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ABSTRACT

The New Orleans Parent-Child Development Center (NOPCDC) was funded four years ago to develop and evaluate the effectiveness of a model of parent education. The ultimate goal was to prevent the effects of poverty on human development. The parent education program was designed to increase the mother's knowledge and understanding about child development and to change her parenting behavior toward her child in ways which, theoretically, should lead to the development of competence in her child. NOPCDC developed and tested two alternate models of parent education, a Center-based program and a Home-Visit program. The Center program included several treatment elements which the Home-Visit Model did not. The major instrument for evaluating changes in optimal mother behavior was the Mother-Child Interaction Scale, an observational procedure. Child development was measured through a battery of standardized and more discrete tests of cognitive abilities. Results from both the pilot wave and the first experimental wave, including Center, Home-Visit, and comparison groups, indicated that the Center model was extremely effective in aiding mothers to become effective enhancers of child development. The Center children began to diverge developmentally relative to the control children approximately one year after the mothers showed improvement. (Author/JM)

FOURTH-YEAR REPORT

NEW ORLEANS PARENT-CHILD DEVELOPMENT CENTER

MARCH, 1975

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Abstract

The New Orleans Parent-Child Development Center was funded four years ago to develop and evaluate the effectiveness of a model of parent education. The ultimate goal of the NOPCDC was to prevent the effects of poverty on human development. Previous research evidence from earlier educational intervention programs indicated that the mother was the major influence in the child's early environment and must be the primary recipient of the intervention effort. The parent education program was designed to increase the mother's knowledge and understanding about child development and to change her parenting behavior toward her child in ways which, theoretically, should lead to the development of competence in her child.

The New Orleans PCDC developed and tested two alternate models of parent education, a Center-based program and a Home-Visit program. The Center program included several treatment elements which the Home-Visit model did not. Thus, the Center model was considered the more intense of the two. Both models were based on a delivery system which utilized community-recruited paraprofessional educators. All mothers and infants were low-income blacks. They began the program at two months of age and remained until the child was three years old.

Since the program was designed to work through the mother to the child, it was hypothesized that the mother would show evidence of change in those parenting behaviors which were considered crucial to later child development prior to the children showing increased developmental gains relative to the comparison groups. The major instrument for evaluating changes in optimal mother behavior was the Mother-Child Interaction Scale. This was an observational procedure which involved the coding of maternal behavior along a number of dimensions. Child development was measured through a battery of standardized and more discrete tests of cognitive abilities.

Results from both the pilot wave and the first experimental wave, including Center, Home-Visit, and comparison groups, indicated that the Center model was extremely effective in aiding mothers to become effective enhancers of child development. On most all of the behavioral indices examined, Center mothers were significantly advanced relative to the Serial Control group mothers. For the pilot wave, Center mothers first showed significant differences in their behavior after two years in the program. The same result was obtained in the first experimental wave after only one year of program participation.

The Center children began to diverge developmentally relative to the control children approximately one year after the mothers showed improvement. Thus, the Center program appears to have worked as predicted: through the mother to the child. The Home-Visit model was not effective in either changing mother's behaviors or increasing children's development. The relevance of these findings for future educational intervention program was discussed.

PREFACE

Several years ago three Parent-Child Development Centers (PCDC's) began a five-year program to look for a solution to the now well-publicized deleterious effects of growing up in poverty. The PCDC's were not, by any means, the only such research effort concerned with this problem. There was history of early educational intervention programs, such as Head Start, whose goals were to provide low-income children with enrichment programs before they entered public school. Traditionally, these programs worked with preschool age children in a center outside the home, to the near exclusion of the mother.

Many of these early attempts at compensatory education, although successful at first, were not able to maintain increases in the children's developmental abilities. The PCDC's took the position that there were three major reasons for this rather limited success. First, most such programs began their environmental enrichment at age 3, after the children had already suffered some developmental declines. We argued that to be truly effective, one must prevent the decline in developmental processes rather than try to "catch up" later on. Thus, the PCDC's decided to begin their programs as soon after birth as possible. The second reason involved the duration and intensity of the program. It was felt that a summer, or even a year was too short a period of time to significantly influence developmental processes.

The third reason for the apparent failure of programs such as Head Start was by far the most important and complex. Evidence was beginning to accumulate which indicated that the mother or primary caretaker both structured, provided, and interpreted the early environment. The 0 - 6 year old child (even one in a Head Start program) spends a major part of his waking hours with his primary caretaker (mother). Taking the child out of the home to enhance his learning would not have a major effect on his development unless his primary caretaker could also become a major developer and sustainer of development. One could further postulate that a young child's relationship with his mother, would be qualitatively different from that with his teacher. The teacher-child relationship most likely would lack the depth of attachment and love which may well mediate early development. This would have implications for day care and early education programs.

Clearly, then, the PCDC's reasoned, the major contributing factor as to why other programs were not successful was because the mother was not the primary "target". We argued that since the mother is the most important part of the child's environment, she should be the primary recipient of the intervention effort. If one can help the low-income mother to become an enhancer of the child's development, then at the program's conclusion, the child's environmental support would not end. Further, any other children that the mother raised should also benefit from her PCDC experience. Making the mother the primary change agent, therefore, seemed developmentally as well as economically more efficient.

UNIQUE ASPECTS OF THE PCDC'S AS COMPREHENSIVE RESEARCH EFFORTS IN EARLY INTERVENTION

The Parent-Child Development Centers are primarily parent-education programs. The parent-education approach is not, however, unique to the PCDC's. Many other groups arrived at the same conclusion more or less concurrently. Each parent education model differs somewhat in its assumptions and in the methods used to educate parents. There are, however, many aspects of the three PCDC programs which are unique:

(1) The PCDC's developed within the framework of a planned research strategy. From inception, the PCDC's were locked into a two-stage experimental plan. The first stage was to last five years. During this period, the models were to be developed, refined, and thoroughly evaluated and documented. If the preliminary results showed promise, the second stage of the plan was to test the replicability and generalizability of the models.

(2) All three PCDC's had a good experimental research design. Anticipating many of the criticisms of this genre of field research, an attempt was made to control as many confounding variables as possible. The PCDC's randomly assigned mothers to treatment and comparison groups, analyzed for the effects of drop-out and repeated testing of mothers and infants.

(3) The rationale behind our parent education models was based on the existing knowledge-base of child development, those aspects of the human and physical environment which seem to facilitate the development of

cognitive and social competence, and what is known about how adults learn. Very little was known concerning which educational methods were most effective in parent education. In this respect the PCDC's may have added to the knowledge base.

(4) Every attempt was made to interweave the theory and rationale, the program goals, the curriculum, and the evaluation. Therefore, we did not rely solely on measures of the child's IQ to evaluate the effectiveness of the program. The program was designed to increase mother's knowledge and understanding about child development, to change her attitudes about child-rearing practices, and most importantly, to change her behavior toward her child in ways which, theoretically, should lead to better development in her child. In short, we predicted a changing mother as a result of our program, and we measured mother change on a number of dimensions.

(5) Another relatively unique aspect of the PCDC is reminiscent of the now cliche "educate the total child." The PCDC's have attempted to educate the "total parent." Besides the child development of parenting curricula, our model includes extensive health care for the whole family. Unhealthy children don't have the same learning advantage as healthy children. Parents also receive health education for themselves and their children. A social worker is available to help parents find solutions to those external stresses which might prevent them from fully profiting from the PCDC experience. A good deal of curricular emphasis is placed on helping the mother gain more self-esteem and become a competent, active individual in the community. Many activities and learning experiences revolve around home-making skills and self-improvement.

The reader is now acquainted with the general conceptual framework within which the PCDC's grew. It remains to explain the program goals, the theoretical underpinnings of the treatment elements, and the evaluation of the New Orleans Model.

THE NEW ORLEANS MODEL: THEORY, RATIONALE, AND GOALS

The major goal of the New Orleans Parent-Child Development Center is to develop an intervention model which will help to optimize the development of competence in the low-income children enrolled in the program. Our definition of competence is broad, and includes intellectual, linguistic, emotional, motivational and social areas of development. Past research has shown that children from poverty areas have not been able to achieve competence as well as children from more priviledged backgrounds. We feel that the major determinants of the development of competence in children are found in ways the mother structures the environment through her interaction with the child. This position is derived both from theory and from strong empirical research roots. We will examine the relevant theory and research evidence of how the maternal environment influences the development of competence in the child in three areas: intellectual (including conceptual and linguistic), motivational, and socio-emotional. Under each area; some of the problems the lower-class mother faces which hinders her ability to provide an optimal learning environment are discussed.

INTELLECTUAL DEVELOPMENT

The theory of intellectual development underlying the New Orleans Model is interactional. We lean heavily on Piaget's cognitive developmental theory which hypothesizes that intellectual development, from birth on, is a function of the child's interaction with and active organization of his environment. While Piaget has devoted the majority of his work to the analysis

of the nature of the child's interaction with the environment, he has not systematically dealt with what J. McV. Hunt has called "the problem of the match" - specifying the most appropriate environment for a child at any point in his development. We believe that it is both theoretically and empirically possible to determine and specify the best role the environment to play at various stages of the child's interactional experience in order to optimize intellectual development. There are certain variations in the environment of low income children which have been, in the past, responsible for less than optimal cognitive development in these children.

It should be noted, at this point, that previous studies of infants from various socio-economic backgrounds have not shown a developmental divergence in competence until some time in the second year of life (Golden and Birns, 1969, among others). Wachs, Uzgiris-Hunt (1967) did report some significant differences in disadvantaged children around one year using the Uzgiris-Hunt Scales of Sensory-Motor Development. The divergence in cognitive comptence does appear in the second year and is pronounced by age 3 or 4 years.

The work of Hess and Shipman (1965) provided the first strong suggestion that cognition was socialized or heavily influenced by the maternal environment. They identified specific maternal behavior variables associated with the 3 - 6 year old child's performance and style on a variety of cognitive strategies, maternal teaching styles, and maternal language styles. All were found to be related to child performance on a number of cognitive tasks.

Hess and Shipman, following Bernstein's lead (1961), identified differences in the type of control strategies used by lower and middle-class mothers. They also linked these different control strategies to developmental divergences in intelligence, language style, and the general cognitive performance of the child. Middle-class mothers used more personal-subjective and rationale-based strategies for control, whereas lower-class parents tended to rely heavily on status-normative control strategies. The status-normative strategies were related to relatively unelaborated language, lower IQ, and a lower level of language development in the child. There was a strong relationship between a mother's control strategies and the degree of elaboration of her language.

It was Hess and Shipman that drew attention to how language was used in communicating with children. White, et al, (1972) and others have found that mothers of competent children do talk a lot to their children. However, Hess and Shipman point out that more than how much is said, what is important is what is said. The mother's functional use of language is one of the most important vehicles through which she structures the child's world. For instance, language can be used to focus on environmental discrepancies, to explain events and cause and effect relationships and to analyze problems and solutions.

The work of Watts, et al, (1973) and White, et al, (1972) lends further support to the assumption that the maternal environment provides a major force in the outcome of the child's development. Whereas Hess and Shipman carried out their work in a laboratory setting with 3 to 6 year olds, the Harvard Preschool Project (B. White and J. Watts) was one of the first projects to undertake a longitudinal study of the maternal home environments of children in their early formative years (ages 1 - 3), and to systematically relate their environments to their intellectual and social development. They studied the characteristics

of mothers of "A" children. "A" and "C" children were those children defined as more, or less, competent on the basis of their scores on a series of tests of cognitive and social abilities. They found that the way in which the "A" mothers interacted with their children was very different from the way the "C" mothers interacted with their children.

"A" mothers interacted more with their children than did "C" mothers on an absolute basis. In addition, "A" mothers spent more time actively involved in intellectually valuable activities with their children. The active involvement took several forms: active participation in the child's activity, facilitation of that activity, or merely listening and observing. The important point is that the mother's active involvement with the child usually revolved around an intellectually valuable experience. Examples of intellectually valuable activities included language activities such as labelling, reading books, elaborating aspects of the environment, and spatial and fine motor activities such as block-building or sorting of objects. "A" mothers also showed significantly more encouragement of the child's activities. There were no differences in the amount of negative or restrictive techniques between "A" and "C" mothers. The difference was that the "A" mothers used, in addition to a few negative techniques, many positive ones.

Again, as in the Hess and Shipman findings, we see in the Watts study that the way in which the mother interacts with the child structures the child's cognitive environment, and ultimately, his cognitive development.

MOTIVATION AND THE DEVELOPMENT OF COMPETENCE

Intellectual development does not proceed in a motivational or emotional vacuum. It is clear in Piaget's theory that in order for intellectual development to proceed, the child will have to explore the environment, and develop and test hypotheses about it. We believe that the child has an intrinsic need to optimize his own development in this way. Hunt (1965) calls this "intrinsic motivation." R. White (1959) calls it "effectance motivation." He hypothesizes that: "the competence of an organism means its fitness or ability to carry on these transactions with the environment which results in its maintaining itself, growing and flourishing." He suggests that exploration, curiosity, mastery, and attempts to deal competently with one's environment are all characteristic expressions of effectance motivation.

Any environment that seriously interferes with the child's ability to exercise his "effectance motivation" - e.g. interference with his curiosity, his desire to explore, his need to achieve mastery over the environment -- will not only impair intellectual development, but also results in maladaptive changes in "effectance motivation" itself.

There is a body of research which shows that low-income children indeed show less curiosity, exploratory, mastery, and achievement motivation than do middle-class children. Bayley and Schaefer (1964) showed that amount of achievement and mastery motivation in the child is related to later cognitive ability. Hess, et al, (1969) and Scheinfield (1969) have shown that parents who have low-achievement and mastery motivation tend to have children who show less achievement motivation, less exploratory behavior, and often score lower on tests of cognitive abilities. Hess and Shipman (1965(reported that if a mother believes

her fate is controlled by external forces, and that she is powerless to achieve her goals, then she is more likely to set low goals and expectations for the child, and to have a child with a low IQ academic record. It seems that mothers, living in poverty, who experience the world as an illogical, irrational place, who tend to have low self-concepts and little sense of matery over the environment, transmit these same concepts to their children's effectance motivation.

Not only do mothers transmit motivational attitudes to the child by their own attitudes toward the outside world, mothers also seem to affect motivation in children by the very nature of the mother's interaction with their children. Mothers who use a preponderance of negative control techniques with their child during the stage around 10-18 months, when needs for curiosity and exploration combine with the ability to actively move around, create an environment which may be damaging the child's intrinsic exploratory drives. Mothers who predominantly use negative reinforcement and negative feedback with the two year old when negativism and a sense of independent self are beginning to peak, could damage the child's self-esteem and sense of power over his environment. On the other hand, mothers who use a lot of positive techniques, who encourage the child's activities, will more likely produce a child with good feelings about himself and fully developed effectance motivation.

