DOCUMENT RESUME

ED 111 529 PS 008 099

AUTHOR Holmes, Monica; And Others
TITLE The Impact of the Head Start Parent-Child Centers on Children. Final Report.
INSTITUTION Center for Community Research, New York, N.Y.
SPONS AGENCY Office of Child Development (DHEW), Washington, D.C.
REPORT NO OCD-2997A/H/0
PUB DATE Dec 73
NOTE 60p.

EDRS PRICE MF-$0.76 HC-$3.32 Plus Postage
DESCRIPTORS Age Differences; *Cognitive Ability; *Cognitive Tests; Comparative Analysis; Home Programs; *Intervention; Norm Referenced Tests; *Preschool Education; Preschool Programs; Program Evaluation; Sex Differences; *Test Results; Validity
IDENTIFIERS DDST; Denver Developmental Screening Test; Parent Child Centers; Preschool Inventory; *Project Head Start; PSI

ABSTRACT

This report presents results of cognitive ability tests administered to 3 to 5-year olds who were graduating from Parent-Child Center (PCC) programs in 14 cities. PCC programs are designed to maximize the potentialities of low income preschoolers through in-center, home-based, or in-center/home-based combination programs. The findings reflected outcomes expected from the educational component. Test scores for the experimental children were compared to national norms on the Preschool Inventory (PSI) and Denver Developmental Screening Test (DDST) and to scores for groups of Home Start children tested prior to their enrollment in Home Start programs in other communities. Descriptions of procedures used included information on tester training, instrument adaptations, testing problems, and validity. Data were subanalyzed by group, rural/urban setting, sex, and age. Scores of PCC children were somewhat better on a majority of items than either national norms or scores of the Home Start comparison group, especially on questions dealing with labelling, concept formation, shapes, and colors. Groups showed minimal differences on the DDST. Overall conclusions indicated that PCC seemed to have an impact on the children enrolled, though the evidence is not statistically strong. (ED)

CENTER FOR COMMUNITY RESEARCH

225 PARK AVENUE SOUTH
NEW YORK, N.Y. 10003
(212) 673-5050

THE IMPACT OF THE HEAD START PARENT-CHILD CENTERS ON CHILDREN

FINAL REPORT

Prepared for
Office of Child Development
Department of Health, Education, and Welfare

Contract No. 2997A/H/O

Monica Holmes, Ph.D.
Douglas Holmes, Ph.D.
Dorie Greenspan
Donna Tapper

December, 1973

ACKNOWLEDGEMENTS.

We wish to thank our Project Officer, Dr. Esther Kresh, for her assistance in every aspect of the evaluation. Particular thanks are due to Dr. Dennis Deloria and Dr. John Love of the High/Scope Foundation who have shared their wisdom and their data with us to the definitive benefit of the study. Thanks are due also to Dr. William Frankenburg, Ms. Alma Fandel, and Mr. Nathan Dick, for their assistance regarding the use of the Denver Developmental Screening Tests and for their making available data from the standardization sample available to us.

Most particularly, we wish to thank the twenty-eight staff members of the fourteen participating PCCs for their work in collecting the data and for their participation in the training conference.

TABLE OF CONTENTS

INTRODUCTION

The Parent-Child Center (PCC) program was initiated in 1968 as a national demonstration. The program is administered through Project Head Start, under the Office of Child Development (OCD). It is designed to meet the needs of low-income children 0-3 and their parents. The formal PCC objective, established at the national level, as it relates to children, is: to maximize the child's inherent talents and potentialities through enhancement of his health and his intellectual, social and emotional development. In order to achieve this objective, all PCCs have a children's education component, a health component, a nutrition component, and a social service component.

This is a report of tests administered to children at fourteen Parent-Child Centers (PCCs) between November, 1972 and July 1973. Previous reports have dealt with the major focus of the two-year evaluation study of the PCCs, namely, PCC impact on parents.[1] Therefore the findings presented in this report are related only to outcomes expected as a function of the children's education component. This component varies in its implementation from one PCC to the other. At some PCCs, children participate in an in-Center program; at others, children are worked with in their own homes; at some, the PCC provides both forms of intervention. In-Center programs range

---

[1] The impact of the Head Start Parent-Child Center Program on parents: a final report.

from two hours a week per child to 40 hours a week per child. Home intervention programs involve either one or two visits per week for approximately one hour per visit. There is tremendous variability among PCCs not only in terms of the number of hours of intervention per week, but also in terms of the kind of program offered. Some programs use a highly structured sequenced approach and others use a more general developmental-affective approach. Regardless of the number of hours of contact or the type of program implemented, all PCCs are designed to have an impact on the cognitive functioning of the children whom they serve.

Children ages 3.0 - 4.11 have been tested by PCC staff at fourteen Centers, using the Preschool Inventory and the Denver Developmental Screening Test. PCC children in this age range are graduating from the program. The test scores of the graduates are compared to the norms for each of the tests in order to see whether PCC graduates are functioning at a level which is commensurate with, or better than, the functioning of children in normative groups. Because of the lack of a control group from within the same community, the level of performance of PCC children cannot be directly attributed to PCC. However, the data do provide a picture of how PCC children are functioning in several important areas. It was not possible to obtain a matched control group because of the difficulty and expense involved in

contacting non-PCC participants. In addition, the comparability of children whose mothers chose to bring them to PCC and children whose mothers do not choose to participate is questionable.

Comparisons are presented between PCC children and the norms obtained from the standardization sample for each test and between PCC children and those recruited for the OCD Home Start Program in the fall of 1972. Home Start children (ages 3-6) were tested in the fall of 1972 prior to their entrance into program, as part of an ongoing evaluation of that program being conducted by the High/Scope Foundation and Abt Associates. The Home Start projects resemble the PCCs in that they are located in urban and rural communities and are designed to meet the needs of a low-income population. Thus, the Home Start children, tested prior to their involvement in any program, constitute an appropriate comparison group for the PCC children despite the fact that they do not come from the same communities. However, it should be clear that PCC children had the advantage of being tested by people who were well known to them, whereas Home Start children were tested by community residents who made only one previous visit to the child's home.

It should be clear, however, that using testers who

are familiar with the children and have a stake in the PCC program runs the risk that children could be coached for the test and that even during testing, in the case of ambiguous answers, the benefit of the doubt would always be given to the child. Despite these reservations, taking all available options into account, it was decided that comparison with the norms for each test and with the pre-program Home Start children would constitute the most methodologically sound design for the evaluation of the impact of PCC on the cognitive functioning of its children.

CHAPTER I
METHOD AND PROCEDURE

1.0 Choosing the test instruments

The test instruments used in this evaluation had to meet three criteria. They had to be:

- Easily administered
- Relevant and appropriate
- Comparable to tests used in the Home Start Evaluation

Ease of administration was important because the tests were administered by PCC staff members who performed the testing in addition to their routine responsibilities at the center. For this reason CCR could not schedule a large battery of tests, each test measuring a specific aspect of behavior or development. Ease of administration thus included not only a consideration of the level of skill needed to give the test, or the duration of the test, but the burden it would place on the PCC program. It was important to use PCC staff for the testing so that children could be tested as they reached the age of three. As testing was spread out throughout the entire program year, it would not have been practicable to utilize non-PCC community testers.

