in Block 19 and to be procured outside the Cooperating Country by the supplier of these services)

A. <u>(1) Quantity</u> <u>(2) Description</u>	<u>(3) Estimated Cost</u>	<u>(4) Special Instructions</u>
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Not Applicable

B. Financing of Equipment and Supplies

(1) By AID - \$

(2) By Cooperating Country -

21. Special Provisions

- A. This PIO/T is subject to AID (contracting) (PASA implementation) regulations.
- B. Except as specifically authorized by AID, or when local hire is authorized under the terms of a contract with a U.S. Supplier, services authorized under this PIO/T must be obtained from U.S. sources.
- C. Except as specifically authorized by AID/W, the purchase of commodities authorized under this PIO/T will be limited to the U.S. under Geographic Code 000.
- D. Other (specify):

AID (350-1X) (8-72)	Cooperating Country Worldwide	PIO T No. 931-17-560-550-73	Page 4 of 4 Pages
PIO/T	Project Activity No. and Title Effects of Environmental Enrichment on Subsequent Development of Malnourished Children II		

22. Reports by Contractor or Participating Agency (Indicate type, content and format of reports required, including language to be used if other than English, frequency or timing of reports, and any special requirements)

See Attachment B January 20, 1972 "Guidelines for Preparation of the Research Annual Report:"

Reports

Thirty-five copies of semi-annual reports on scientific progress submitted to AID/W, TA/N, beginning 6 months following the signing of the contract and the annual report beginning 12 months following signing of the contract describing the status of the work in progress; changes in research personnel; management information deemed necessary; and detailed information on expenditures of project funds as well as scientific progress.

23. Background Information (Additional information useful to Authorized Agent and Prospective Contractors or Participating Agency; if necessary cross reference Block 19.C(4) above.)

1. Dr. Harold L. Rice, Research Officer, TA/N, AID/W

Dr. Irwin Hornstein, Dep. Director, TA/N, AID/W

2. Dr. Myron Winick, Director Institute of Human Nutrition
College of Physicians and Surgeons
630 W. 166th Street, N.Y. N.Y. 10032
Telephone (212) 579-6162

24. Relationship of Contractor or Participating Agency to Cooperating Country and to AID

A. Relationships and Responsibilities

B. Cooperating Country Liaison Official

C. AID Liaison Officials

TA/N, Dr. Harold Rice, Research Officer TA/N, AID/W
TA/N, Dr. Irwin Hornstein, Dep. Director TA/N, AID/W