SOCIAL-EMOTIONAL DEVELOPMENT

There seems to be a strong, innate need for the human infant to form

an attachment relationship. Ainsworth (1969) hypothesizes that all infants (except under the most extreme circumstances) become attached, usually to the primary caretaker, or mother. By the end of the first year, attachment relationships of infants could be characterized as secure or insecure. Certain kinds of behaviors by the attachment figure, the mother, toward the infant in the first year of life were associated with security or insecurity of the infant's attachment bond. Maternal behaviors associated with a secure bond include the qualities of responsiveness to the infant's signals, affectionate physical contact, sensitivity to child's needs and intentions, and cooperation with the infant's activities. Mothers of securely attached infants also seemed to be especially well-informed about their infants.

Achieving a secure attachment relationship is seen as critical to a number of different areas of development. Bowlby (1969) hypothesizes that the attachment relationship serves a biological function of protection, and that the child will continue to put a great deal of energy into seeking this relationship until he feels secure in it. Ainsworth (1969) hypothesizes that only when a child has a secure relationship with his major attachment figure will the child not "be preoccupied with maintaining the close proximity to which his initial attachment behaviors were genetically based, but should come to feel free to explore the novel features of his environment." The critical nature of the need for encouragement of the intrinsic drive for exploration and mastery in the infant was discussed above in the context of cognitive and motivational development. A secure attachment relationship is also part of the necessary environmental conditions which this sort of intrinsic exploratory motivation needs in order to flourish.

The importance of attachment behavior is reinforced when seen in the context of Erikson's stages. A secure attachment to the mother is part of the child successfully developing a sense of trust in his mother, in other humans in his environment, and in himself. The hallmark of a competent child is his ability to use adults as resources in seeking information, solving problems, and meeting needs. A secure attachment and basic trust is certainly necessary to learn to use adults as resources.

A mother who is overwhelmed with survival, inadequate food and health problems, does not have the psychic energy left to respond with sensitivity to her toddler's requests. It is difficult to be child-oriented, to take the time and patience to anticipate and understand needs when one is tired and feeling defeated.

Finally, Bronfenbrenner (1974) makes the argument that the interaction which takes place between parent and child within the context of a strong attachment bond will not only strengthen this bond, but will also "enhance motivation, increase the frequency and power of contingent responses, produce mutual adaptation in behavior, and thereby improve the parent's effectiveness as a teacher for the child, further the child's learning and, in due course, establish a stable interpersonal system capable of fostering and sustaining the child's development in the future."

To summarize, attachment serves as a theoretical concept which has been seen as influencing several critical areas of child development - emotional, motivational, and cognitive, through the quality of the interaction of the mother and child within the attachment bond.

GOALS OF THE NEW ORLEANS PROGRAM

It was stated initially that the goal of our program was to help mothers optimize the development of competence of the children in our program. It seems clear from the theory and empirical research discussed above that the whole constellation of mothering competences, attitudes, needs and behaviors in interaction with the child are major variables in his development of intellectual, motivational and social competence. We further assume that there is no good substitute for the mother or primary caretaker in these respects. Our intervention program, then, really must have two goals:

(1) To help the mother develop those techniques, behaviors, and attitudes which will optimize her interaction with her child, which in turn will:

(2) Cause the child to develop a higher level of competence and to ultimately achieve in school.

With respect to the program goal for the mothers, there are two interrelated sets of goals. Both are important, although perhaps not equally. Approximately three-fourths of the program is designed to accomplish the first goal and one-fourth of the treatment is aimed at the second:

(1) The Mother As Enhancer Of Competent Child Development

The mother needs to learn about the importance of and techniques for actively participating in and encouraging her child's activities, especially language and conceptual activities. She needs to learn what activities

are most appropriate for her child as he develops, within the context of his cognitive, emotional, and social needs. She needs to learn positive control techniques of shaping her child's behavior, as an alternate to negative control techniques. She needs to learn to use language as a positive and effective tool in her interaction with the child. Finally, she needs to learn not only about the importance of what she says and does, but the way she does it — she needs to learn to respond sensitively, contingently and in an accepting manner.

(2) Mother's Self Development

As we have seen, the mother's own feelings of powerlessness and lack of mastery over her environment critically affect both her child's own self-image and motivation, as well as his intellectual development. Therefore, a major goal of our program is to help the mother gain new feelings of mastery over major portions of her immediate environment. We do this through attempts to increase the mother's skills and knowledge in areas that most vitally concern her, such as nutrition, medical and social services, her own general education, and leadership skills.

It should be noted that in addition to those activities designed to enhance the mother's own development, (which will be discussed in more detail in the next section), we hope that the overall effect of our program will be to enhance the mother's feelings of mastery in being a parent -- a parent who not only loves her child, but feels secure in the knowledge that she has the skills and techniques that will enable her to help her child develop into a competent adult.

TREATMENT ELEMENTS OF THE NEW ORLEANS PCDC MODEL

The treatment elements of the New Orleans PCDC Model are responsive to the stated program goals and available knowledge base. The New Orleans PCDC is primarily a parent-education program as most of the evidence points to the parent as the most enduring and effective mechanism to support and sustain the child's development. The treatment elements of the NOPCDC were developed to take into account the accumulating evidence concerning the most effective methods of parent education. As all educators [illegible] meaningful learning and retention necessitates a consideration of the cognitive, affective, and social variables of the learner - in our case, the parent.

Research results indicate that no intervention strategy that focuses solely on the child or on the parent-child relationship will be totally effective (Bronfenbrenner, 1974). We felt that it was necessary to structure an intervention that would provide the mother with the means to better cope with or to effect changes in the environment in which she and her child live. There are many internal and external stresses which operate to prevent mothers from functioning as effective child-rearers beyond their lack of information about the most effective strategies of parent-child interaction. These external stresses include inadequate health care, nutrition, housing and income. Internal stresses result from the mother's lack of good educational opportunities, feelings of powerlessness and failure, and often the lack of an appropriate mother model during her own early socialization years. The New Orleans model attempts to provide those conditions necessary for the parent to gain

some control over the total environment by creating an atmosphere conducive to adult self-actualization.

The New Orleans PCDC developed and tested two alternate models of parent intervention, a Center-based model and a Home-Visit based model. The Center model includes the following four treatment elements:

(1) Child Development Discussion Groups - designed to give mothers basic information on child development, such as the developmental stages of growth, language acquisition, cognitive abilities, social and personality development. Information is not just imposed on the mothers. The Parent Educator guides the discussion so that mothers can assimilate information to their own situations and needs. It was felt that group situations would provide mutual support and encouragement for the mothers. It was felt that better informed parents could make better decisions and that information was a necessary prerequisite to insight and true assimilation of parenting behaviors and attitudes. The emphasis throughout the three years is on understanding the meaning of experiences for the child - to become more sensitive to child's level. The discussion group allows the mothers to actively participate with individuals who are similar to themselves. This includes the Parent Educators who are community women trained at the PCDC.

(2) Parent-Child Laboratory - designed to allow parents practice and training in specific ways they can enhance their child's development. The laboratory experience is coordinated with the Child Development Discussion Group so as to reinforce the content by furnishing the opportunity to observe

the developmental stages and behaviors discussed. Adults learn best by doing, and we felt no program could hope to be successful without active involvement by the parents. The primary focus of content in the laboratory experiences is on the parent-child interaction, enjoying active participation with your child and his activities, learning to use praise and reward to encourage his activities, structuring learning experiences, learning to be a more effective teacher, using language to order, analyze, and interpret the child's experiences and feelings, to name a few. The Parent-Child Laboratory is designed around the children's program. The educational staff in the laboratories are therefore involved in providing a learning experience for the children when the parents are in the room as well as when they are attending other activities. An essential part of this component is that the educational staff provide good models while the mothers are involved in their laboratory activities.

(3) Home Resource Workshop- is designed to help parents structure an appropriate home environment . Topics such as "child-proofing" the home are discussed when the infants begin to move about. Mothers are encouraged to make and use inexpensive toys and books. Every attempt is made to offer mothers strategies and techniques of maximizing the home environment within the realistic circumstances in which they live. For example, how can the mother transform a stressful situation like trying to cook dinner with the child crying for her attention into a learning experience, or, suggestions to make rainy days easier. In summary, the Home Resources Workshop focuses primarily on how the mother can use at home what she has learned in the Center.

(4) Parent Development - This treatment element is the one primarily concerned with parent's self-actualization. It is difficult to describe because it embodies so many different things. The following list of components of the Parent Development treatment are not all offered at the same time. Rather, pieces are integrated into the parent's weekly Center schedule where they are developmentally appropriate:

(a). Home Economics Classes - includes low budget meal planning and nutrition, making children's clothes as well as adults', and managing on a budget. Mothers enjoy this time together.

(b). Child and Maternal Health Education - a knowledge of preventive health measures, first aid and treatment of minor illnesses is important if an individual is to be a competent child-rearer.

(c). General Equivalence Diploma (GED) Training - some of our mothers did not finish high school. It is difficult to have high goals for your child, if you feel that you have accomplished less than you want for yourself.

(d). Community Resource Utilization - Independent and competent adults know how to find answers to their problems. Mothers are encouraged to learn what is available to them and use it.

(e). Field Trips - Occasionally, mothers plan a special outing for themselves. The extra benefit is that they do the planning and the execution.

(f). Parent Advisory Committee - a group of mothers are elected from the total group to form an advisory board to the Center. Mothers must have an active voice in order to feel an integral part of the PCDC.

(g). Family Health Care - complete well-baby and sick-baby medical care is offered to families to reduce the external stresses on the mother to increase the child's growth and learning potential.

(h). Family Social Service Counseling - for those problems which are more difficult,such as housing, jobs, mental health, a full-time social worker is available.

The Home-Visit Model does not include all of these treatment elements. Originally, it was felt that a home-based intervention might prove less expensive, and could possibly still be effective. The major differences between the two models are:

(1) The Home-Visit Model is based on a one-to-one interaction between the mother and the Educator, as opposed to the group dynamics which develop in the Center Model.

(2) The Home-Visit Model does not have the strong adult-self-actualization treatment of the Center. Missing from the Parent Development Treatment are all components except Health Education and Health Care, membership in the Parent Advisory Committee, and the Family Social Service Counselling.

(3) The Home-Visit Model also excludes the Parent-Child Laboratory.

(4) There is a difference in the total amount of contact time between the two models. In the Center Model, mothers and their children come to the Center two mornings each week (total of six hours per week) for three years (from the target child's birth until he or she is 3 years old). The Home-Visit Model provides for one visit of one-and-one-half hours duration one time a week.

The structure within which the treatments are delivered rounds out the description of the model. In the New Orleans PCDC Model, the educational staff who deliver the various treatment curricula are community-recruited paraprofessionals. The paraprofessional Educators were selected from the same community as the mother population, with little or no prior training in child development or education. Therefore, in a real sense, the New Orleans Model is a chain-of-effects model. The Educators are first trained to deliver the curricula. Then they train the mothers, who, in turn, in a broader sense, train their own children.

Although at first glance this may seem cumbersome, there are many theoretically valid reasons for the use of community-based educators. We felt that much of the child development information would be meaningless unless "interpreted" or put into terms that the mothers could assimilate into their own experience base. The community-based educator, after intensive training, is in a much better position to make the material meaningful than a college student or professional educator. Further, we believe that this aspect of our model makes it more generalizable to different communities and populations since the initial training of any new educator staff will include their input

into the cirriculum. This interactional training process will result in some changes in examples used with mothers, and in the interpretive re-working of the lessons to fit into the existing cognitive structures of the new population of mothers.

The second major reason for the use of community-based paraprofessionals relates to the cumulative knowledge of social learning and attitude change. Modeling and observational learning are the model's most important methods of behavior change and information transmission. The mothers are much more likely to identify with educators who are members of their community than they would be to identify with professional educators. Identification with the model is key in the process of imitating child-rearing behaviors. The paraprofessionals should also be a more credible source of information. Particularly with minority groups, non-members are true outsiders and often distrusted.

The implication of the use of paraprofessional Educators for the curriculum development is that two (2) parallel sets of training materials and training hours in the day are necessary. The training of the staff is a continuous on-the-job process and every afternoon is used for this purpose. After a period of some years, the in-service training needs will decrease, at which time, a larger population of mothers could be served. Career ladders and continuing education for the staff, however, will always be a part of the New Orleans PCDC Model. Included in the appendix will be:

(1) A typical weekly schedule for mothers and Educators.

(2) Staffing Patterns - roles and responsibilities

(3) A list of curriculum and training materials necessary for replication.

RESEARCH DESIGN

The New Orleans PCDC research design is somewhat complicated. It was designed to answer two questions:

(1) What is the relative effectiveness of the two different models of parent education - A Center-based Model versus a Home-Visit Model?

(2) How early should the intervention begin to be most effective -- soon after birth versus at one year of age? The design included a Center group and a Home-Visit group which were recruited at 2 months of age, but did not begin the program until age one year and graduated at age 3 years. There was an intentional confounding of the age of starting the program with the duration of the program. As it turned out. it was impossible to keep the children in the program until age 4. Therefore, the two variables could not be un-confounded.

Two types of comparison groups were recruited to control for the effects of repeated testing on infants. One comparison group was called the Yearly Control. The Yearly Control Group received only medical services and was tested once a year. The Serial Control Group also received only medical services but was always tested at the same intervals as the two experimental treatment groups, the Center and the Home-Visit. All groups receive a modest stipend of $5.00 per testing session to offset their costs of participation.

Table 1 summarizes the recruitment schedule for all the program groups. Wave designations are used to indicate which groups were recruited together.

Cohort designations refer to the year the groups were recruited.

The group comparisons which result from Wave I (C1, HV1, SC1 and YC1) speak to the first question of the relative effectiveness of the two different models. However, Wave I was a pilot study in the truest sense of the word -- we were still evolving our treatments, training our staff, and designing the evaluation instruments. Wave III was recruited to be the first true experimental test of the effectiveness of the two models. A Yearly Control group was not included in Wave III because the testing schedule was reduced from every 2 months to twice a year. It was felt that testing the children and mothers only two times a year was not frequent enough to constitute a practice effect.

Wave II groups, C2 and HV2, were recruited to answer the second question of how early should the intervention begin to be most effective. Since these two groups were in the same general cohort as Wave I, the comparison groups SC1 and YC1 were considered appropriate control groups.