Once the validity, reliability, and ease of administration were investigated and established, the content of each potential test was scrutinized to ensure that the test was measuring precisely those areas of functioning relevant to PCC. Particularly as the test battery had to be limited in size, it became crucial to exclude tests with "surplus meaning."

Special consideration was given to the criterion that PCC study results be comparable with those from the Home Start study. As was discussed in the introduction to this report, it was not feasible to develop a control group. Problems of gaining entré into non-PCC homes, non-comparability between joiners and non-joiners, and between PCC children familiar with the tester and control children unfamiliar with the tester, led to the conclusion that no control group would be adequate. In the absence of a control group, a pre and post-test design could not be implemented as the effects of maturation could not be separated from those of program input. Since the evaluation relied on one data point (test scores of children who reached the age of 3), it was felt that comparability with the evaluation of the Home Start Program was particularly desirable. Comparisons are made with data from the fall 1972 testing of Home Start children, a time prior to the inception of actual program.

The tests chosen for the PCC evaluation were the Denver Developmental Screening Test (DDST) and the Preschool

Inventory (PSI). These instruments met the above stated set of criteria: they measured areas relevant to the study with an acceptable degree of reliability, they could be administered by persons not formally trained in the child testing field, and they were being used in the Home Start study.

The DDST in its original form is comprised of 105 developmental items for use with children from two weeks to six years of age. The version used by both CCR and High/Scope consists of 22 items appropriate for use with children three to five years of age. In addition to 22 items administered to the child, 8 personal-social items to be asked of the parent are included. The DDST measures four specific areas: fine motor development, gross motor development, language development, and personal-social development. Because of the relationship established between tester and child in the PCC program and because of the difficulties that would arise in attempting to have all parents present at the time their children were scheduled for testing, the tester, or the PCC teacher with most knowledge of the child, completed the personal-social portion of the test. However, whenever possible, parents were the respondents to this section's questions.

The Preschool Inventory is designed to test cognitive development in areas related to success in school. For both the PCC and Home Start studies, the 32 item edition of the

instrument was used.

2.0 The participating Centers

Fourteen Parent-Child Centers participated in the child testing portion of the impact study. Included in this group were the seven PCCs that had been part of the study of impact on parents and the seven PCCs with Advocacy Components. Thus, the sample of Centers was comprised of the following programs:

Atlanta PCC	Baltimore PCC/AC
Detroit PCC	Boston PCC/AC
Harbor City PCC	Cleveland PCC/AC
Menomonie PCC	Huntington PCC/AC
Mt. Carmel PCC	Jacksonville PCC/AC
Pasco PCC	La Junta PCC/AC
St. Louis PCC	Leitchfield PCC/AC

The decision to incorporate the PCC/ACs into the study design rather than seven different programs was based on two factors: (1) through the CCR evaluation of the Advocacy Components, ongoing, working relationships had been established; and (2) as part of this evaluation CCR staff members would be visiting these PCC/ACs, thus enabling them to provide on-site assistance to testers and monitor progress without further expenditure of funds or time.

2.1 The testers

Directors of participating PCCs were asked to choose two persons for participation in the CCR Training Conference.

These persons would then be responsible for testing all children included in the CCR sample. While CCR did not stipulate which persons should be chosen from each Center, it was suggested that directors select persons who either worked directly with the children or who were familiar with the children.

Twenty-eight PCC staff members attended the Training Conference in November, 1972. Approximately 60% of these persons were professionals: education coordinators, head teachers, nurses, and data coordinators. The remaining persons were paraprofessionals, most of whom were classroom teachers or home instructors. During the course of the testing period, from December, 1972 to July, 1973, three persons either terminated their employment at PCC or relinquished their position as testers. These persons did, however, train their replacements who were then supervised, on site, by CCR staff.

2.2 The trainers

Eight CCR staff members acted as trainers. Each had had experience with children and had acted as supervisors or trainers in similar situations.

Trainer preparation took several forms. The project director and manager attended a training session on the DDST and PSI conducted by High/Scope Foundation and Abt Associates. Videotapes developed for use at these sessions were borrowed

for the CCR training conference. Those persons then acted as trainers for the other CCR staff members. Numerous group and individual training sessions were conducted at the Center for Community Research using the materials that were later presented at the conference.

3.0 The Training Conference

The three day training session was held from November 27 - 29, 1972 at the Holiday Hills Conference Center in Pawling, New York.

Both group and individual training sessions were conducted. During the first session, the rationale and philosophy of both the tests and the testing program were discussed. Some of the issues raised during this session included possible cultural biases in the tests, the issue of confidentiality, and the need for standardized tests.

The individual tests were then introduced to the group. Each item was reviewed with regard to what it was measuring, how it should be administered, what materials were needed, and how the item should be scored. CCR staff members role played tester and child for both the PSI and the DDST. This session served to familiarize testers with specific techniques and to alert them to the variety of responses and actions that could result. The degree to which this introductory group session provided a working basis for more

intensive training was brought out during a group viewing of the High/Scope - Abt Associates video-tapes. These tapes showed the administration of both the PSI and the DDST. Watching the tapes, testers were able to sight errors in administration and to compare and discuss scoring rationale.

Following this group session, trainers conducted individualized instruction. Four testers were assigned to each trainer for the duration of the Conference. During these smaller sessions, testers were given the opportunity to role play both tester and child under the supervision of the trainer. The tests and role playing were repeated numerous times so that there was ample opportunity to check the reliability of the testers' scoring and administration.

The last day of the Training Conference was devoted to testing children. Arrangements were made through the management of the Conference site to have children, ages 3 years to 4.11 years, available for testing. There was one child for each of the seven training groups so that two testers could actually administer a test while all testers could score.

3.1 Follow-up to the Training Conference

Follow-up to the Training Conference took the form of mail and telephone correspondence and on-site visits. At the close of the Conference, testers were asked to

begin testing as soon after their return as possible. While six months were allotted for testing, CCR felt that it was important for testers to begin using their new skills soon after training. Each tester was asked to mail their first five tests to CCR as soon as they were completed and then to continue mailing tests at the end of each week. As the first tests were received, they were carefully reviewed by CCR staff members. Letters concerning scoring techniques were sent to the testers. In most cases, the tests were in order and letters were sent only to obtain such information as the date of the child's enrollment in PCC or the like. In the instances where technical errors were made, testers were telephoned so that such errors would not be repeated in the time it would take for the arrival of a letter. While follow-up was most intense during this initial period, correspondence between tester and trainer was ongoing throughout the testing period.

During the course of the testing period, it was decided that revision should be made in the Denver Developmental Screening Test. This decision was made in conjunction with Dr. Frankenburg, the originator of the DDST, his associates, and the staff of the High/Scope Foundation. Testers were asked to stop using the DDST until they received the newly revised instrument. The changes that were made on the Denver were not so major as to require a second training conference; testers were mailed the new

test with a comprehensive manual. Issue of the revised DDST coincided with CCR site visits to the PCC Centers. Thus, at the point at which these new tests were to be administered, CCR staff was available to provide technical assistance.

4.0 Testing

4.1 Who was tested

All PCC children at study programs who were between the ages of 3 and 4 years 11 months were to be scheduled for testing. At most PCCs, 3 year olds are "graduating" from the program into Head Start. Thus, tests would measure the effects of program input when compared to similar children who had not been through a program, i.e., the children in the standardization sample of each test and Home Start participants.