TABLE 1

CHART OF NEW ORLEANS PCDC RECRUITMENT WAVES, COHORTS, GROUP ABBREVIATIONS AND SAMPLE SIZE

	RECRUITED N	AGE STARTED PROGRAM	RETAINED N	3-1-1975 PRESENT AGE
WAVE I - (9/1971 - Cohort)				
Center (C1)	32	2 months	18	Graduated
Home-Visit (HV1)	26	2 months	17	Graduated
Serial Control (SC1)	26	2 months	14	Graduated
Yearly Control (YC1)	26	2 months	19	Graduated
WAVE II - (12/1971 - Cohort)				
Center (C2)	36	12 months	14	Graduated
Home-Visit (HV2)	24	12 months	15	Graduated
WAVE III - (9/1972 - Cohort)				
Center C3)	42	2 months	16	30 months
Home Visit (HV3)	36	2 months	23	30 months
Serial Control (SC3)	37	2 months	20	30 months
WAVE IV - (3/1975 - Cohort)				
Center (C4)	60*	2 months		
Serial Control (SC4)	40*	2 months		

* WAVE IV is presently being recruited.

RECRUITMENT, ATTRITION AND SAMPLE CHARACTERISTICS

Recruitment Of Sample

All of the mother-child pairs in the New Orleans PCDC program are low-income Black and live in the inner-city area of New Orleans. The criteria for inclusion in the recruitment pool were the following:

(1) Participants must be under the federal poverty guidelines and live in the Central City area.

(2) The mother must be the primary caretaker of the child, and must be free to attend the Center (i.e., not working or in school).

(3) The mother must be between 17 and 35 years of age, and have no more than five (5) other children.

(4) Mothers must not have had any complications with pregnancy or delivery, such as Toxemia, high forceps, etc.

(5) Child must not have severe congenital malformations or evidence of neurological impairment.

Apgar 1 minute = not less than 6

5 minute = not less than 7

Birthweight = not less than 5½ lbs.

The initial recruitment of Wave I was not random. All subsequent waves, however, were randomly assigned to treatment and comparison groups after they

agreed to participation in the program. Group assignment was accomplished by a table of random numbers. (See Appendix for the details of the recruitment procedure.)

Population And Attrition

A number of demographic variables were used to describe our sample besides an index of socio-economic status. The index of SES was comprised of rent, income and mother's education, standardized with a mean of 50 and a SD of 10. The index of SES and a measure of the mother's verbal intelligence (the sum of the vocabulary, comprehension, and similarities of the WAIS) were considered extremely important control variables since both SES and mother's IQ have been proven to correlate highly with later child development. It would be disastrous for the Center or Home-Visit groups to be significantly higher on either measure because later child or mother scores could be attributed to that.

Table 2 summarizes the characteristics of our sample. As can be seen from the table, our mothers average between 24 and 29 years of age, have an average of 9th to 10th grade education, and have an average income per family of 4 to 5 of $2,500.00 to $4,200.00 per year. They live mainly in public housing and pay on the average $45.00 to $75.00 per month in rent.

For the most part, all of our groups are equivalent. There are only two significant differences among groups. YC1 is significantly higher on general SES than all other groups, and the HV3 is significantly higher on the WAIS than all other groups. The fact that the YC1 is higher on SES does not impair the integrity of the research design for the following reasons:

(1) We are dealing with a limited range of SES. The highest group income is still only $4,200.00 per year.

(2) If there are subsequent (age 2 or 3 years) differences between the experimental groups and the yearly control favoring the experimental groups, then one can make a case for the greater strength of the experimental treatment. The problem of the higher verbal intelligence of the HV3 mothers is essentially the same argument in reverse. If the HV3 children are significantly advanced developmentally, it would be difficult to definitely determine the cause.

Finally, the groups remained equivalent after attrition. There does not appear to be any substantial differential drop out with respect to the control variables we have measured. Mothers leave or drop out of the program for a variety of reasons such as a return to school, to work, moving out of town, illness in the family, and loss of interest. It is difficult to find a pattern in motivation for attrition since some mothers who have left for quite valid reasons asked that their lessons be mailed to them.

TABLE 2

CHARACTERISTICS OF THE MOTHER POPULATION

	C1	C2	C3	HV1	HV2	HV3	SC1	SC3	YC1
..!DEX[1]	48.2	48.9	50.7	46.3	46.2	53.1	43.1	50.6	55.6
T '$/month)	58.2	78.3	52.0	60.0	60.2	73.9	45.4	68.3	75.6
OME*	3,400	3,800	4,000	3,000	2,500	4,000	3,000	3,700	4,200
H !'S EDUCA-N (YR)	10.2	8.9	9.6	9.1	9.4	10.9	10.0	9.9	10.7
H !'S AGE)	26.2	27.6	27.0	26.6	29.0	26.5	26.8	25.9	24.5
E "IAL PROBLEMS N ENTORY**	44.8	62.3	-	62.1	43.0	-	50.8	-	-
HER'S VERBAL L "Y[2]	23.2	21.0	24.1	20.9	21.2	27.9	20.9	20.2	20.9

ıcome was categorized.

"igh score means more external problems such as housing, food stamps, etc. Blank means not given to those groups.

[1] ne YC Group was significantly higher on SES than all other groups.

[2] ıe HV3 Group was significantly higher on the WAIS than all other groups.

EVALUATION STRATEGY AND THE OUTCOME MEASURES

The evaluation measures were chosen to evaluate whether or not we were successful in achieving our program goals. As previously discussed, each program goal is firmly grounded in theoretical and empirical research. Similarly, each program evaluation measure is grounded on the same theoretical underpinning as the goal it is measuring.

Our program goals fell into two major categories, hypothesizing a "chain of effects" from the first to the second: (1) Development of Optimal Mother Behaviors and Attitudes; (2) Development of Child Competence. We will divide our discussion of measures into the same two categories.

MEASURES OF OPTIMAL MOTHER BEHAVIORS AND ATTITUDES

The major instrument for evaluating changes in optimal mother behavior is the Mother-Child Interaction Scale. This scale was developed by us over a period of five (5) years to attempt to measure those interaction behaviors which we felt were (a) theoretically vital in the development of child-competence; (b) were consistent with the behaviors that constituted the major program goals.

The Mother-Child Interaction Scale is used in a variety of situations. The data in this report were obtained in an Unstructured Observation Situation.

Every two months, starting at age two months, all Center, Serial Control, and Home-Visit mothers and children came to the Center for testing. Prior to the testing, the mother and child were asked to enter the room and wait a brief while before testing would begin. Mothers were informed that they were being observed. The room was approximately 9 x 12, with a two-way mirror in one wall.

The room contained a comfortable adult-size arm chair, a table with six (6) magazines, a child-size table and chair, and bookshelves filled with toys. Different toys were experimented with. The following list became standardized when the pilot wave was about 30 months old and the third wave about 20 months old:

3 child books
1 musical jack-in-the box
1 pull-toy telephone
1 dumptruck
1 power mower toy
3 puzzles
10 beads
2 sets of blocks
2 hats
1 container
1 bunny
1 doll and bottle (magic nurser)
2 toy pots
1 stick

there is also a closed, heavy wooden toy chest in the room containing the toys and other items of the Uzgiris-Hunt Scales.

Through the time the pilot wave was 24 months old and the third wave 12 months, the interaction was recorded by a trained observer located in the

observation room on the other side of the one-way mirror. This observer recorded, into a microphone attached to a tape recorder, a narrative record of everything the mother and child did and said during the 6-minute interaction. A beeper also marked the tape every 15 seconds. A secretary then typed the taped record of the observation. Scoring was done from the typed protocol.

After the 24-month testing of the pilot wave and the 12-month testing of Wave III, recording of the interaction was done by videotape, rather than by the trained observer. The video recorder and camera were stationed behind the one-way mirror. A microphone was added to the center of the observation room and hooked directly into the video recorder. This was found to give much better sound replication than recording the sound from the observation room speaker. After the video-tapes were recorded, visual and sound markers were dubbed on to mark each 15-seconds, for scoring purposes.

There were two reasons for the switch from trained observer to automatic video recorder. One was purely practical: it was taking an extraordinary amount of secretarial time to type the observation protocols. The second reason was based on our feeling that it would be more reliable for the scorer to score the observation from the video-tape of the interaction itself, rather than having the interaction interpreted by an observer. We felt that no matter how highly trained, the observer would be selective in subtle ways as the interaction was recorded.

The categories developed for scoring of the observations relate directly to both our theory and program goals. Watts, et al, (1973, a personal communication) was especially helpful to us in transforming our own preliminary format and scoring categories into a new format and categories which were empirically more

useful and easier to score, while maintaining the same theoretical orientation we had developed over the years.

As noted above, each interaction is divided into 15-second units. To score an interaction, one of the two protocol authors (Andrews or Blumenthal) reviews each unit individually, for occurrence of the "critical" behaviors to be scored. If one of these behaviors is observed at any time during the unit, it is tallied as one frequency of occurrence for that behavior. A behavior can only be tallied once for each unit, regardless of the number of times it might occur during the unit. The frequency measures thus generated are frequencies of the number of units during which any particular behavior is observed. In the cases of maternal techniques and the mother's use of language (see below), the "critical" behaviors are clustered into positive and negative categories. If any one or more of the constituent behaviors is observed, then a tally is generated for that positive or negative category for that unit. The positive and negative categories are not interdependent, since some techniques and uses of language were considered neutral and were not scored. Furthermore, a unit will occasionally be found in which both positive and negative behaviors are clearly discerned, in which case tallies are generated for both categories. Such a unit is referred to as being "double-coded."

Although most interactions are 6 minutes long, yielding 24 units, there is some variation in the length of the observation. Thus, the behavioral frequency counts are transformed to percentage scores by dividing by the total

number of units in the interaction. The resultant scores can be interpreted as "the percentage of behavioral interaction units in which behavior X was observed." (When an interaction contains units which were double-coded, the number of interaction units is appropriately increased by the number of such units before the percentage transformation is obtained.)

(1) Total Positive Techniques Used By Mother (PT)

There are six (6) constituent behaviors in this category:

a) active participation in child activity

b) general conversation with child; giving information; labelling

c) facilitation of child activity

d) positive control; giving suggestions; positive commands

e) giving affection; praise

f) asking the child questions

PT represents to us most of the "good" ways in which we have previously specified a mother should interact with the child.

(2) Negative Techniques Used By Mother (NT)

There are four (4) constituent behaviors in this category:

a) negative control of child by mother (no verbal interaction)

b) negative control of child by mother (no physical interaction)

c) negative reinforcement of child or child's activity

d) ignoring a specific bid for attention from the child

Behaviors which are considered neutral techniques (and are not scored) include observation of the child and self-involvement which does not ignore a bid from the child.

A net techniques (NetT) score is obtained by subtracting percent negative from percent positive techniques.

(3) Amount of Mother Language (MVB)

This category is tallied "absent" or "present" for each 15-second unit.

(4) Positive Maternal Language

There are five (5) constituent behaviors in this category:

a) Elaboration or Extension

b) Praise

c) Gerneral Conversation

d) Positive Verbal Control

e) Ask Questions

Two types of percentages are derived for positive maternal language. In one type, the frequency of positive language usage is divided by the number of units in which language occurred (MVB), and is designated PLL. In the other, the division is by the total number of observation units and is designated PLB. PLL indicates how much of the mother's language is positive, while PLB indicates how much of the mother's total behavior is positive language.

(5) Negative Maternal Language

There are three (3) constituent behaviors in this category:

a) correction

b) Criticism

c) Restriction/Negative Control

Language not directed to the child is considered neutral and is not scored.

As in positive language, two types of percentages are derived for negative maternal language. NLL is frequency of negative language usage divided by the number of language units in which language occurred. NLB is the frequency of negative language usage divided by the total number of observation units. Two additional language scores are calculated. A net use of language score (NetLL) is calculated by substracting NLL from PLL. Correspondingly, a Net LB is calculated by subtracting NLB from PLB.

(6) Maternal Encouragement or Discouragement of Child-Initiated Activity

This category is tallied as either "encouragement" or "discouragement" in any 15-second unit where the mother is actively encouraging or discouraging a child initiated behavior. This category is not used in every 15-second unit -- only where there is active encouragement or discouragement. (Often, maternal behaviors are neutral in this respect.)

(7) Initiation Of Activity

This category is tallied as either "child-initiated" or "mother-initiated" in any 15-second unit where the child or mother has actively initiated an activity. Many units have no initiation score, as activity is ongoing. Additionally, it should be noted that initiation refers to initiation of a child or child-directed activity, not to initiation of interaction. (Example: the child picks up a toy. The mother says "put it back." The activity is child-initiated, and is so scored.)

Three scores are derived for the initiation variables: CINI is the number of child-initiated units divided by the total number of units. MINI is the number of mother-initiated units divided by the total number of units. CTINI is the ratio of child units to total number of units initiated (CINI is divided by the sum of CINI plus MINI.)

(8) Child Language

In each 15-second unit, a tally is made if child language was present. "Child Language" is defined as at least one recognizable word uttered by the child. Total Child Language (ChL) is the percentage based on the number of units with child language, divided by the total number of units.

In summary, there are fifteen (15) variables which are derived from the raw scores of the unit-by-unit analysis. These are: PT (percent total positive techniques, based on total units); NT (percent total negative techniques); NetT (percent net techniques); MVB (percent total language); PLL (percent of language which is positive); PLB (percent of total behavior units in which positive language is exhibited); NLL (percent of language which is negative); NLB (percent of total behavior units in which negative language is exhibited); NetLL (PLL minus NLL); NetLB (PLB minus NLB); ENC (percent encouragement, based on total units); CINI (percent of child-initiated activity, based on total units); MINI (percent of mother-initiated activity, based on total units); CTINI (CINI divided by the sum of CINI plus MINI); and ChL (percent child language, based on total units).

Global Ratings

In addition to the unit-by-unit analysis, five (5) ratings were also obtained for each 6-minute interaction. The first three of these were originally developed by Ainsworth, Bell, and Stayton (1971) for rating maternal-infant interaction in the first year of life, but we have found them extremely valuable for all of our interactions from 2 months to 36 months. The Ainsworth ratings are: Sensitivity vs. Insensitivity; Acceptance vs. Rejection; and Cooperation vs. Interference. The other two global ratings were developed by the authors: Responsiveness and Verbal Richness. The scorer rates the interaction observation on all five rating dimensions after doing the unit-by-unit scoring. Each of the dimensions is divided into a 9-point continuum.

(1) Sensitivity vs. Insensitivity (SI)

Ainsworth defines this variable as the mother's ability to perceive and interpret accurately the signals and communications implicit in her infant's behavior, and given this understanding, respond to them appropriately and promptly. Only the odd-numbered points of the scale are behaviorally anchored, as summarized by the following descriptions: (9) is highly sensitive, (7) sensitive (5) inconsistently sensttive (3) insensitive (1) highly insensitive.

(2) Acceptance vs. Rejection (AR)

This scale deals with the balance between the mother's positive and negative feelings about her baby — about having a baby and about this particular baby — and with the extent to which she has been able to integrate these conflicting feelings. (9) is highly accepting, (7) accepting, (5) ambivalent, (3) substantially rejecting, (1) highly rejecting.

(3) Cooperation vs. Interference (CI)

This scale deals with the extent to which the mother's interventions and initiations of interaction break into, interrupt, or cut across the baby's ongoing activity rather than being geared in both timing and quality to the baby's state, mood, and current interests. (9) is conspicuously cooperative, (7) cooperative, (5) mildely interfering (3) interferring, (1) highly interferring.

(4) Responsiveness (R)

This scale measures the awareness of the mother of the fact that the child has signalled her, and her promptness in responding to his signal. The range is from (9) highiy responsive to (1) highly unresponsive.

(5) Verbal Richness (VR)

This scale measures the overall elaborated quality of the mother's speech during the interaction. "Rich" speech is characterized by the use of a variety of labels, descriptions, and elaborations, and (in the context of a positive interaction) by a large number of maternal language units.

THE MEASURES OF CHILD COMPETENCE

One of the major program goals is the development of a competent child. Therefore, in selecting outcome child measures, we wanted to select a battery of tests that would adequately assess the broad range of the child competencies we hoped to affect. White, et al, (1973) pointed out that there are few descriptions of the competent child, and fewer still measures of competence. We had optimally defined child competence as competent development in the broad areas of conceptual language, social, and emotional skills. In selecting measures of competence, we found we were severely limited by the restricted range of available measures. At the moment, we are only measuring child competence in the language and intellectual realms, although we hope in the future to add to this.

(1) The Uzgiris-Hunt Scales Of Ordinal Infant Development

These were given every two months from 2 to about 22 months of age, or until the child finished the scales (i.e., passed the most difficult item on each scale). They are based on Piaget's sensori-motor stage of cognitive development. Since this theory underlies much of our thinking about child

development, it seemed an appropriate outcome measure. In addition, Wachs had reported differences between infants of middle-and lower-class backgrounds at the age of one year. Since this finding was earlier than most tests of infant development show these differences, we were hopeful that this test might be sensitive enough to detect program effects earlier than most traditional tests (e.g., the Bayley scale, etc.).

The next three tests were all used by the Harvard Preschool Project and were found to help predict "A" vs. "C" children. This is one of the major reasons they were chosen as outcome measures.

(2) The Meyers Pacific Test Of Intellectual Abilities (Pacific)

This battery was developed by the Harvard Preschool Project (White, et al, 1973) to form a link between the top of the Uzigiris-Hunt scales and the bottom of the Stanford-Binet. It was also selected by us for this reason. It was administered at ages 24, 28, and 36 months. It has three subscales: Form-Color Matching, Form Completion, and Picture Completion. The total score possible for all four scales is 40 points. The test is heavily weighted in perceptual-motor skills. Most of the stimuli are geometric forms such as circles, squares and triangles. A typical item shows the child a circle and then requires him to pick the same shape out of three forms.

(3) Ammons Full-Range Picture Vocabulary Test

This is a standardized receptive-language picture vocabulary test. It was administered to our groups at ages 26, 30, and 36 months. The Ammons Test consists of a series of four (4) picture cards. The child is asked to "show me the corn." The average number of items passed at 24 months is 6 to 8 and 36 months, 12 to 15.

(4) Grammar Test

This is a responsive-language grammar test, administered at ages 24, 30 and 36 months. The Grammar Test was developed by the Harvard Preschool Project and taps prepositional concepts. The child is asked to demonstrate knowledge by performing short commands on actual objects. For example, "Put the ball in the cup." The average number of items passed at 24 months is 5 and at 36 months is 10 to 13.

(5) Palmer's Concept Familiarity Index (CFI)

Francis Palmer (1969) found that this test seemed to differentiate conceptually competent from less competent children in a number of diverse cultural settings. It was chosen by us in the hope that it would be particularly sensitive to program effects. The CFI was given at 36 months. There are 50 concepts such as clean, big, many, around, etc. Children demonstrate knowledge of a concept by choosing between two objects such as a clean napkin and a dirty one.

(6) The Bayley Scales Of Infant Development

The mental and motor scales, as well as the Infant Behavior Record, were given at 7, 13, 19, and 25 months. We used them because they are traditional infant development tests, and would promote standard comparabilty of our results with those of other projects using the Bayley. However, we did not expect it to be nearly as sensitive to change, nor as related to later development, as some of the other child-measures chosen.

(7) The Stanford-Binet Intelligence Scale

As with the Bayley, we selected this test because it is a standardized measure, with which many persons are familiar, and which many other intervention projects have used. This allows us to make comparisons and draw more or less standardized inferences from our data. However, it is important to note that we did not feel that the Stanford-Binet was by itself an adequate measure of the kind of general child competence our program is concerned with. It is administered at 36 months.

TREATMENT PREDICTIONS BASED ON EXPERIMENTAL DESIGN

HO: 1 Changes in the mother-child interaction as a result of the educational intervention will preceed child developmental increases by at least six (6) months to one (1) year. Mother is the primary recipient of the New Orleans PCDC educational intervention. The model is based on the chain-of-effects passing from mother to child. If the model works, as predicted, the mother must change her behavior before the child can benefit from the more faciliatory mothering environment. Any differences between treatment and comparison groups of children prior to or without evidence of correlated mother change must be considered a day care or nursery school effect, and would not be predicted to be lasting.

HO: 2 Differences in child development for either the experimental treatment or the comparison groups would not be evident until age two (2) years at the earliest. (Golden and Birns, 1969, among others.) Therefore, child gains due to the experimental treatment would not be evident until age 2 years, at the earliest, assuming the mothers changed their interaction styles prior to 2 years of the child's age.

HO: 3 It was predicted that the Center program would be more effective than the Home-Visit Model in terms of both mother effects (HO: 8 to HO: 22) and child effects (HO: 23 - HO: 30). This prediction was based on the differences in intensity of the two treatments.

HO: 4 It was predicted that the replication waves for both models would show greater and possibly earlier program effects on the mother and the child than the pilot waves. (C3>C1 and HV3>HV1). The rationale for the predicted differences between waves of the treatment groups is that the treatments would have stabilized with the added time for model development.

HO: 5 It was expected that the Serial Control group would perform somewhat better than the Yearly Control group due to the practice effect of repeated testing. This effect would probably not be evident until after the first year of the child's life, since the infant tests used measure such different capacities at the earlier ages.

HO: 6 No predictions were made for the relative effectiveness of the time at which the intervention was begun. This was due not only to the lack of prior research evidence on this point, but also to the irreversible confounding of duration of program with age of beginning.

TREATMENT PREDICTIONS BASED ON PROGRAM GOALS, THE EVALUATION STRATEGY, AND OUTCOME MEASURES

Mother As Enhancer Of Competent Child Development

HO: 7 Total Positive Techniques Used By The Mother (PT). It was hypothesized that Center and Home-Visit Mothers would increase in the total number of positive techniques they used with their child. The difference in PT relative to the control groups should be significant as time in the program increases.

HO: 8 Total Negative Techniques Used By The Mother (NT). Center and Home-Visit mothers should show a decrease, relative to the Control group mothers, in the total amount of negative techniques they exhibit with their children. It was predicted that the total amount of negative techniques would increase as a function of the child's age due to the child's increasing tendency to engage in activities which necessitate mother's intervention. However, the Center and Home-Visit mothers should use less negative control techniques than the Control mothers due to the program's curricular emphasis on alternative ways of controlling child behavior.

HO: 9 Net Positive Techniques Used By The Mother (NETT). Program mothers (Center and Home-Visit) should have a higher net positive index of techniques used since they are predicted to use more positive techniques and less negative techniques than the Control mothers.

HO: 10 Total Amount Of Mother Language (MVB). Although, theoretically, it is what the mother says and not how much she says (Hess and Shipman, 1965) that makes the difference in child-competence, there is evidence (White and Watts, 1973) to indicate that mothers who talk more to their child have children who score higher on developmental tests. Since there is a heavy emphasis in our curriculum for mothers to talk more to their children, Center and Home-Visit mothers were expected to exhibit a greater amount of language than Control mothers.

HO: 11 Total Amount Of Mother's Language That Was Positive (PLL). It was predicted that due to the program treatment, a significantly higher percentage of Center and Home-Visit mother's language relative to the Control's would be for functionally positive uses.

HO: 12 Total Amount Of Mother's Behavior That Was Positive Language (PLB). Since it was predicted that program mothers would spend more interaction time talking to their children, a larger percentage of their total interaction time should be using positive language. Thus, Center and Home-Visit mothers were hypothesized to be significantly different from Control mothers in the total amount of interaction time that they used positive language.

HO: 13 Total Amount Of Mother's Language That Was Negative (NLL). A significantly smaller percentage of negative use of language was predicted for the Center and Home-Visit mothers than the Control mothers.

HO: 14 Total Amount Of Mother's Behavior That Was Negative Language (NLB). A significantly smaller amount of the Center and Home-Visit mother's total behavior should be negative language.

HO: 15 · Net Amount Of Positive Language (Net LL) And Net Amount Of Total Behavior That Was Positive Language (Net LB). For both net language categories, Center and Home-Visit mothers were predicted to have significantly larger net positive uses of language than the Control group mothers.

HO: 16 Maternal Encouragment Of Child-Initiated Activity (ENC). Center and Home-Visit mothers were expected to encourage their child's activities much more than the Control mothers would.

HO: 17 Initiation Of Activity. The program curricular emphasis has consistently been on teaching mothers not to interfere too much with their child's activity, to follow his interests, and to unobtrusively structure learning experiences based on the child's interest at the moment. Therefore, we predicted that program mothers (Center and Home-Visit) would show a higher ratio of Child-Initiated Activities to the total activities that were initiated by both mother and child. Obviously, then, the Center and Home-Visit groups should exhibit more child-initiated activities and fewer mother-initiated activities than the Control groups.

HO: 18 Sensitivity Vs. Insensitivity (SI). Center and Home-Visit mothers were predicted to become more sensitive than the Control mothers with increasing time in the program.

HO: 19 Acceptance Vs. Rejection (AR). It was hypothesized that program mothers would become more accepting of their child's behavior than Control mothers. Control mothers should also tend to be rated as more rejecting as the child gets older since the two to three year old child is usually negativistic and demanding.

HO: 20 Cooperation Vs. Interference (CI). A predicted result of program treatment is an increase in the mother's cooperation with the child or a corresponding decrease in her interruptions of the child's ongoing activity.

HO: 21 Responsiveness. Program mothers were hypothesized to evidence increased responsiveness to their child's needs and signals as a result of the treatment.

HO: 22 Verbal Richness. It was predicted that one of the consequences of the program on the mother would be to increase the amount of labelling, explanations, justification and general conversation she had with her child. Since all of these are components measured by the rating of verbal richness, Center and Home-Visit mothers were predicted to score higher than Control mothers.

Development Of Competence In Children

HO: 23 Uzgiris-Hunt Scales Of Sensori-Motor Development. Due to the fact that the Uzgiris-Hunt Scales were reported to be sensitive to SES differences earlier than age 2 years (Wachs, et al, 1967), we predicted the Center and Home-Visit infants would finish the scales, or reach the highest developmental level measured, at a significantly younger age than the Control infants.

HO: 24 The Meyers Pacific Test Of Intellectual Abilities (PACIFIC TEST SERIES). It was hypothesized that program children would score significantly higher on the subscales and total score on the Pacific Test Series than the Control group children. It is, however, important to recall that the overarching hypothesis regarding child development (HO: 1) state. that mother changes must preceed child changes. Consequently, significant differences on the Pacific at 24 months are not predicted unless the mother changes prior to that time.

HO: 25 Ammons Full-Range Picture Vocabulary Test (AFRPVT). Center and Home-Visit group children were predicted to score significantly higher on the Ammons than the Control children. The time point at which differences were predicted to emerge is again dependent on when the mothers change.

HO: 26 Grammar Test (GR). Significant differences were predicted between program and Control children on the total score of the Grammar Test depending on when the mother showed evidence of program effects.

HO: 27 Concept Familiarity Index (CFI). Significant differences between the Center and Home-Visit children and the Control children were expected if the mother had changed prior to 36 months of the child's age.

HO: 28 Bayley Scales Of Infant Development. No significant differences were predicted on either the mental or motor scales prior to the 25 month administration due to the fact that previous use of this instrument had shown it to be less than sensitive to developmental differences due to environment before 2 years.

It was predicted that Center and Home-Visit children would score higher than Control children on the mental scale (BMN). However, no predictions made with respect to the motor scale (BMT). It was reasoned that the motor scale measured predominately large motor skills at the top of the age scale, and that there was no reason to expect the program to effect these types of skills.

HO: 29 The Stanford-Binet Intelligence Scale. It was predicted that program children would score significantly higher on the Binet than Control group children. Although we did not feel that the Binet was an adequate measure of the kind of child-competence we hoped the PCDC would foster, it is a good predictive measure of educability.

HO: 30 Amount Of Child Language. One measure of the child's linguistic competence comes from the Mother-Child Interaction Measure. It was predicted that children whose mothers benefitted from the program would exhibit more language than Control children.

RESULTS

The results will be presented as a series of seven separate studies as a means of exploiting the complex design. Each section will discuss the effects of a treatment model (either Center or Home-Visit) relative to the appropriate Control groups. The effectiveness of the model will be discussed with respect to significant differences between the treatment group and the comparison group(s) on the mother-child interaction measures and on child-competence. There were no sex differences on any of the child measures.

EXPERIMENT 1: C1 Vs SC1 And YC1

The pilot Center group was compared to the Serial Control group on all measures between the time points of 24 months of the child's age and 36 months, when the program ended. Data for those testing points prior to 24 months have been presented in previous reports and will only be briefly summarized.

The Effect Of The Center Program (Pilot Wave) On The Mothers As Enhancers Of Competent Child Development.