At the point at which testing began, testers were asked to submit their programs' enrollment roster to CCR. At that time, the total enrollment of the 14 participating PCCs was 1,382 children (approximately 99 children/PCC). Of these children, 545 or 39% were between 3 years and 4.11 years and eligible for testing. As can be seen from the table below, not all eligible children were tested, nor were all tests submitted valid.

	PSI	DDST
# tests submitted	389	303
% tests of all eligible	71	56
# valid tests	351	287
% valid of all eligible for test	64	53

All of the eligible children were not tested for various reasons: the family moved from the program's catchment area, was terminated from the program, graduated from the program, or was unable to be scheduled for testing within the testing period. The number of children not tested on the DDST was higher than that for the PSI because of the disruption in testing with the DDST. During the interim period of revision, children left the program for the reasons stated above and could not be tracked once the test was in use again. As the PSI was being used continuously, testers could better plan their schedules around graduations and terminations which were known beforehand.

Distribution of tests from the 14 PCCs was far from even. Some PCCs tested a very large proportion of children, whereas others tested a very small proportion. This distribution can be represented as follows:

	# children eligible for testing	PSI	DDST
Atlanta	53	38	24
Baltimore	49	45	38
Boston	29	9	6
Cleveland	24	22	20
Detroit	25	17	16
Harbor City	66	53	44
Huntington	54	37	28
Jacksonville	22	11	9
La Junta	29	23	16
Leitchfield	32	26	24
Menomonie	47	45	40
Mount Carmel	46	28	21
Pasco	26	19	17
St. Louis	43	16	-

The table above shows that the range from Center to Center of the number of children eligible for testing and those actually tested was wide. Children in one PCC were not tested on the DDST because of personnel illness and turnover.

For each child tested, the following information was requested: length of time in PCC, and a rating of involvement in terms of regularity of attendance.

4.2 Invalid tests

In all, 54 tests were submitted that were judged invalid for inclusion in the data analyses: 38 PSIs and 16 DDSTs.

4.2.1 Refusals

The most common reason for judging a test invalid was the child's refusal to answer items. This was particularly true in the case of PSIs. Here, however, some confusion arose among testers between the PSI and the DDST; this caused some refusals to be tester errors. The manual for using the PSI states that if a child refuses to answer four items in sequence, the test should be terminated. While no such stipulation is made for the Denver, testers often applied the same rule and terminated a test that should have been administered and scored to completion.

4.2.2 Incompletes

In the case of the DDSTs, if at least 2 of the 4 test sections were not complete, the test was judged invalid. In those instances where at least two sections of the test were complete, the completed sections were used in the data analyses.

2.3 Language difficulties

Two of the participating Centers serve a Spanish-speaking population and one of these Centers has a number of Polynesian-speaking members. Although most of the Spanish-speaking children were able to understand the directions given in English, they had difficulty verbalizing answers in English. Thus, sections of the PSI and the language development portion of the DDST were problematic for this part of the sample. Where correct answers were given in Spanish, they were marked as such. The Polynesian-speaking portion of the sample presented greater problems; many of these children were unable to understand the directions given to them. Actually these children should not have been tested at all.

5.0 Data analyses

PCC children's scores were compared to normative data for each test and to the Home Start data. Tables presenting the data report the percent of children in each age group passing an item and the mean age of those passing in each age group.

Age grouping decisions were made on the basis of the standardized norms. For the Preschool Inventory, the age groups were:

3.0 - 3.11 years
4.0 - 4.5 years
4.6 - 4.11 years

DDST age groupings were:

36 - 39 months

40 - 45 months

46 - 51 months

52 - 57 months

58 - 59 months

Additional comparisons are made between PCC children who have been in the program for less than 1 and 1/2 years, 1-1/2 to 3 years, and for more than 3 years. Comparisons are also made between test scores of children who attend the program regularly and those who attend sporadically.

CHAPTER II

FINDINGS ON THE PRESCHOOL INVENTORY (PSI)

INTRODUCTION

The thirty-two item Preschool Inventory (PSI) was used in the PCC evaluation. The 32 items were selected from the longer test by the Stanford Research Institute for use in the Planned Variation Head Start evaluation. Norms on the percent of children passing each item at different age levels are reported by the Educational Testing Service (ETS).[1] Comparisons are made between PCC childrens' scores and the ETS norms. Additional comparisons are made between PCC children and children in the Home Start sample.

The PSI was administered to a total of 389 PCC children ranging in age from three years (3.0) to four years and eleven months (4.11). Three hundred and fifty-one tests were actually used; the remaining 38 were considered invalid. The PSIs were scored by the testers according to the following categories: correct, correct plus extra information, wrong, wrong plus extra information, substitution, refusal, don't know, requests aid, and no response. In terms of actual findings and comparisons with the norms and with Home Start children, responses in the first two categories were counted as "pass" and responses in all other categories were counted as "fail".

---

[1] Education Testing Service - Preschool Inventory Revised Edition Handbook, Princeton, N.J.: Educational Testing Service, 1970.

The thirty-two items are:

1. What is your first name?
2. Show me your shoulder.
3. What is this? (point to knee)
4. What is this? (point to elbow)
5. Put the yellow car on the little box.
6. Put the blue car under the green box.
7. Put 2 cars behind the box in the middle.
8. If you were sick, who would you go to?
9. When do we eat breakfast?
10. If you wanted to find a lion, where would you look?
11. What does a dentist do?
12. Which way does a phonograph record go?
13. Which way does a ferris wheel go?
14. How many hands do you have?
15. How many wheels does a bicycle have?
16. How many wheels does a car have?
17. How many toes do you have?
18. Which is slower, a car or a bicycle?
19. Point to the middle one. (checker)
20. Point to the first one.
21. Point to the last one.
22. Point to the second one.
23. Which of these 2 groups has less checkers in it?
24. Which of these 2 groups has more checkers in it?
25. Point to the one that is most like a tent.
26. Make one like this (square).
    Make yours here (point).
27. Make one like this (triangle).
    Make yours here (point).
28. Which one is the color of night?
29. Color the square.
30. Color square purple.
31. Color the triangle.
32. Color triangle orange.

FINDINGS

Each of the items were scored either pass or fail. The percentage of children in the normative group, in the Home Start group, and in the PCC group passing each item, by age group, are presented in Table 1.

Table II-1. Percent of PCC, standardization sample, and Home Start children passing each item.

	3.0 - 3.11 Yrs.			4.0 - 4.5 Yrs.			4.6 - 4.11 Yrs.		
	Norm N=158	PCC N=255	H.S. N=73	Norm N=528	PCC N=77	H.S. N=44	Norm N=438	PCC N=49	H.S. N=34
1. First name	90%	90%	62%	90%	97%	76%	91%	90%	87%
2. Shoulder	58	59	53	65	82	62	74	80	58
3. Knee	49	52	42	52	62	43	64	82	69
4. Elbow	26	36	34	31	44	38	40	57	56
5. Yellow car on little box	25	41	23	32	61	45	41	55	48
6. Blue car under green box	27	25	20	28	40	19	36	39	39
7. Two cars behind middle box	17	15	13	23	31	10	34	16	10
8. If sick	46	40	40	55	71	60	65	63	71
9. Breakfast	29	17	27	36	38	27	45	26	28
10. Find lion	20	14	23	27	18	29	30	37	25
11. Dentist	38	28	26	41	44	43	52	61	59
12. Phono. record	41	32	25	39	52	30	48	59	19
13. Ferris wheel	20	17	20	20	29	20	26	37	23
14. How many hands	42	48	47	50	60	58	51	69	61
15. How many wheels-bicycle	42	42	43	49	65	62	52	67	52
16. How many wheels-car	13	20	27	24	35	25	34	53	23
17. How many toes	02	07	04	03	09	10	03	12	00
18. Slower-car/bike	42	52	61	50	74	51	53	69	60
19. Point to middle checker	25	35	42	33	49	49	44	57	43
20. Point to first checker	30	42	56	33	57	38	37	47	50
21. Point to last checker	15	26	30	20	42	33	24	26	40
22. Point to second checker	20	22	20	20	27	31	21	39	33
23. 4&6, which less	41	44	52	44	48	44	51	53	37
24. 5&5, which more	04	29	03	07	27	08	07	26	06
25. Point to tent	52	65	71	58	73	53	60	82	81
26. Copy square	15	17	20	21	39	21	34	53	45
27. Copy triangle	10	14	14	14	26	13	23	47	23
28. Color of night	34	49	58	42	56	59	49	67	52
29. Color square	34	40	43	45	58	33	48	63	42
30. Color square purple	25	41	34	31	49	28	37	65	45
31. Color triangle	35	49	56	44	56	54	50	69	71
32. Color triangle orange	49	44	48	52	66	54	63	69	61

Examination of these data shows that PCC children did somewhat better on a majority of items than did the children in the norm groups or in the Home Start sample. Considering differences of ten percentage points or more, PCC children did better on a larger number of items than did children in the norm or Home Start samples.

Table II-2. Number of items on which at least 10% more PCC children than standardization sample or Home Start children pass.

	3.0 - 3.11	4.0 - 4.5	4.6 - 4.11
Number of items on which PCC > Norm	11	23	20
Number of items on which PCC < Norm	2	0	2
Number of items on which PCC > Home Start	4	20	15
Number of items on which PCC < Home Start	3	1	1

It is clear from these data that PCC children present a somewhat superior performance to children in the norm group and to Home Start children.

An examination of the specific items on which PCC children show a marked advantage over standardization sample and Home Start children is interesting:

- Show me your shoulder.
- What is this (knee)?

- Which way does a phonograph record go?
- Which way does a ferris wheel go?
- How many wheels does a car have?
- Which is slower, a car or a bicycle?
- Which of these two groups has more checkers in it?
- Copy the square.
- Copy the triangle.
- Color the square.
- Color the square purple.

It appears that in general PCC children have had more experience with labelling, with concept formation, with shapes, and with colors than have their non-PCC counterparts.

Because PCC staff generally felt that Item 8 (If you were sick, who would you go to?) and Item 10 (If you wanted to find a lion, where would you look?)would elicit good but not acceptable answers, a second code was developed for these two items to allow for a more flexible and responsive scoring. However, in all comparisons with the standardization or Home Start samples only the standardized scoring criteria were used for PCC data. According to the standardized scoring system, the only correct responses for Item 8 is "doctor" or "nurse". Similarly, "zoo", "carnival", and "circus" are the only acceptable responses to Item 10. In order to see what differences in total scores would be made by using a more PCC-oriented scoring system, Items 8 and 10 were scored a second time. CCR coders scored as correct "hospital" and "clinic" for Item 8; and "TV", "books", and "cage" for Item 10. Thus, all children received two scores:

one score using the standardized scoring system and one more "lenient" score allowing for a greater range of responses to these two items.

Using the more lenient scoring system, there were increases for all age groups in the percent of children passing these two items. These comparisons are presented in Table 3.

Table II-3. Percent of PCC sample passing items 8 and 10, using the standardized scoring and the more lenient CCR scoring system.

	ITEM 8: IF SICK		ITEM 10: FIND LION	
	Standard	CCR code	Standard	CCR code
3.0 - 3.11 yrs.	N=225 40	N=225 52	N=225 14	N=225 21
4.0 - 4.5 yrs.	N=77 71	N=77 79	N=77 18	N=77 35
4.6 - 4.11 yrs.	N=49 63	N=49 79	N=49 37	N=49 45

It is clear that use of a more culture-relevant scoring system for these items does make a difference in the percentage of children passing at each age level. It does not make the inordinate difference claimed by some PCC advocates, but it does make a difference.

Home Start data are broken down into smaller interval age groups by High/Scope. In order to make further comparisons,

PCC data were regrouped into comparable intervals and mean score comparisons were made.

Table II-4. PSI mean scores by age; comparison with Home Start data.

AGE		PCC (1)	HOME START (2)	
3.0 - 3.3 Yrs.	N	80	18	t1-2 = 1.05
	M	10.0	8.6	N.S.
	S.D.	5.1	4.1	
3.4 - 3.9 Yrs.	N	107	29	t1-2 = .67
	M	11.9	11.1	N.S.
	S.D.	5.8	5.2	
3.10 - 4.3 Yrs.	N	93	44	t1-2 = 1.63
	M	15.0	13.0	N.S.
	S.D.	6.9	6.1	
4.4 - 4.9 Yrs.	N	51	39	t1-2 = 2.69
	M	17.0	13.5	P < .01
	S.D.	6.6	5.3	
4.10 - 4.11 Yrs.	N	20	19	t1-2 = .45
	M	17.0	16.2	N.S.
	S.D.	5.1	5.7	

Means for both groups of children increase as the children grow older as a function of maturation. In all age groups, PCC children have slightly higher mean scores than do their Home Start counterparts. Differences are statistically significant only in the 4.4-4.9 age group. Within this age group PCC children pass between three and four items more than do Home Start children. By age five, the differences between the two

samples are virtually negligible. PCC children show a mean score of 17 and Home Start children score 16.2. This lack of differences for the older age group is not a function of the ceiling of the test. High/Scope[1] reports that the "mean for 6 and 1/2 year old children was 21.0 which indicates that the ceiling of the test has not yet been reached." (p.21)

Table II-5. Mean scores by sex.

	MALE (1)	FEMALE (2)	
N	171	180	
M	12.40	14.21	t1-2 = -2.61 P < .01
S.D.	6.31	6.70	

Female children score significantly higher than do males, a finding which is consistent with the well documented finding that the cognitive development of female pre-adolescent children is accelerated over that of male pre-adolescent children.

[1] Home Start evaluation study. Summative evaluation results. Interim Report III, Nov. 1973

It must be noted that, although statistically significant, the differences in the means are small and the sample sizes are large, therefore these statistically significant differences cannot be regarded as having much social significance.

The analysis of variance performed on PCC data for age and sex showed significant differences along the sex variable at the .01 level ($F = 7.25$, 1 df) and along the age variable at the .001 level ($F = 35.52$, 4 df). The interaction between sex and age is significant at the .001 level (f - 10.15, f df).

Table II-6. Mean scores by age and sex; comparison with Home Start data.