The mother-child interaction data for 4 months and 12 months comparing the C1 and the SC1 groups was presented in a previous report (September, 1973). There were no significant differences between groups on any of the variables at 4 or 12 months. However, all of the means favored the Center group by 12 months. At 22 months, the Center 1 mothers were beginning to differ significantly from the Serial Control mothers on a number of the behavioral indices. Table 3 presents the means and standard deviations for the two groups on all the variables then scored. The tests of significance which are reported in Table 3 are point-biserial correlations which yield the

TABLE 3

POINT-BISERIAL CORRELATIONS COMPARING CENTER I AND SERIAL CONTROL I GROUPS ON MOTHER-CHILD UNSTRUCTURED INTERACTION VARIABLES: 22 MONTHS OF AGE.[1]

		Center I n = 10	Serial Control I n = 11	
22-Mon.	Insensitivity-Sensitivity	X=6.2	3.9	.44 r
		S.D.(n)=2.3	2.6	.02 p
22-Mon.	Rejection-Acceptance	6.6	4.3	.53
		2.1	1.8	.01
22-Mon.	Interference-Cooperation	5.2	3.7	.29
		2.7	2.4	.10
22-Mon.	Mean Length Utterance	4.4	3.8	.46
		0.5	0.7	.02
22-Mon.	% Verbal Behavior	60.1	49.0	n s
		24.2	20.1	
22-Mon.	% Positive Encouragement	51.0	45.4	n s
		24.3	26.5	
22-Mon.	% Language Which Is Positive	71.0	56.2	.33
		12.0	28.7	.07
22-Mon.	% Language Which Is Negative	25.6	42.5	.35
		15.1	29.9	.06
22-Mon.	% Language: Net (Positive-Negative)	45.4	13.7	.34
		25.0	58.5	.07
22-Mon.	% Positive Maternal Technique	54.6	49.8	n s
		13.3	28.3	
22-Mon.	% Negative Maternal Technique	23.6	36.5	n s
		14.1	28.5	
22-Mon.	Net Techniques	31.0	13.4	n s
		22.6	55.5	

[1]The number of cases is given in parentheses only when it differs from the group n given at the top of the column. "n s" = p>.10. Absolute value of r is reported. One-tailed probabilities have been used.

exact same probability of differences between the means as a t-test. Inspection of the means between the groups shows that C1 is always in the predicted direction relative to SC1. Seven out of 12 variables show the C1 to be significantly better than SC1.

Center mothers, at 22 months of the child's age, were more sensitive to their child's needs and development capabilities (p = .02), more accepting of their child (p = .10). Center mothers were using longer sentences (mean length = 4.4 words) than Serial Control mothers (mean length = 3.8 words). This difference in the mean length of the mother's utterance was significant at the .02 level. This particular variable is roughly analogous to the rating of Verbal Richness since the longer the mother's sentence, the more likely she is to be using elaborated language. A greater percentage of the Center mothers' language was used positively (for labelling, explanation, praise, general conversation, asking questions or making suggestions or positive commands) than the Serial Control mothers (p = .07). By the same token, a significantly smaller amount of language had a negative function for the Center mothrs (p = .06). The net percentage of language used positively favored the Center. The mean percentage net positive language for the Center mothers was 45.5% as opposed to 13.7% net positive language for the Serial Control. This difference was significant at the .07 level.

At 36 months, an even stronger picture of the Center mothers increased parenting competence emerged. Table 4 reports the means, standard deviations and t-tests between the Center 1 and Serial Control 1 at the program's end.

TABLE 4
t-TEST COMPARING CENTER I AND SERIAL CONTROL I
ON MOTHER-CHILD UNSTRUCTURED INTERACTION VARIABLES: 36 MONTHS

		Center I n = 10	Serial Control I n = 9	
36-Mon.	Insensitivity-Sensitivity	$\bar{X}$= 5.7	3.0	3.29 t
		S.D.= 1.6	2.0	.002 p[1]
36-Mon.	Rejection-Acceptance	6.6	3.8	3.22
		1.8	2.0	.003
36-Mon.	Interference-Cooperation	5.9	4.1	2.08
		1.8	2.0	.03
36-Mon.	Responsiveness	5.3	2.4	3.15
		1.9	2.1	.003
36-Mon.	Verbal Richness	5.2	3.4	1.72
		1.6	2.7	.05
36-Mon.	%Verbal Behavior	77.9	45.7	2.30
		23.6	36.7	.02
36-Mon.	%Positive Encouragment	23.9	10.1	1.62
		22.0	13.8	.06
36-Mon.	%Language Which Is Positive	83.7	75.0	n s
		8.0	23.1	
36-Mon.	%Language Which Is Negative	14.0	22.2	n s
		7.3	23.4	
36-Mon.	%Language: Net (Positive-Negative)	69.7	52.8	n s
		14.9	46.2	
36-Mon.	%Positive Maternal Techniques	70.2	39.7	2.37
		17.7	36.2	.02
36-Mon.	%Negative Maternal Techniques	13.8	16.9	n s
		8.3	21.0	
36-Mon.	%Net Maternal Techniques (Positive-Negative)	56.4	22.8	2.02
		20.8	48.0	.03
36-Mon.	%Mother Initiation	6.5	5.0	n s
		5.1	7.0	
36-Mon.	%Child Initiation	20.4	17.2	n s
		10.9	14.0	
36-Mon.	Child/Total Ratio:	0.73	0.82	n s
		0.22	0.24	
36-Mon.	%Behavior Which Is Positive Language	65.9	37.5	2.28
		19.5	33.6	.02
36-Mon.	%Behavior Which Is Negative Language	11.5	6.4	n s
		7.9	7.8	
36-Mon.	%Behavior: Net Language (Positive-Negative)	54.4	31.1	1.86
		19.3	34.3	.04
36-Mon.	%Child Language	68.9	47.7	2.35
		15.7	23.3	.02

[1]One tailed probabilities are reported. "n s" = $p > .10$.

On 12 out of 19 variables, the C1 mothers were significantly better than the SC1 mothers. The probabilities are now on the order of the .02 and .03 level as opposed to .06 at 2 years. All five of the global ratings are highly significant. Center mothers are more sensitive (p = .002), more accepting (p = .003), more cooperative (p = .03), more responsive (p = .003) and their language is richer, more elaborated (p = .05) than the Control mothers.

Center mothers encouraged more of the activities and interests initiated by their child (p = .06). Perhaps, more importantly, Center mothers were observed to use significantly more positive techniques in their interactions with their children (p = .02). Positive techniques, it will be recalled, include such behaviors as active participation, general conversation, information giving, labelling, facilitation of the child's activity, positive control, affection and praise. The negative techniques represent restriction, forbidding an activity, negative reinforcement, criticism, and ignoring a specific bid from the child. Center mothers spent 70.2% of their interaction time engaged in positive techniques and only 13.8% of their time in negative techniques for a net positive techniques score of 56.4%. The Serial Control mothers spent only 39.7% of their time engaged in positive techniques and 16.9% in negative for a net positive of 22.8%. The net positive technique difference was significant at the .03 level. There are two very interesting points to be noted. The first is that the Center mothers increased the percentage of positive techniques they used from 54.6% at 2 years to 70.2% at 3 years while

Control mothers decreased from 49.8% positive techniques at 2 years to 39.7% at 3 years (see figure 1). The second interesting note is that both groups decreased the amount of negative techniques from 2 years to 3 years which is a reflection of the difference between the negative 2 year old and the more managable 3 year old. There was no difference in the amount of negative techniques between C1 and SC1, which may indicate that the important difference to the child is the net percentage of positive techniques he experiences. The percentages of positive and negative techniques do not sum to 100% because all maternal behaviors observed are not coded. For example, observation of the child and those units when the mother is engaged in other activities (besides ignoring a bid) are not scored as either positive or negative. It is interesting to observe (by summing % positive and % negative techniques) that Center mothers were interacting 84% of the time as opposed to the SC1's 56.6%, which possibly indicates a greater "child-centeredness" in the Center mothers.

There was no significant difference in who initiated the activities, although in both groups, the child initiated by far the greater number of activities.

Finally, the mother's language behavior is very interesting. Center mothers talked to the child significantly more than SC1 mothers (C1, $\overline{X}$ = 77.9%, SC1 $\overline{X}$ = 45.7%). The difference is significant at the .04 level. The paradoxical finding is that the percentage of language that was positive versus negative was not different between the groups. It was felt that this was due to the fact that Center mothers said so much more. In fact, if one looks at the total amount of the mother's interaction time and the functional use of

	22 m	36 m
Center I	54.6	70.2
Serial Control I	49.8	39.7

PERCENT POSITIVE MATERNAL TECHNIQUES

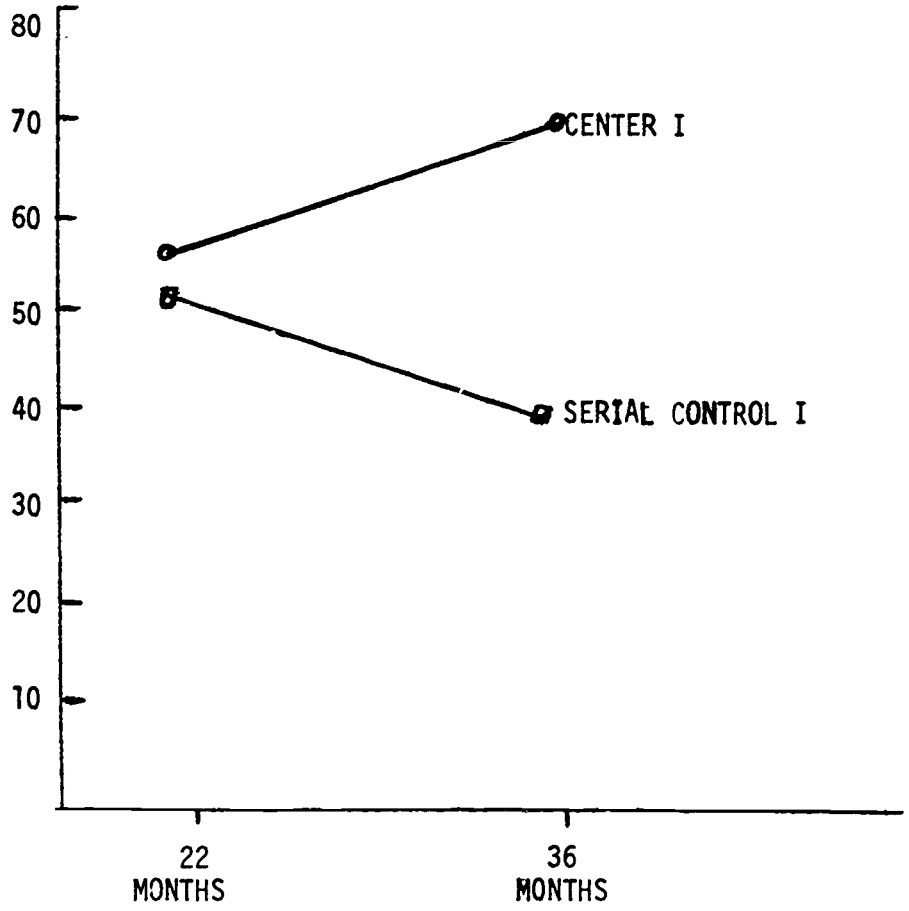

Figure 1. Comparison of Center I and Serial Control I Groups (Wave 1) on the 22- and 36-month Unstructured Interaction: % Positive Maternal Techniques.

language, it is clear this is the case. C1 mothers spent 65.9% of their total interaction time using language positively compared to 37.5% in the SC1 ($p = .02$). The net percentage of maternal behavior that was given to positive uses of language was significantly different at the .04 level from the SC1 mothers.

In sum, referring to the Hypotheses of program effectiveness, the C1 - SC1 comparisons confirmed Hypotheses 7, 9, 10, 12, 14, 16, 18, 19, 20, 21, and 22 concerning mother-competence as a child-rearer as a result of the Center program.

The Effects Of The Center Program (Pilot) On The Child's Development Of Competence.

The discussion of the hypotheses concerning the child's development all revolves around the principle hypothesis (HO: 1) of the program effects. Mother-competence must be demonstrated before child-competence can be expected. Any significant findings prior to demonstrating this change can only be considered an effect of the Center children's program, which is secondary in the PCDC model.

Since the C1 mothers only became significantly "better mothers" than the SC1 at about 2 years of the child's age, we predicted no differences prior to or even around that time in the child's development. This is, in fact, the picture painted by data presented in earlier reports. The C1 children reached top-level performance on the Uzgiris-Hunt Scales at approximately the same age as the SC1 children (HO: 23).

The results of the 28-month and 36-month testing on the Pacific Test Series are tabulated in Tables 5 and 6, respectively. As can be seen in Table 5, on only one subtest of the Pacific Test were the C1 children superior to the SC1 (p = .01 on the Form-Color Match Subtest). This was not unexpected since the C1 mothers only showed differences from the SC1 mothers 4 to 6 months prior to the 28 month test. The 36 month test results are considerably stronger (see Table 6). On two (2) subtests out of four (4) the C1 children score significantly higher. The total scale score favored the Center group by five (5) points, a difference significant at the .04 level. The maximum number of points possible is 40. Figure 2 shows that the Center 1 increased from 24.8 to 32.9 from 28 months to 36 months while the SC1 went from 22.1 to 28.0 points.

There were three measures of the child's linguistic competence, the Ammons, the Grammar Test and the total amount of the child's language (from the Mother-Child Interaction Scale). Table 7 compares the means and standard deviations for the C1 and SC1 groups on the 26 month, 30 month, 36 month administrations of the Ammons test and the change score from 26 to 36 months. While there are no significant differences between the groups at any time point, the Center group scored behind the SC1 at 26 months and more than caught up by 36 months (See Figure 3). The increase is significant at the .01 level. Although it is purely speculative, this slower start and more rapid growth could be indicative of the "problem of the match". It seems probable, particularly with language development, that the environment which might facilitate later language development would hinder earlier language development. For example, it has been hypothesized that shorter sentences are best for early language acquisition but not for

TABLE 5
COMPARISON OF CENTER I WITH SERIAL CONTROL I GROUPS
(WAVE 1) ON THE 28-MONTH PACIFIC TEST SERIES

		C1	SC1	p[1]
Form-Color Match	Mean	7.2	4.8	.01
	n	12	13	
	SD	2.3	2.5	
Pattern Completion	Mean	8.6	8.1	n s
	n	13	12	
	SD	2.0	3.1	
Form Completion	Mean	5.3	5.5	n s
	n	13	12	
	SD	.95	.80	
Picture Completion	Mean	5.0	5.6	n s
	n	11	11	
	SD	2.4	1.7	
Total Points	Mean	24.8	22.1	n s
	n	13	13	
	SD	4.6	17.5	

[1]One-tailed probabilies are reported. "n s" = $p > .10$.

TABLE 6
COMPARISONS OF CENTER 1 WITH SERIAL CONTROL 1 GROUPS (WAVE 1) ON THE 36-MONTH PACIFIC TEST SERIES

		C1	SC1	p
Form-Color Match	Mean	8.8	7.3	.08
	n	12	11	
	SD	2.2	2.6	
Pattern Completion	Mean	10.4	8.6	.05
	n	12	12	
	SD	3.3	1.7	
Form Completion	Mean	5.9	5.8	n s
	n	12	12	
	SD	0.3	0.6	
Picture Completion	Mean	7.8	7.5	n s
	n	12	11	
	SD	2.8	2.0	
Total Points	Mean	32.9	28.0	.04
	n	12	12	
	SD	7.1	5.9	

[1]One-tailed probabilities are reported. "n s" = $p > .10$.