AGE	SEX		PCC (1)	HOME START (2)	
3.0-3.3 years	Male	N	41	12	t1-2 = 2.97
		M	9.2	4.8	P < .01
		S.D.	5.0	1.3	
	Female	N	39	6	t1-2 = 1.53
		M	10.7	7.5	N.S.
		S.D.	5.0	2.0	
3.4-3.9 years	Male	N	51	16	t1-2 = .82
		M	11.7	10.3	N.S.
		S.D.	6.2	4.0	
	Female	N	56	13	t1-2 = -.01
		M	12.2	12.2	N.S.
		S.D.	5.4	6.4	
3.10-4.3 years	Male	N	40	20	t1-2 = 1.16
		M	13.8	11.8	N.S.
		S.D.	6.6	5.8	
	Female	N	52	24	t1-2 = .99
		M	15.9	14.2	N.S.
		S.D.	7.0	6.3	
4.4-4.9 years	Male	N	27	14	t1-2 = .73
		M	14.7	13.4	N.S.
		S.D.	5.6	4.0	
	Female	N	24	5	t1-2 = 2.25
		M	19.6	12.2	P < .05
		S.D.	6.6	5.9	
4.10-4.11 years	Male	N	12	21	t1-2 = .73
		M	16.4	14.7	N.S.
		S.D.	5.6	6.6	
	Female	N	8	18	t1-2 = 1.01
		M	17.9	15.7	N.S.
		S.D.	4.0	5.2	

While PCC scores tend to be higher in nine out of the ten comparisons, differences are significant in only two cases. PCC male 3.0-3.3 year olds score significantly higher than do Home Start males of the same age. The mean number of items passed by this group is 9.2 for PCC children and only 4.8 for those in the Home Start subsample. In the 4.4-4.9 age range, PCC females score significantly higher than do Home Start females. The mean scores are 19.6 for PCC and 12.2 for Home Start.

Table II-7. Mean scores by age and locale.

AGE		URBAN (1)	RURAL (2)	
3.0-3.3 years	N	44	36	t1-2 = -.54
	M	9.68	10.31	N.S.
	S.D.	4.34	5.83	
3.4-3.9 years	N	62	45	t1-2 = -.20
	M	11.84	12.07	N.S.
	S.D.	6.08	5.35	
3.10-4.3 years	N	50	43	t1-2 = .28
	M	15.20	14.79	N.S.
	S.D.	7.41	6.34	
4.4-4.9 years	N	24	27	t1-2 = -2.05
	M	15.04	18.74	P < .05
	S.D.	6.90	5.73	
4.10-4.11 years	N	8	12	t1-2 = .51
	M	16.25	17.50	N.S.
	S.D.	6.12	4.23	

In comparing mean scores broken down into urban and rural subsamples, it can be seen that in four out of the five categories rural PCC children score slightly higher than do children in the urban group. These differences are significant for children in the 4.4-4.9 age group only. In that group, urban children respond correctly to a mean of 15.04 items while the rural subsample passes a mean of 18.74 items.

Children in rural PCC programs tend to spend more time in program activities than do urban PCC children. Rural children usually participate in program activities more hours per day and for more days per week. Thus, longer contact with PCC staff and longer participation in PCC activities could lead to somewhat higher scores on the Preschool Inventory.

Table II-8. Mean scores by age and longevity in the PCC program.

AGE		Less than 1-1/2 yrs. in PCC (1)	1-1/2 to 3 years in PCC (2)	Over 3 years in PCC (3)	
3.0-3.3 years	N	40	25	15	t1-2 = .75 N.S.
	M	10.18	9.20	10.67	t1-3 = -.31 N.S.
	S.D.	5.20	4.65	5.25	t2-3 = -.90 N.S.
3.4-3.9 years	N	51	27	29	t1-2 = -.43 N.S.
	M	11.04	11.59	13.83	t1-3 = -2.06 P < .05
	S.D.	5.27	5.42	6.50	t2-3 = -1.37 N.S.
3.10-4.3 years	N	40	18	35	t1-2 = -.52 N.S.
	M	12.42	13.78	18.60	t1-3 = -3.06 P < .001
	S.D.	9.93	6.25	6.80	t2-3 = -2.46 P < .05
4.4-4.9 years	N	17	12	22	t1-2 = -.12 N.S.
	M	15.71	16.00	18.54	t1-3 = -1.37 N.S.
	S.D.	5.95	7.04	6.44	t2-3 = -1.03 N.S.
4.10-4.11 years	N	7	7	6	t1-2 = -.04 N.S.
	M	16.71	16.86	17.50	t1-3 = -.24 N.S.
	S.D.	6.52	4.32	3.90	t2-3 = -.26 N.S.

The mean scores of PCC children tend to increase with the length of their enrollment in the Center. On the whole, children who have been in the program for more than three years tend to score higher than do those who have been enrolled for less than three years.

Significant differences between groups are found among children in the 3.4-3.9 (3-1/2 year-olds) and the 3.10-4.3 (4 year-olds) age groups. Three and one-half year-old children, in the PCC for less than 1-1/2 years, score significantly lower than do children who have been enrolled in the PCC program for over three years. Thus, at 3-1/2, children who have been in PCC from earliest infancy have an advantage over children who entered PCC as toddlers.

Among four year-olds, there is a marked difference in favor of long-term participants between children who have been in the program for more than three years and those who have been in the program for less than 1-1/2 years. A significant difference is also found among four year-olds who have been in the program 1 and 1/2 to 3 years when compared to those in PCC for over three years.

The trend toward increased mean scores as an accompaniment to longer enrollment in PCC is maintained for the oldest two groups. However, increases in the oldest age group are negligible and it should be noted that the sample size is really inadequate for any kind of analysis.

Table II-9. Mean scores by age and involvement.

AGE		LOW (1)	HIGH (2)	
3.0-3.3 years	N	35	45	t1-2 = .76
	M	10.46	9.58	N.S.
	S.D.	5.63	4.56	
3.4-3.9 years	N	48	59	t1-2 = .37
	M	12.17	11.75	N.S.
	S.D.	6.04	5.57	
3.10-4.3 years	N	47	46	t1-2 = -2.82
	M	13.06	17.00	P < .01
	S.D.	6.22	7.07	
4.4-4.9 years	N	27	24	t1-2 = .04
	M	17.04	16.96	N.S.
	S.D.	6.66	6.46	
4.10-4.11 years	N	5	15	t1-2 = .48
	M	18.00	16.67	N.S.
	S.D.	4.60	5.22	

PCCs were asked to rate each child as high or low-involved according to whether the child's attendance in the program was consistent and sustained or sporadic and intermittent.

It can be seen that mean scores do not increase with involvement except for children in the 3.10-4.3 year-old age group. Involvement levels may not accurately reflect how much stimulation is received by the children. Each child was assigned a high or low involvement rating by each Center; because of program differences what is rated high at one Center may actually be

evaluated as low participation at another. Centers vary as to the amount of time each child is scheduled to attend. Some programs schedule only one day a week participation; a child who faithfully attends the Center one day each week will be rated high by that Center. However, compared to a Center where five day a week attendance is possible, this once-a-week participation is actually low involvement. Thus it is quite likely that what is important is not the Centers' rating of low or high involvement but the actual number of in-program hours spent by any given child.

Attempts were made to break down the data in a manner which would permit comparisons at each age between children who were in the program for 10 or more hours a week and children who were in the program for 10 or less hours a week. Such comparisons turned out to be unfeasible because at several PCCs children are in the program for as much as 20 hours a week until they are 3 and receive a one hour weekly home visit once they are past 3. As children grow older or as programs change, the number of hours a week of participation changes markedly. Thus, for any given child it is virtually impossible to determine how many hours a week he has participated in the program.