	28 m	36 m
Center 1	24.8	32.9
Serial Control 1	22.1	28.0

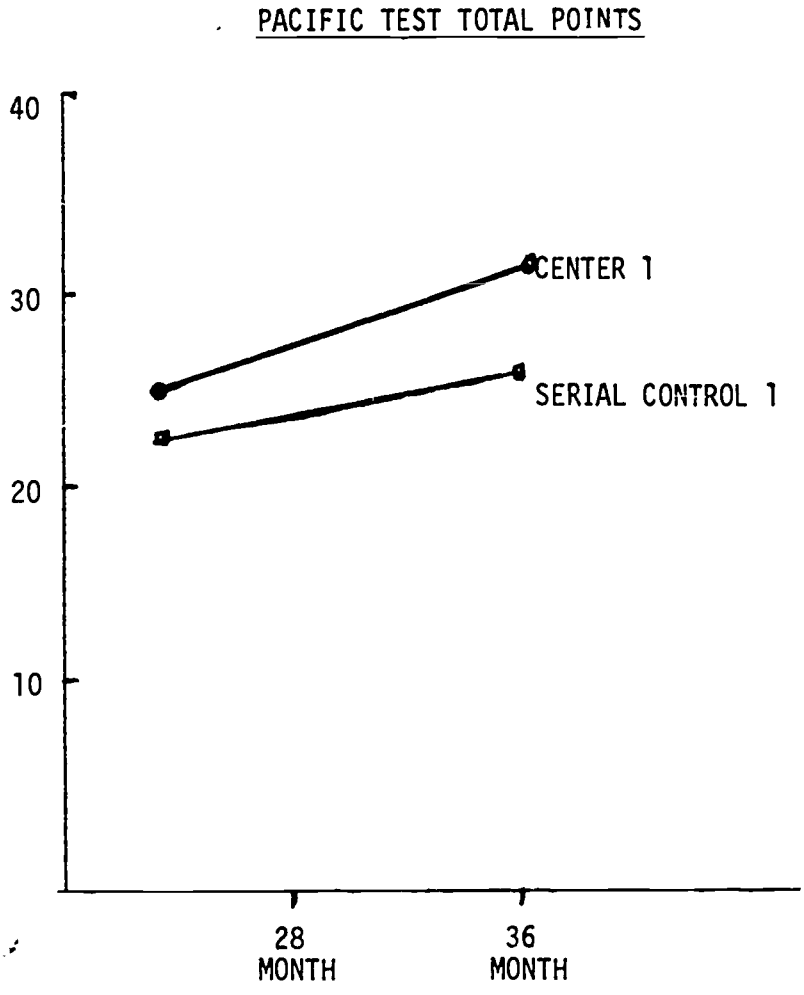

Figure 2. Comparison of Center 1 and Serial Control 1 Groups (WAVE 1) on the 28- and 36-month Pacific Test Series: Total Points.

TABLE 7
COMPARISON OF CENTER 1 WITH SERIAL CONTROL 1 GROUPS (WAVE 1) ON THE 26-, 30-, AND 36-MONTH AMMONS VOCABULARY TEST[1]

		C1	SC1	p
26 Months	Mean	7.0	10.0	n s
	n	7	7	
	SD	3.4	3.1	
30 Months	Mean	10.6	12.2	n s
	n	15	12	
	SD	4.0	3.8	
36 Months	Mean	14.3	13.1	n s
	n	11	11	
	SD	3.2	3.7	
36-26 Difference	Mean	9.0	2.3	.01
	n	6	6	
	SD	4.0	4.8	

[1]One-tailed probabilities are reported. "n s" = $p > .10$.

	26 m	36 m
Center 1	7.0	14.3
Serial Control 1	10.0	13.1

AMMONS TEST TOTAL POINTS

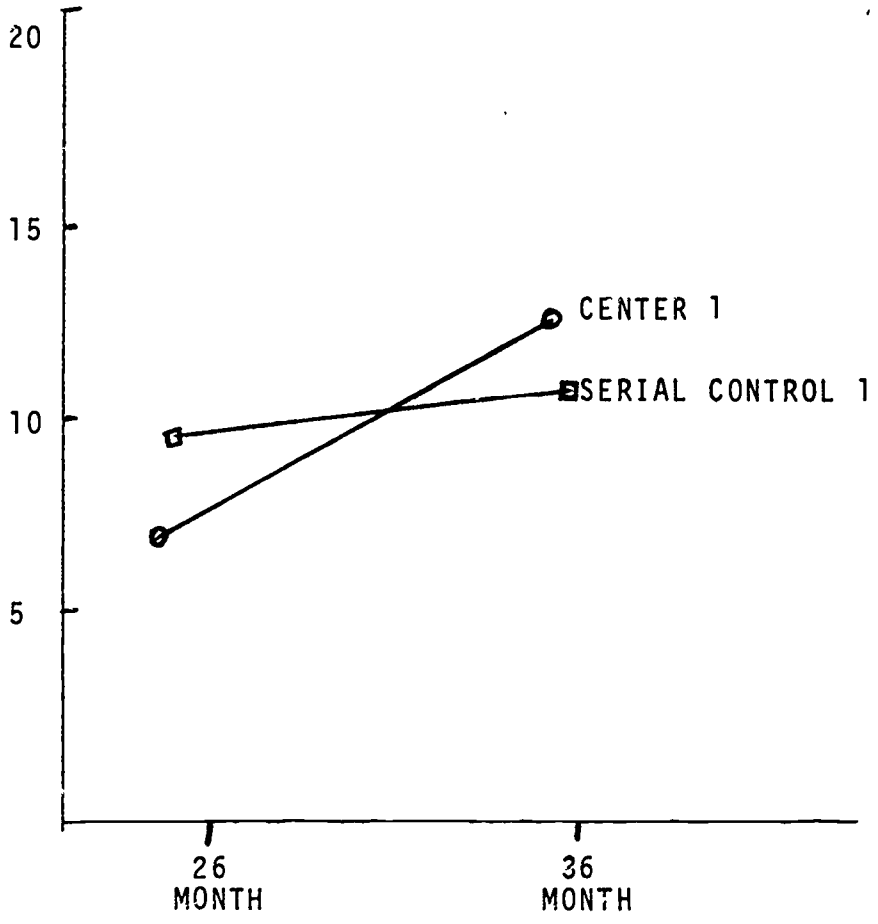

Figure 3. Comparison of Center 1 and Serial Control 1 Groups (Wave 1) on the 26- and 36-month Ammons Picture Vocabulary Test.

later acquisition. It will be recalled that as early as 22 months, the Center mothers were using longer sentences with their children. This may have hindered their performance on the 26 month test, but as they became more facile there was a better "match" between the mother's more elaborated, rich verbalizations and the child's developmental readiness for language acquisition. If this is the case, one might easily predict greater differences between the groups at later time points.

There were no significant differences between the groups on the Grammar Test, which could be a reflection of the fact that the test necessitates a standard English-language environment, which the New Orleans PCDC does not consider of great importance.

At 36 months of age (see Table 4) the C1 children talked significantly more than the SC1 children ($p = .02$). This is, in many respects, a better index of linguistic competence. Although it is yet too early to analyze how the children were using language, follow-up studies at later time points should prove interesting. It would be predicted that Center children would use language more analytically and less for purely social interaction.

Table 8 groups those measures which relate to general overall educability for comparison. Since these tests were administered at the yearly time points, it is possible to include the Yearly Control group in the comparisons. Note that on all tests the Center children score higher though not always significantly so. This is the first time that it is possible to examine HO: 5 (the repeated testing effect on the SC1 children).

TABLE 8

COMPARISON OF CENTER 1, SERIAL CONTROL 1, AND YEARLY CONTROL 1 GROUPS (WAVE 1) ON THE BAYLEY SCALES, THE CONCEPT FAMILIARITY INDEX, AND THE STANFORD-BINET[1]

		C1	SC1	YC1		
Bayley Mental 25 mon.	Mean	98.6	96.9	95.6	p (C-SC):	n s
	n	12	11	14	p (C-YC):	n s
	SD	13.8	23.6	13.0		
Bayley Motor 25 mon.	Mean	117.2	90.9	101.5	p (C-SC):	.002
	n	12	11	14	p (C-YC):	.06
	SD	21.0	18.9	26.2		
CFI 36-mon.	Mean	25.8	25.1	22.7	p (C-SC):	n s
	n	17	13	14	p (C-YC):	.10
	SD	5.9	7.2	7.1		
Stanford Binet 36 mon.	Mean	100.6	97.4	92.9	p (C-SC):	n s
	n	13	12	12	p (C-YC):	.07
	SD	14.3	14.6	10.3		

[1]One-tailed probabilities are reported. "n s" = $p > .10$.

As expected, C1 did not differ from either the SC1 or YC1 on the Mental Scale of the Bayley at 25 months. Totally unexpected, however, was the significant difference on the Motor Scale of the Bayley at 25 months (p = .002, C1 vs SC1; p = .06, C1 vs YC1). This finding could be dismissed as spurious if the C2 and C3 babies were not also significantly higher than their controls on the 25 month Bayley Motor. It seems quite possible that these results indicate a more cooperative test subject since most of the upper items on the Motor Scale demand that the child stand on one foot, walk a board, jump over a string and a host of other motor skills that most children can do but many two year olds refuse to perform on command. If the program affects testability and cooperation, we are pleased.

The Concept Familiarity Index yields a rather marginal difference between C1 and YC1 (p = .10). Finally, let us look at the Stanford-Binet, which might be the most subject of all the measures to the repeated-testing effect. The pattern of results is indeed suggestive of this. This mean for the Center is 100.6, for SC1 is 97.4, and for Yearly Control is 92.9. The difference between the Yearly Control and the Center is significant at the .07 level. It is interesting to note that in spite of their higher SES, at three years of age, the YC children are almost eight (8) points lower than the Center group, which is right around the national average. The Serial Control group may well be reflecting their serial testing practice. However, the follow-up Binet at four (4) years should find the SC lower, since a year will have passed without a test. The Center is expected to continue the trend up and/or maintain its position, while any testing in the SC1 group is expected to disappear during this time.

In sum, the Center (pilot) group mothers are showing evidence of enhancing their child's development at 24 months and more strongly at 36 months. The Center children begin to show a developmental increase at 28 months which is considerably stronger by age 3. The most exciting finding, however, is that, as predicted (HO: 1), mother change preceded child change.

EXPERIMENT 2: C3 Vs SC3

The third wave of Center mothers and children (C3) constituted the first real experimental test of the model's effectiveness. Although still in the process of developing, the treatment was considerably more stable for C3 than for C1. Recall that it was hypothesized (HO: 3) that the C3 groups would be more effective than the C1 group. At this writing, the C3 children are approximately 30 months old, therefore, data will be presented only up to the 24 month test batttery. The data will be organized as in the previous section.

The Effect Of The Center Program (C3) On The Mothers As Enchancers Of Child Compentence.

Data analyzed prior to 24 months of age for C3 vs SC3 has been reported in earlier reports and will only be summarized. The 4 month mother-child interaction observations yielded no differences between the groups, as expected. At 12 months, however, differences between the C3 mothers and SC3 mothers were already emerging. Table 9 presents the means, standard deviations and probabilities based on point-biserial correlations of the major mothering dimensions considered so important to a child's developing abilities. As can be seen by inspection of Table 9, the C3 group was significnatly better than the SC3 mothers on seven (7) of the 12 variables. It is also important to note that, as was the case with C1, all means are in the predicted direction.

C3 mothers were significantly more sensitive (p = .03), more accepting (p = .04), more cooperative (p = .001) and gave their infants considerably more encouragement than SC3 mothers (p = .004). There was no difference in the amount of talking the mother did to the infant; however, C3 mothers used marginally longer sentences (p = .10). This finding , as discussed before, relates basically to the curriculum emphasis on elaborated language and could also produce a problem of the match with the children until they catch up. There was no difference in the mother's functional use of language, but at 12 months it is hardly expected that mothers would take many opportunities to ask questions, give explanations or suggestions for the child's behavior.

The pleasing result of the larger amount of positive techniques (p =.05) and net positive techniques (p = .05) evidenced by the C3 mothers merits discussion. C3 mothers are showing the same percentage of positive techniques at 12 months (71.4%) as the C1 mothers showed at 36 months (70.2%).

TABLE 9
POINT-BISERIAL CORRELATIONS COMPARING
CENTER III AND SERIAL CONTROL III GROUPS
MOTHER-CHILD UNSTRUCTURED INTERACTION VARIABLES:
12 MONTHS OF AGE.[1]

		Center III n = 7	Serial Control III n = 10	
12-Mon.	Insensitivity-Sensitivity	$\bar{X}$=6.1	4.6	.46 r
		S.D.(n)=1.6	1.6	.03 p
12-Mon.	Rejection-Acceptance	8.7	7.0	.44
		0.8	2.3	.04
12-Mon.	Interference-Cooperation	6.4	4.2	.68
		1.0	1.4	.001
12-Mon.	Mean Length Utterance	4.0	3.4	.33
		1.1	0.8	.10
12-Mon.	% Verbal Behavior	43.0	43.9	n s
		16.0	18.0	
12-Mon.	% Positive Encouragment	69.7	40.8	.61
		12.5	23.0	.004
12-Mon.	% Language Which Is Positive	85.4	76.1	n s
		15.3	19.5	
12-Mon.	% Language Which Is Negative	13.1	23.8	n s
		15.3	19.4	
12-Mon.	% Language: Net (Positive-Negative)	72.3	52.3	n s
		30.4	29.0	
12-Mon.	% Positive Maternal Technique	71.4	55.1	.41
		19.6	19.1	.05
12-Mon.	% Negative Maternal Technique	12.3	18.8	n s
		12.1	9.4	
12-Mon.	Net Techniques	59.1	36.3	.42
		28.9	24.1	.05

[1]The number of cases is given in parentheses only when it differs from the group n given at the top of the column. "n s" = $p > .10$. Absolute value of r is reported. One-tailed probabilities have been used.

The 24 month interaction results are dramatic. Table 10. shows that on 15 out of 18 good mothering behaviors,the C3 group was significantly better than the SC3 mothers. It would be easier, by far, to discuss those in which, although higher than the SC3, the C3 mothers were not significantly different. These were total amount of language, the amount of positive encouragement, and the percentage of activities that the child initiated. Although C3 mothers did not differ in amount of language, they differed significantly from the SC3 in how they used the language. In the C3 group 92.6% of the mothers' language was positive to 71.5% in the SC3 ($p = .03$), 7.4% of their language served a negative function compared to 18.8% in the control group ($p = .01$).