Summary of PSI findings

Based on the data presented in this section the following conclusions can be drawn:

- PCC children tend to do better than do children in the standardization sample or children in the Home Start sample. Differences are not significant across all age groups, but in general PCC children are at an advantage.

- Children who have been in PCC for three years or more tend to be at an advantage when compared with children who have been in PCC for less than three years. This advantage seems to be lost as the children reach the age of 4, i.e., the performance of children over four years of age on the PSI improves as a function of age regardless of length of time in PCC.

- Children who participate in the program regularly show no gains over children who come only sporadically. It was pointed out that the number of hours per week is not consistent across groups. Children rated as having sporadic attendance at one Center may still attend 10 hours a week and be contrasted with children rated "regular" who participate one hour a week. Attempts to contrast groups of children who participate for a large number of hours vs. those who participate for only a few hours were unfeasible due to the variability of the program in terms of hours across the life cycle of any given child.

- As an overall conclusion, it can be said that PCC does have some impact on the school readiness of children, in terms of knowledge of the kinds of concepts which are expected of the child once he reaches school age. The data also suggest that with maturation this initial advantage of PCC over non-PCC low income-children is not sustained. However, without long-term follow-up of these PCC children and comparisons with their non-PCC schoolmates, no firm conclusions can be reached about the longer-term effects of PCC.

CHAPTER III

FINDINGS ON THE DENVER DEVELOPMENTAL SCREENING TEST (DDST)

INTRODUCTION

Twenty-nine items of the DDST were selected by staff of the High/Scope Foundation for use in the Home Start and PCC evaluations, as having the most relevance to children three years and over. Norms on the percent of children passing each item at different age levels were provided by Dr. Frankenburg and his staff. Comparisons are made between PCC children and children from the standardization sample. Additional comparisons are made between PCC children and children in the Home Start sample.

The DDST was administered to a total of 303 children, ranging in age from 3.0 - 4.11 years. Tests which had incomplete data on more than two sub-tests were excluded from the analyses. Seventeen tests were excluded in this manner. In the case of tests which had one or two incomplete sub-tests, only the completed sub-tests were used in the analyses. For this reason, the total sample size within any age group varies from one sub-test to another.

The twenty-nine items of the test are:

- Fine motor-adaptive

1. Dumps raisin from bottle - spontaneously
2. Builds tower - 4 cubes
   - 8 cubes
3. Imitates bridge
4. Picks longer line
5. Imitates vertical line

6. Copies circle

7. Copies cross

8. Draws man - 3 parts
   - 6 parts

Gross motor

9. Balances on one foot - 1 sec.
   - 5 sec.
   - 10 sec.

10. Jump in place

11. Broad jump

12. Hops on one foot

13. Forward heel-to-toe walk

14. Backward heel-to-toe walk

15. Catches bounced ball

Language

16. Uses plurals

17. Comprehends "cold," "tired," "hungry"

18. Comprehends 3 prepositions

19. Recognizes 3 colors

20. Understands opposites

21. Composition of materials

22. Defines 6 words

Personal-Social

23. Plays interactive games

24. Separates from mother easily

25. Washes and dries hands

26. Puts on clothing

27. Buttons up.

28. Dresses with supervision

29. Dresses without supervision.

FINDINGS

Each of the items was scored dichotomously: pass or fail. The percentage of children in the standardization sample, in the Home Start sample, and in the PCC group passing each item, by age group are presented in Table III-1.

Table III-1. DDST: Percent passing comparison with Home Start data and standardization sample.

	3.0 - 3.3			3.4 - 3.9			3.10 - 4.3			4.4 - 4.9			4.10 - 4.11		
	Norm	PCC	H.S.	Norm	PCC	H.S.	Norm	PCC	H.S.	Norm	PCC	H.S.	Norm	PCC	H.S.
FINE MOTOR N	*	46	24	*	79	32	*	85	51	*	46	20	*	30	42
Dumps raisin	67 (3)	100	95	-	98	100	-	97	98	0 (1)	97	100	100 (1)	100	95
Builds tower - 4 cubes	75 (4)	67	-	-	62	-	-	60	-	0 (1)	46	-	-	40	-
8 cubes	84 (37)	70	84	92 (37)	78	90	100 (13)	85	90	100 (6)	87	95	100 (4)	93	90
Imitates bridge	70 (37)	72	40	92 (52)	89	61	98 (41)	95	78	100 (23)	98	80	95 (19)	93	90
Picks longer line	56 (36)	33	15	70 (53)	40	32	85 (48)	75	53	94 (51)	74	55	90 (31)	63	48
Imitates vertical line	78 (18)	65	47	100 (6)	80	67	-	89	64	100 (1)	94	80	-	100	70
Copies circle	81 (37)	30	26	92 (53)	46	48	98 (42)	68	63	100 (32)	74	70	95 (19)	93	70
Copies cross	28 (36)	15	15	55 (53)	40	48	81 (48)	66	61	96 (51)	72	70	94 (33)	87	63
Draws man - 3 parts	20 (25)	6	5	27 (48)	22	38	52 (48)	44	53	79 (47)	59	70	78 (49)	60	63
6 parts	4 (27)	4	5	6 (50)	9	9	12 (50)	20	20	36 (52)	33	25	42 (54)	27	26
GROSS MOTOR N	*	38	24	*	73	32	*	82	51	*	45	20	*	30	42
Balance on one foot- 1 sec.	70 (37)	66	56	88 (51)	48	78	94 (34)	46	88	90 (20)	40	94	94 (17)	20	90
5 sec.	31 (35)	5	8	58 (53)	19	6	82 (49)	24	29	94 (49)	13	26	90 (31)	33	36
10 sec.	24 (17)	3	0	22 (45)	11	6	35 (48)	14	15	46 (52)	29	10	77 (52)	30	9
Jump in place	85 (33)	87	60	96 (27)	83	81	88 (8)	95	90	50 (2)	91	80	100 (3)	97	83
Broad jump	68 (37)	71	39	90 (51)	81	71	94 (33)	93	86	95 (20)	84	95	94 (17)	83	85
Hops on one foot	15 (27)	24	13	51 (51)	60	40	80 (50)	71	62	84 (51)	87	75	92 (50)	90	73
Forward heel-to-toe walk	9 (34)	10	8	42 (53)	19	12	67 (45)	45	15	90 (49)	49	25	80 (30)	60	28
Backward heel-to-toe walk	0 (3)	8	0	6 (17)	7	16	28 (35)	22	17	45 (49)	33	10	63 (49)	33	9
Catches bounced ball	12 (8)	26	14	22 (27)	37	12	49 (47)	54	23	60 (52)	69	35	82 (50)	90	43
LANGUAGE N	*	45	24	*	78	32	*	85	51	*	45	20	*	30	42
Uses plurals	86 (37)	31	61	94 (52)	55	74	98 (41)	69	80	96 (28)	70	95	94 (18)	90	85
Comprehends cold, tired, hungry	47 (34)	22	22	69 (51)	57	48	92 (48)	81	64	94 (51)	76	75	91 (33)	90	65
Comprehends prepositions	48 (35)	62	61	80 (51)	65	67	89 (45)	88	74	94 (50)	83	80	94 (33)	100	75
Recognizes colors	43 (37)	11	38	68 (53)	33	35	76 (42)	49	55	71 (31)	67	45	72 (18)	67	58
Understands opposites	42 (19)	16	16	46 (46)	36	37	58 (48)	54	37	77 (53)	60	63	76 (51)	80	59
Composition of materials	13 (15)	0	5	12 (40)	4	3	31 (48)	9	12	38 (53)	18	15	49 (53)	7	25
Defines words	0 (3)	0	-	28 (14)	4	-	30 (27)	10	-	43 (44)	20	-	52 (46)	23	-
PERSONAL-SOCIAL N	*	45	24	*	78	32	*	80	51	*	43	20	*	28	42
Interactive games	78 (36)	64	77	90 (51)	74	93	100 (41)	78	86	97 (31)	69	90	95 (21)	71	82
Separates from mother easily	52 (33)	71	59	72 (46)	70	70	83 (47)	76	70	92 (50)	81	55	86 (36)	82	65
Washes and dries hands	89 (36)	100	81	94 (52)	99	100	100 (43)	100	98	100 (32)	100	100	100 (21)	100	100
Puts on clothing	89 (36)	93	90	100 (39)	90	96	100 (13)	96	98	100 (4)	98	100	100 (5)	100	100
Buttons up	62 (34)	36	42	69 (52)	60	64	89 (47)	73	76	96 (52)	84	75	97 (39)	89	82
Dresses with supervision	80 (36)	42	42	92 (51)	54	64	98 (44)	70	74	97 (32)	74	75	100 (22)	89	82
Dresses without supervision	47 (17)	60	45	45 (38)	62	61	75 (48)	80	84	87 (53)	70	90	89 (53)	86	87

*The N for the Norm group varies from item to item and is presented as the figure in parenthesis just below the percent passing for each item.

Using as a criterion for measuring differences the number of items on which at least 50% of the PCC children passed an item and less than 50% of the norm group, or the Home Start group passed, it can be seen that there are virtually no differences between groups of children.

Table III-2. Number of items on which at least 50% of PCC children and less than 50% of the standardization sample or Home Start children pass.

	3.0-3.3	3.4-3.9	3.10-4.3	4.4-4.9	4.10-4.11
Number of items on which more than 50% of PCC children and less than 50% of norm children pass	2	1	1	0	0
Number of items on which more than 50% of norm children and less than 50% of PCC children pass	5	5	5	3	5
Number of items on which more than 50% of PCC and less than 50% of Home Start pass	4	2	2	3	3
Number of items on which more than 50% of Home Start and less than 50% of PCC children pass	1	1	2	1	1

As can be seen from the data presented above, there are relatively few differences between the groups. It should be noted that only 18% of the standardization sample children were the children of unskilled laborers or unemployed.[1] Thus the standardization sample can be regarded as an improper criterion for measuring the effects of the PCC program.

The evaluative question can be stated as follows: Is PCC effective in helping low-income children to function better than an equivalent group of low-income children who have not been through the program? This question is addressed through the comparisons between PCC and Home Start data.

The results suggest that differences on the DDST between PCC and Home Start children are minimal. It is not at all clear whether the absence of differences is a function of a lack of any PCC impact on PCC children or the insensitivity of the DDST to change. The DDST was developed as a test to aid in the diagnosis of individual children with developmental lag and was not intended for use in comparisons between groups of children. Thus, it is entirely possible that the test is not sensitive in terms of relatively small differences between groups.

Comparisons were made between Home Start and PCC children in terms of mean scores by age for each of the four DDST areas.

---

[1] Frankenburg, W.K. and Dodds, J.B. The Denver Developmental Screening Test, Journal of Pediatrics, St. Louis, Vol. 71, No. 2, pp. 181-191

Table III-4. DDST mean scores by age; comparison with Home Start data.

AGE	DDST SECTION		PCC (1)	HOME START (2)	
3.0 - 3.3 YEARS	Fine motor	N	445	18	t1-2 = .67
		M	4.5	4.2	N.S.
		S.D.	1.6	1.5	
	Gross motor	N	37	21	t1-2 = 2.0
		M	3.0	2.2	P < .05
		S.D.	1.4	1.5	
	Language	N	40	17	t1-2 = -2.2
		M	1.4	2.2	P < .05
		S.D.	1.1	1.5	
	Personal-Social	N	44	21	t1-2 = .69
		M	4.7	4.4	N.S.
		S.D.	1.6	1.8	
3.4 - 3.9 YEARS	Fine motor	N	78	31	t1-2 = -.78
		M	5.6	5.9	N.S.
		S.D.	1.7	2.0	
	Gross motor	N	70	31	t1-2 = .79
		M	3.7	3.4	N.S.
		S.D.	1.8	1.6	
	Language	N	73	31	
		M	2.6	2.6	N.S.
		S.D.	1.7	1.6	
	Personal-Social	N	76	31	t1-2 = -1.1
		M	5.1	5.5	N.S.
		S.D.	1.8	1.4	
3.10- 4.3 YEARS	Fine motor	N	83	48	t1-2 = .91
		M	7.0	6.7	N.S.
		S.D.	1.7	2.0	
	Gross motor	N	78	51	t1-2 = 1.40
		M	4.7	4.3	N.S.
		S.D.	1.5	1.7	
	Language	N	84	49	t1-2 = 1.35
		M	3.6	3.2	N.S.
		S.D.	1.6	1.7	
	Personal-Social	N	78	51	t1-2 = -.83
		M	5.7	5.9	N.S.
		S.D.	1.4	1.2	
4.4 - 4.9 YEARS	Fine motor	N	42	20	t1-2 = -.59
		M	7.3	7.6	N.S.
		S.D.	1.7	2.1	
	Gross motor	N	44	19	t1-2 = 1.05
		M	5.0	4.5	N.S.
		S.D.	1.8	1.5	
	Language	N	45	20	t1-2 = .68
		M	4.0	3.7	N.S.
		S.D.	1.7	1.4	
	Personal-Social	N	28	40	t1-2 = .64
		M	6.2	6.0	N.S.
		S.D.	1.3	1.2	
4.10 - 4.11 YEARS	Fine motor	N	29	41	t1-2 = 1.15
		M	7.6	7.1	N.S.
		S.D.	1.4	2.0	
	Gross motor	N	30	40	t1-2 = 1.77
		M	5.4	4.7	N.S.
		S.D.	1.5	1.7	
	Language	N	29	41	t1-2 = 2.65
		M	4.6	3.7	P < .01
		S.D.	1.0	1.6	
	Personal-Social	N	28	40	t1-2 = .64
		M	6.2	6.0	N.S.
		S.D.	1.3	1.2	

As can be seen from the data presented in Table III-4, differences in terms of mean scores between PCC children and children just entering into the Home Start program are generally not significant. Only three of the differences are statistically significant, and one of these differences favors the pre-Home Start children. These few differences can probably be attributed to chance variation. Thus, the supposition that PCC has an impact on children, as measured by comparison with an untreated group in terms of DDST scores, cannot be upheld.

Table III-5. Mean scores by sex.