The C3 children initiated more activities than their mothers did while the SC3 mothers initiated more activities than their children. The difference between the ratios was in the desired direction and significant at the .002 level. The failure of the amount of encouragement variable to discriminate between groups may be the result of a problem in scoring which was detected after several of the interactions had been scored.

The Effect Of The Center Program (C3) On The Child's Development Of Competence.

As always, the discussion of the child effects must revolve around the Center's hypothesis that mother change must preceed child change. Since the C3 mothers were significantly better than the SC3 mothers at 12 months of age, it was hoped that the C3 children would begin to diverge from the SC3 children around age 2 years.

TABLE 10
t-TESTS COMPARING CENTER 3 AND SERIAL CONTROL 3
ON MOTHER-CHILD UNSTRUCTURED INTERACTION VARIABLES: 24 MONTHS

		Center 3 n = 9	Serial Control 3 n = 9	t p[1]
24-Mon.	Insensitivity-Sensitivity	X=6.9 S.D.=1.5	5.0 1.9	2.34 .02
24-Mon.	Rejection-Acceptance	7.6 1.0	5.4 2.6	2.30 .02
24-Mon.	Interference-Cooperation	7.4 1.4	3.9 2.1	4.14 .001
24-Mon.	Responsiveness	7.4 1.4	5.6 1.7	2.42 .01
24-Mon.	%Verbal Behavior	69.7 28.4	61.8 19.6	n s
24-Mon.	%Positive Encouragement	19.4 20.0	15.2 9.7	n s
24-Mon.	%Language Which Is Positive	92.6 8.9	71.5 28.7	2.11 .03
24-Mon.	%Language Which Is Negative	7.4 8.9	18.8 10.6	-2.47 .01
24-Mon.	%Language: Net (Positive-Negative)	85.2 17.9	52.6 32.0	2.67 .01
24-Mon.	%Positive Maternal Techniques	73.7 22.3	54.2 13.2	2.26 .02
24-Mon.	%Negative Maternal Techniques	7.5 7.0	16.4 8.6	-2.52 .01
24-Mon.	%Net Maternal Techniques (Positive-Negative)	66.2 25.7	37.7 16.5	2.80 .01
24-Mon.	%Mother Initiation	6.7 9.5	13.2 8.1	-1.56 .07
24-Mon.	%Child Initiation	14.0 13.4	8.1 7.7	n s
24-Mon.	%Child/Total Ratio:	0.73 0.12	0.37 0.30	3.35 .002
24-Mon.	%Behavior Which Is Positive Language	64.0 26.1	50.3 15.7	1.35 .10
24-Mon.	%Behavior Which Is Negative Language	6.1 7.7	12.2 7.5	-1.72 .05
24-Mon.	%Behavior: Net Language (Positive-Negative)	57.9 26.1	38.0 14.5	2.00 .03

[1]One-tailed probabilities are reported. "n s" = $p > .10$.

The C3 children reached top level performance on all five (5) of the Uzgiris-Hunt Scales at an earlier age than the SC3 children. The differences between the groups were only significant on two (2) of the five (5) scales (see Table 11). The Center-3 children did however finish all the scales earlier than the SC3 children. It is necessary to view these results with caution, however, due to possible methodological problems attendant to the age-at-passing data. The scales were administered to the C3 and SC3 groups at 2, 4, 6, 8, 10, 12, 16, and 20 months of age. The scores for each groups are derived by averaging the age, in days, that each subject completely passed the last three (3) items of each scale. Since the testing points were four (4) months apart from twelve (12) months to twenty (20) months, the age, in days, at which each subject actually received the test could be important. The C3 group received the 12 month test on the average significantly later than the SC3 (371 days, C3 and 358 days for SC3).

It is possible that some of the C3's who received the 12 month test late passed, whereas the earlier 12 month tests of the SC3 were too early for too many of the group to pass at that age. Therefore, more SC3 children would pass at 16 months and more C3 children could have passed at 12 months. This possibility is being investigated further. However, the HV3 group received the 12 month test significantly earlier than the SC3 group also, and did not reach top level performance on any of the five scales significantly earlier than the SC3. Therefore, it is likely that the C3 children's performance is the beginning of the trend which emerges clearly at twenty-four (24) months. Since the C3 mothers first began to differ

TABLE 11
POINT-BISERIAL CORRELATIONS COMPARING
CENTER III AND SERIAL CONTROL III GROUPS
ON UZGIRIS-HUNT INFANT PSYCHOLOGICAL DEVELOPMENT SCALES:
AGE-AT-PASSING BEGINNING AND ENDING ITEMS (IN DAYS)[1]

	Center III	Serial Control III	r / p
BEGINNING			
Visual Pursuit And Object Permanence (2,3,4/16)	$\bar{X}$=233.5 S.D.(n)= 58.5 (27)	230.1 44.1 (27)	n s
Means For Achieving Ends (2,3,4/12)	227.6 73.7 (27)	207.7 43.2 (27)	n s
Schema Exhibited (10/24) ("Examines Object")	214.9 43.0 (14)	208.0 84.7 (17)	n s
Construction Of Objects In Space (2,3,4/11)	215.6 46.6 (27)	211.8 36.0 (27)	n s
Vocal Imitation (2,3,4/7)	391.4 62.7 (18)	386.4 74.5 (22)	n s
ENDING			
Visual Pursuit And Object Permanence (13,14,15/16)	441.2 87.6 (15)	479.9 90.7 (20)	n s
Means For Achieving Ends (9,10,11/12)	452.8 86.5 (9)	511.9 44.5 (13)	.43 .02
Schema Exhibited (18/24) ("Wears Necklace")	342.6 128.3 (15)	378.4 112.0 (16)	n s
Construction Of Objects In Space (8,9,10/11)	472.2 69.3 (17)	509.0 78.6 (20)	.25 .07
Vocal Imitation (5,6/7)	475.0 85.9 (16)	482.2 88.5 (16)	n s

[1] Numbers in parentheses preceding the slash are number of those items whose passages were averaged to obtain the dependent measure. The total number of items in the scale is given after the slash. Correlation probabilities are two-tailed for beginning items, one-tailed for ending items. "n s" = $p > .10$. Absolute value of r is reported.

significantly on the Mother-Child Interaction Scale at 12 months, the sixteen (16) to twenty (20) month period would be a little soon for the children's developmental pattern to emerge full blown. That is, of course, if one accepts the approximate lag time of one year after mother change.

Table 12 presents the comparison of the C3 and SC3 means, standard deviations and t-tests on the 24-month administration of the Pacific Test Series. The C3 children score significantly higher on two (2) of the sub-tests and the total score (all p's = .01) than the SC3. The result would be predicted since the C3 mothers changed around twelve (12) months.

Consistent with C1 findings and the 12 month mean-length-of sentence findings for the C3 group, there was no difference between the groups on the Ammons or Grammar. This further suggests the possibility of the problem of the match (see Table 13).

Table 14 tabulates the means, SD's and t-tests on the nineteen (19) and twenty-fifth (25th) month Bayley Mental and Motor Scales. At nineteen (19) months, the C3 scored significantly higher than the SC3 on the Bayley Mental (C3 $\overline{X}$ = 102.0, SC3 $\overline{X}$ = 91.9, p = .01). At twenty-five (25) months, the difference eroded a little but the direction is still solid. Again at twenty-five (25) months, the Bayley Motor Scale yields that strange result. The C3 ($\overline{X}$ = 104.4) is significantly different from the SC3 ($\overline{X}$ = 91.1) at the .07 level.

TABLE 12
COMPARISON OF CENTER 3 WITH SERIAL CONTROL 3 GROUPS (WAVE 3) ON THE 24-MONTH PACIFIC TEST SERIES[1]

		C3	SC3	p
Form-Color Match	Mean	4.6	4.8	n s
	n	8	6	
	SD	0.9	1.7	
Pattern Completion	Mean	7.2	4.3	.01
	n	9	7	
	SD	1.9	2.9	
Form Completion	Mean	5.0	3.6	.01
	n	10	10	
	SD	1.2	1.4	
Picture Completion	Mean	3.9	3.4	n s
	n	10	8	
	SD	1.5	2.2	
Total Points	Mean	19.1	12.2	.01
	n	10	10	
	SD	4.2	8.0	

[1]One-tailed probabilities are reported. "n s" = $p > .10$.

TABLE 13
COMPARISON OF CENTER 3 WITH SERIAL CONTROL 3 GROUPS (WAVE 3) ON THE 26-MONTH AMMONS AND GRAMMAR TESTS[1]

		C3	SC3	p
Ammons 26 months	Mean	8.7	12.0	n s
	n	9	5	
	SD	2.9	5.7	
Grammar 26 months	Mean	5.9	7.8	n s
	n	9	5	
	SD	2.4	1.6	

[1] "n s" = $p > .10$, one-tailed.

TABLE 14
COMPARISON OF CENTER 3 WITH SERIAL CONTROL 3 GROUPS (WAVE 3) ON THE 19- AND 25-MONTH BAYLEY SCALES[1]

		C3	SC3	p
Mental 19 months	Mean	102.0	91.9	.01
	n	7	14	
	SD	17.4	12.9	
Motor 19 months	Mean	100.3	91.4	n s
	n	6	14	
	SD	12.1	18.3	
Mental 25 months	Mean	99.3	93.5	n s
	n	11	13	
	SD	14.1	20.6	
Motor 25 months	Mean	104.4	91.1	.07
	n	11	13	
	SD	19.1	23.4	

[1]One-tailed probabilities are reported.
"n s" = $p > .10$.

The HO: 4 that the C3 program would be more effective than the C1 appears to be confirmed. Where C1 mothers showed increases at twenty-two (22) months, C3 mothers showed them at twelve (12) months and considerably stronger than ever could have been predicted at twenty-four (24) months. The major point, however, is that with these results, we have a replicated finding that mother-change preceded child-change. It appears that the lag time is no more than one year on most measures.

EXPERIMENTS 3 And 4: HV1 Vs SC1 And HV3 Vs SC3

The experiments three (3) and four (4) will be treated together. The reason for this is that there was no significant effects of the Home-Visit program on the mother or on the child. As a matter of interest, the means on almost all variables for the Home-Visit groups were either the same or only slightly better than the Serial Control groups.

EXPERIMENT 5: C2 Vs SC1 And HV2 Vs SC1

The two treatment groups, C2 and HV2, who started the program at age one (1) year and graduated at three (3) years of age will also be discussed together. The C2 group means on most all of the child measures were close to but not as high as the C1 means. The only significant difference between the C2 children and the SC1 children was again on the Motor Scale of the Bayley at twenty-five (25) months of age. There were no significant group differences on the thirty-six (36) month Pacific Test Series, Concept Familiarity Index or Binet (C2 vs SC1). The C2 children did score well on the Binet ($\overline{X}$ = 102.1) and were significantly higher than the Yearly Control group ($\overline{X}$ = 92.9)at the .02 level of probability. Thus, although not quite

as convincing (due to the lack of C2 vs SC1 differences at thirty-six (35) months) as the C1 program, it is not possible to conclude whether it was the shortened intervention time (three (3) years vs two (2) years) or the age of beginning the program that account for the difference. Personal observations of this group as they graduated left the impression that they were just beginning to "catch fire". Possibly the 4-year follow-up data will give us some clues about the strength of the continuing effect on the children. Mother interaction data is presently being analyzed for this group.

As an interesting set of comparisons, Table 15 presents the means and t-tests for the Stanford-Binet, the CFI and the 26-to-36 month change score for the Ammons, pooling the C1 with the C2 and the SC1 with the YC1. The combined Center groups with the increased N scored significantly higher on the Binet ($p = .05$) than the pooled Control groups. The difference between the groups on the CFI approaches significance at the .10 level. Finally, the change score from 26 to 36 months on the Ammons is highly significantly different ($p = .002$), indicating that both Center groups showed a large increase in language development relative to the Control groups.

The HV2 group showe ne same relatively disappointing results as the HV1 and HV3. wo years or three (3) years, the Home-Visit Model of the New Orleans PCDC does not seem to be effective.

EXPERIMENT 6: CENTER MODEL VS THE HOME-VISIT MODEL

It is now possible to address HO:3 that the Center Model would be more effective than the Home-Visit Model. This Hypothesis was confirmed much more

TABLE 15

COMPARISON OF POOLED CENTER 1 AND CENTER 2 WITH POOLED SERIAL CONTROL 1 AND YEARLY CONTROL 1 GROUPS (WAVES 1 AND 2) ON THE STANFORD-BINET, THE CONCEPT FAMILIARITY INDEX, AND THE AMMONS 36-26 DIFFERENCE SCORE[1]

		C1+C2	SC1+YC1	p
Stanford-Binet 36-mon.	Mean	101	95	.05
	n	21	24	
CFI 36-mon.	Mean	26	24	.10
	n	26	27	
Ammons 36-26 Difference	Mean	8.0	1.8	.002
	n	9	9	

[1]One-tailed probabilities are reported. Standard deviations were unavailable in time for release with this draft.

solidly than we would have expected. Previous results have already indicated that the Home-Visit groups were not significantly different from SC1 or SC3 on any mother measures or child measures. The final confirmatory evidence can be found in Tables 16 and 17. As can be seen, the C1 mothers were significantly better than the HV1 mothers at thirty-six (36) months on the following ten (10) out of twenty (20) measures of mother-competence: Sensitivity (p= .02), Responsiveness (p = .04), Verbal Richness (p = .01), Amount of Mother Language (p = .03), percentage of Positive Maternal Techniques (p = .03), Net Positive Techniques (p = .05), Ratio of Child-Initiated Activities to Total (p = .05), Amount of Behavior which was Positive Language (p = .04), and amount of the Mother's Behavior that was Negative Language (p = .04).

The HV3 mothers were significantly poorer than the C3 mothers at twenty-four (24) months on the following Mother-Child Interaction Measures: Sensitivity (p = .04), Rejection (p = .03), Cooperation (p = .003), Responsiveness (p = .01), and the Net Positive Maternal Techniques (p = .05).

EXPERIMENT 7: A PREDICTIVE VALIDATION OF THE MOTHER-CHILD INTERACTION MEASURE

Throughout the past five (5) years, the New Orleans PCDC has put a "lot of eggs in one basket," so to speak. We felt it was possible to identify the mothering dimensions that would lead to later child-competence. Further, we felt it was possible to create a treatment which would be successful in moving a mother closest to the ideal mother who enhances her child's development through her daily interactions with him.

TABLE 16
t-TEST COMPARING CENTER 1 AND HOME-VISIT 1
ON MOTHER-CHILD UNSTRUCTURED INTERACTION VARIABLES: 36 MONTHS

		Center 1 n = 10	Home Visit 1 n = 9	t p[1]
36-Mon.	Insensitivity-Sensitivity	$\bar{X}$=5.7	3.7	2.22
		S.D.=1.6	2.1	.02
36-Mon.	Rejection-Acceptance	6.6	4.9	n s
		1.8	3.0	
36-Mon.	Interference Cooperation	5.9	4.3	n s
		1.8	2.1	
36-Mon.	Responsiveness	5.3	3.3	1.80
		1.9	2.8	.04
36-Mon.	Verbal Richness	5.2	2.9	2.45
		1.6	2.3	.01
36-Mon.	%Verbal Behavior	77.9	51.0	2.05
		23.6	30.5	.03
36-Mon.	%Positive Encouragement	23.9	11.1	n s
		22.0	14.6	
36-Mon.	%Language Which Is Positive	83.7	88.6	n s
		8.0	16.9	
36-Mon.	%Language Which Is Negative	14.0	10.1	n s
		7.3	13.17	
36-Mon.	%Language: Net (Positive-Negative)	69.7	78.5	n s
		14.9	30.0	
36-Mon.	%Positive Maternal Techniques	70.2	47.4	2.07
		17.7	27.9	.03
36-Mon.	%Negative Maternal Techniques	13.8	18.5	n s
		8.3	20.0	
36-Mon.	%Net Maternal Techniques (Positive-Negative)	56.4	29.0	1.74
		20.8	43.8	.05
36-Mon.	%Mother Initiation	6.5	1.8	2.30
		5.1	2.2	.04
36-Mon.	%Child Initiation	20.4	22.2	n s
		10.9	11.4	
36-Mon.	Child/Total Ratio: Initiation	0.73	0.89	-1.74
		0.22	0.14	.05
36-Mon.	%Behavior Which Is Positive Language	65.9	44.6	1.91
		19.5	26.7	.04
36-Mon.	%Behavior Which Is Negative Language	11.5	5.0	1.80
		7.9	6.1	.04
36-Mon.	%Behavior: Net Language (Positive-Negative)	54.4	39.5	n s
		19.3	26.9	
36-Mon.	%Child Language	68.9	67.5	n s
		15.7	21.1	

[1] One-tailed probabilities are reported (a priori hypotheses of differences). "n s" = p>.10.

TABLE 17
t-TESTS COMPARING CENTER 3 AND HOME VISIT 3
ON MOTHER-CHILD UNSTRUCTURED INTERACTION VARIABLES: 24 MONTHS

		Center 3 n = 9	Home Visit 3 n = 9	
24-Mon.	Insensitivity-Sensitivity	$\bar{X}$=6.9	5.1	1.89 t
		S.D.=1.5	2.4	.04 p[1]
24-Mon.	Rejection-Acceptance	7.6	6.2	2.07
		1.0	1.6	.03
24-Mon.	Interference-Cooperation	7.4	4.8	3.21
		1.4	2.0	.003
24-Mon.	Responsiveness	7.4	5 0	2.41
		1.4	2.6	.01
24-Mon.	%Verbal Behavior	69.7	59.4	n s
		28.4	29.9	
24-Mon.	%Positive Encouragement	19.4	23.6	n s
		20.0	18.0	
24-Mon.	%Language Which Is Positive	92.6	75.1	n s
		8.9	35.2	
24-Mon.	%Language Which Is Negative	7.4	22.7	n s
		8.9	35.8	
24-Mon.	%Language: Net	85.2	52	n s
	(Positive-Negative)	17.9	70.8	
24-Mon.	%Positive Maternal Techniques	73.7	53.1	n s
		22.3	30.9	
24-Mon.	%Negative Maternal Techniques	7.5	14.6	n s
		7.0	14.4	
24-Mon.	%Net Maternal Techniques	66.2	38.5	1.75
		25.7	39.8	.05
24-Mon.	%Mother Initiation	6.7	9.0	n s
		9.5	11.4	
24-Mon.	%Child Initiation	14.0	12.4	n s
		13.4	13.1	
24-Mon.	Child/Total Ratio Initiation	0.73	0.57	n s
		0.12	0.38	
24-Mon.	%Behavior Which Is	64.0	50.1	n s
	Positive Language	26.1	33.9	
24-Mon.	%Behavior Which Is	6.1	9.3	n s
	Negative Language	7.7	12.8	
24-Mon.	%Behavior: Net Language	57.9	40.8	n s
	(Positive-Negative)	26.1	41.6	

[1] One-tailed probabilities are reported (a priori hypotheses of differences). "n s" = $p > .10$.

We have demonstrated the Center Model's success in training mothers to be more competent according to the criteria of the measure. We have also demonstrated that the children in our Center program, at a point in time after the mother becomes a better environmental support agent (again according to the operational definitions of the measure), show developmental differences with respect to the Control group children. This replicated pattern (C1 and C3) is suggestive that our hypothesized chain-of-effects from Educator to Mother to Child did take place.

It remained, however, to demonstrate that mothers, who we operationally defined as competent, did, in fact, raise children who were also competent. In order to validate our measures of mothering competence as well as to eliminate any doubts that our Model was effective, we constructed two indices from the interaction measures. One index consisted of the average of the three global ratings, Sensitivity-Insensitivity, Acceptance-Rejection, and Cooperation Interference. The other was composed of the average of the Net Techniques and Net Language Categories. Mothers from Wave I (C1, HV1 and SC1) were pooled and those above the median on both indices (irrespective of group) formed the "higher" group while those mothers below the median on both formed the "lower" group. Only four (4) mothers were not categorized identically by both indices and were excluded from the analysis. T-tests were then performed on the Child Outcome Measures between the groups higher and lower on the indices of optimal mothering.

Table 18 presents the results. The "higher" group of mothers had children who scored significantly higher on the Bayley Motor at twenty-five (25) months ($p = .085$), the Form-Color-Match Subtest of the Pacific at thirty-six (36)

TABLE 18

t-TESTS OF CHILD OUTCOME MEASURED BETWEEN GROUPS HIGHER AND LOWER ON TWO INTERACTION INDICES OF OPTIMAL MOTHERING: WAVE 1 GROUPS POOLED AT 36 MONTHS[1]

		Higher	Lower	
25-Mon.	Bayley Mental	Mean = 95.5 S.D.(n) = 16.5 (5)	87.2 18.1 (8)	n s
25-Mon.	Bayley Motor	113.5 27.6 (5)	92.6 19.7 (8)	1.47 t .09 p
28-Mon.	Pacific: Form-Color Matching	5.1 3.1 (8)	5.9 2.0 (8)	n s
28-Mon.	Pacific: Pattern Completion	8.0 3.7 (8)	7.9 2.8 (8)	n s
28-Mon.	Pacific: Form Completion	3.5 2.3 (8)	5.6 0.7 (8)	-2.33 .04
28-Mon.	Pacific: Picture Completion	5.1 3.5 (8)	4.9 2.6 (8)	n s
28-Mon.	Pacific: Total Points	15.8 12.0 (11)	19.4 11.8 (10)	n s
28-Mon.	Pacific: Developmental Category	1.4 1.1 (11)	1.6 1.1 (10)	n s
36-Mon.	Pacific: Form-Color Matching	8.6 3.1 (11)	5.8 3.2 (10)	2.06 .03
36-Mon.	Pacific: Pattern Completion	10.5 2.1 (11)	8.7 1.9 (10)	2.07 .03
36-Mon.	Pacific: Form Completion	5.8 0.4 (11)	5.9 0.3 (10)	n s
36-Mon.	Pacific: Picture Completion	8.0 2.5 (11)	7.3 1.8 (10)	n s
36-Mon.	Pacific: Total Points	33.0 6.2 (11)	27.7 4.8 (10)	2.18 .02
36-Mon.	Pacific: Developmental Category	3.6 1.1 (11)	2.6 0.7 (10)	2.51 .01
26-Mon.	Ammon: Picture Vocabulary	4.3 2.9 (3)	12.0 1.0 (3)	-4.35 .01
30-Mon.	Ammon: Picture Vocabulary	11.1 5.0 (10)	10.1 5.0 (0)	n s
26-Mon.	Grammar	6.0 1.6 (4)	5.3 4.0 (4)	n s
30-Mon.	Grammar	9.6 3.9 (10)	4.8 2.3 (8)	3.14 .003
36 Mon.	Grammar	13.1 5.2 (10)	9.0 4.2 (9)	1.88 .04
36-Mon.	Stanfrod-Binet IQ	97.0 13.9 (11)	91.9 7.8 (10)	n s
36-Mon.	Concept Familiarity Index	26.7 7.2 (11)	22.4 6.0 (10)	1.49 .08

[1]One-tailed probabilities are reported, except where the t value is negative. Refer to the text for a description of the method by which the groups were formed.

months (p = .021), the Ammons at thirty-six (36) months (.01), The Grammar Test at thirty (30) (p = .003) and thirty-six (36) months (.030), and the CFI at thirty-six (36) months (p = .076). Good mothering had the reverse effect on the twenty-six (26) month Ammons (p = .006) and Pacific Form at 28 months, which is even more convincing evidence that we are dealing with the problem of matching the best environmental stimulation to the child's developmental level. It appears that the Mother-Child Interaction Measure does assess behaviors which do influence positively the child's development of competence.

A corresponding analysis was performed on Wave III (C3, HV3, and SC3). At twenty-four (24) months, "higher" mothers on the interaction indices of optimal mothering had children who scored higher on the following measures of child development (see Table 19): Bayley 19 Mental (p = .085), Bayley 19 Motor (p = .059) and the twenty-five (25) month Bayley Mental (p = .041).

It is interesting to note the pattern of the means for the higher and lower groups on both waves. In almost every instance, the children of mothers higher on the indices of optimal mothering scored higher than the children of the lower mothers, although not always significantly higher.

TABLE 19
t-TESTS OF CHILD OUTCOME MEASURES BETWEEN GROUPS HIGHER AND LOWER ON TWO INTERACTION INDICES OF OPTIMAL MOTHERING: WAVE 3 GROUPS POOLED AT 24 MONTHS[1]

		Higher	Lower	
19-Mon.	Bayley Mental	103.^ 14.7 (7)	94.0 10.1 (7)	1.46 t .09 p
19-Mon.	Bayley Motor	107.7 11.9 (6)	92.9 18.3 (7)	1.70 .06
25-Mon.	Bayley Mental	110.8 8.4 (6)	88.7 26.8 (6)	1.93 .04
25-Mon.	Bayley Motor	102.3 21.5 (6)	96.8 30.6 (6)	n s
24-Mon.	Pacific: Form-Color Matching	4.1 2.4 (8)	3.2 2.6 (9)	n s
24-Mon.	Pacific: Pattern Completion	6.0 3.0 (8)	4.7 3.8 (9)	n s
24-Mon.	Pacific: Form Completion	4.3 1.2 (8)	3.8 2.1 (9)	n s
24-Mon.	Pacific: Picture Completion	4.4 2.3 (8)	3.0 2.6 (9)	n s
24-Mon.	Pacific: Total Points	13.6 10.3 (11)	13.2 8.6 (10)	n s
24-Mon.	Pacific: Developmental Cateogry	1.2 0.9 (11)	1.3 0.7 (10)	n s
26-Mon.	Ammons Picture Vocabulary	9.0 4.0 (7)	8.7 4.1 (6)	n s
26-Mon.	Grammar	6.0 1.6 (7)	5.5 3.1 (6)	n s

[1]One-tailed probabilities are reported. Refer to the text for a description of the method by which the groups were formed.

DISCUSSION

Almost all of our hypotheses regarding the general effectiveness of the program, in terms of its effects on the mother and the ultimate effects on the child were confirmed. The only surprise was that the Home-Visit Model was little more effective than the Serial Control. The Center Model, however, does work. It works as predicted: through the mother to the child. In no analysis did we find evidence that the children in the Center groups were showing improved development until at least 6 months after the mother had demonstrated significant advances relative to the Control mothers on those variables defined as necessary to promote child-competence.

This is singularly important because almost all the available evidence points to the fact that children do not maintain developmental gains in the absence of the supportive parenting environment. A basic premise of the PCDC concept is that once parents have been given the necessary information and skills, they will continue to influence their child's development long after the 3-year program has ended. Although none of our Center babies and their mothers have been out of the program long enough to test the long-term effects on the mother's retention of these skills and attitudes or on the child, we have presented conclusive evidence that our Center mothers were better promoters of their child's development at the program's conclusion. Further, there is every reason to believe that the differences shown between the Center children and the Control children will increase with age.

The most impressive findings concerned the validity of the measures of mothering competence. We have made many "educated guesses" about what mothers needed to do in order to further their child's development. The mother-child interaction scale was designed around these guesses. Obviously, the treatment was also designed to influence those behaviors we were measuring. The problem that worried us was the following: If we were wrong about what behaviors constituted a mother who was effective in enhancing her child's cognitive growth, then, even if we were successful in promoting these behaviors in our mothers, they might not have the desired ultimate effect on the child. The preliminary results of the analysis which split the mothers into two (2) groups scoring higher and lower on the interaction variables, irrespective of their group, treatment or control, indicates that our "guesses" about optimal moth ring were correct. The mothers scoring higher on the summative factors of the interaction did have children who were scoring higher on almost all of the child-measures at twenty-four (24) and thirty-six (36) months of age. A large number of these differences between higher and lower mothers were significant at thirty-six (36) months. The implication for the New Orleans PCDC, then is that the program treatment definitely is effective in helping mothers break the cycle of poverty for their children.

Taken as a whole, the results of the New Orleans PCDC, after four (4) years of model building, evaluation, and documentation, argue strongly the need for a replication experiment. It is crucial to the future structure of the social programming that these models be tested for feasibility and generalizability to all elements of the poverty population.

In summary, the New Orleans Parent-Child Development Center designed a model to give the mother a supportive adult learning environment —health, social services, homemaking, self-improvement classes, and a real voice in what she felt she needed. From that foundation of parent or adult development, the program sought to give mothers insight and understanding of the importance of their child's early years and their key role in them. Information and knowledge were not considered enough, however, to effect the changes in mothering behaviors and attitudes. Mothers were encouraged to actively participate -- observe, practice, role-play, and model these behaviors. Over a period of a year or two, these behaviors, indeed, appeared to have been internalized by the mothers.

It is not possible to identify which one or more treatment elements were most effective in producing the final outcome. It is more likely that the program's effectiveness is due to the whole atmosphere of child-centeredness that was created and not to any one specific part. We consider all the parts or treatment elements important in the creation of a total parent learning environment.

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