DDST SECTION		MALE (1)	FEMALE (2)	
Fine motor	N	127	148	t1-2 = -1.50
	M	6.11	6.46	N.S.
	S.D.	1.86	1.98	
Gross motor	N	114	143	t1-2 = - .11
	M	4.33	4.31	N.S.
	S.D.	1.75	1.84	
Language	N	120	149	t1-2 = .11
	M	3.18	3.16	N.S.
	S.D.	1.72	1.88	
Personal/Social	N	122	144	t1-2 = - .98
	M	5.30	5.50	N.S.
	S.D.	1.64	1.60	

There are no significant differences between males and females. This is consistent with Frankenburg's[1] original data, which revealed no systematic differences between boys and girls.

---

[1] Ibid.

Mean score comparisons between PCC and Home Start boys and girls at every age group show only two significant differences. These data are presented in the appendix. One of these differences favors the Home Start children. Since two significant differences out of a possible 39 comparisons could be expected on the basis of chance alone, it can be concluded that there are simply no differences between PCC and Home Start children, among either boys or girls, at any age, in terms of the data collected.

Table III-6. Mean scores by age and locale.

AGE	DDST SECTION		URBAN (1)	RURAL (2)	
3.0 - 3.3 YEARS	Fine motor	N M S.D.	24 4.58 1.58	21 4.48 1.62	t1-2 = .22 N.S.
	Gross motor	N M S.D.	19 3.16 1.35	18 2.83 1.54	t1-2 = .71 N.S.
	Language	N M S.D.	21 1.29 .98	19 1.58 1.14	t1-2 = -.93 N.S.
	Personal-Social	N M S.D.	23 5.13 1.60	21 4.14 1.52	t1-2 = 2.25 P <.05
3.4 - 3.9 YEARS	Fine motor	N M S.D.	45 5.93 1.73	33 5.27 1.54	t1-2 = 1.83 N.S.
	Gross motor	N M S.D.	40 4.32 1.65	30 2.93 1.67	t1-2 = 3.75 P <.001
	Language	N M S.D.	42 2.71 1.56	31 2.45 1.83	t1-2 = .70 N.S.
	Personal-Social	N M S.D.	44 5.23 1.80	32 4.84 1.66	t1-2 = 1.02 N.S.
3.10-4.3 YEARS	Fine motor	N M S.D.	41 7.32 1.67	41 6.63 1.57	t1-2 = .55 N.S.
	Gross motor	N M S.D.	40 5.18 1.32	38 4.16 1.42	t1-2 = 3.92 P <.001
	Language	N M S.D.	41 3.76 1.68	42 3.48 1.59	t1-2 = .90 N.S.
	Personal-Social	N M S.D.	38 5.60 1.53	40 5.85 1.30	t1-2 = -.89 N.S.
4.4 - 4.9 YEARS	Fine motor	N M S.D.	18 7.06 1.43	24 7.42 1.87	t1-2 = -.70 N.S.
	Gross motor	N M S.D.	18 5.00 1.76	26 4.96 1.87	t1-2 = .07 N.S.
	Language	N M S.D.	18 4.11 1.29	27 3.89 1.93	t1-2 = .45 N.S.
	Personal-Social	N M S.D.	17 5.76 1.52	25 5.72 1.31	t1-2 = .09 N.S.
4.10-4.11 YEARS	Fine motor	N M S.D.	17 7.53 1.58	12 7.58 1.04	t1-2 = -.10 N.S.
	Gross motor	N M S.D.	17 5.24 1.70	13 5.54 1.08	t1-2 = -.58 N.S.
	Language	N M S.D.	17 4.53 1.09	12 4.58 .95	t1-2 = -.13 N.S.
	Personal-Social	N M S.D.	15 6.00 1.59	13 6.38 .92	t1-2 = -.79 N.S.

Although several differences are statistically significant, there are no consistent differences between rural and urban PCCs in terms of the impact they have on children.

Table III-7. Mean scores by age and longevity.

AGE	DDST SECTION		Less than 1-1/2 yrs. in prog. (1)	1-1/2 to 3 yrs. in prog. (2)	Over 3 yrs. in prog. (3)	
3.0 - 3.3 YEARS	Fine motor	N	21	16	8	t1-2 = .45 N.S.
		M	4.48	4.25	5.25	t1-3 = -1.28 N.S.
		S.D.	1.50	1.75	1.30	t2-3 = -1.40 N.S.
	Gross motor	N	17	14	6	t1-2 = .82 N.S.
		M	3.12	2.71	3.33	t1-3 = -.28 N.S.
		S.D.	1.60	1.22	1.37	t2-3 = -.98 N.S.
	Language	N	18	15	7	t1-2 = 1.70 N.S.
		M	1.44	.93	2.43	t1-3 = -2.20 P<.05
		S.D.	1.01	.77	1.05	t2-3 = -3.75 P<.01
	Personal-Social	N	21	16	7	t1-2 = -.51 N.S.
		M	4.48	4.75	5.00	t1-3 = -.80 N.S.
		S.D.	1.47	1.82	1.60	t2-3 = -.30 N.S.
3.4 - 3.9 YEARS	Fine motor	N	41	13	24	t1-2 = 1.46 N.S.
		M	5.66	5.00	6.00	t1-3 = -.85 N.S.
		S.D.	1.48	1.66	1.92	t2-3 = -1.63 N.S.
	Gross motor	N	37	11	22	t1-2 = -.52 N.S.
		M	3.43	3.73	4.23	t1-3 = -1.90 P<.05
		S.D.	1.67	1.81	1.88	t2-3 = -0.73 N.S.
	Language	N	39	11	23	t1-2 = 1.36 N.S.
		M	2.62	1.91	2.91	t1-3 = -.70 N.S.
		S.D.	1.60	1.50	1.82	t2-3 = -1.58 N.S.
	Personal-Social	N	41	13	22	t1-2 = .54 N.S.
		M	5.05	4.77	5.27	t1-3 = -.52 N.S.
		S.D.	1.71	1.76	1.79	t2-3 = -.83 N.S.

Table III-7- (continued) Mean scores by age and longevity.

AGE	DDST SECTION		Less than 1-1/2 yrs.in prog. (1)	1-1/2 to 3 yrs. in prog. (2)	Over 3 yrs. in prog. (3)	
3.10-4.3 YEARS	Fine motor	N	35	15	33	t1-2 = -1.25 N.S.
		M	6.60	7.20	7.33	t1-3 = -2.21 P < .05
		S.D.	1.48	2.17	1.49	t2-3 = -.25 N.S.
	Gross motor	N	32	15	31	t1-2 = -.86 N.S.
		M	4.62	5.00	4.58	t1-3 = .12 N.S.
		S.D.	1.34	1.79	1.39	t2-3 = .91 N.S.
	Language	N	35	15	34	t1-2 = -1.73 P < .05
		M	3.20	4.00	3.91	t1-3 = -2.29 P < .05
		S.D.	1.69	1.55	1.52	t2-3 = .20 N.S.
	Personal-Social	N	33	14	31	t1-2 = .00 N.S.
		M	5.79	5.79	5.64	t1-3 = .40 N.S.
		S.D.	1.59	.86	1.43	t2-3 = .36 N.S.
4.4 - 4.9 YEARS	Fine motor	N	18	7	17	t1-2 = .16 N.S.
		M	7.39	7.29	7.12	t1-3 = .48 N.S.
		S.D.	1.34	1.48	2.08	t2-3 = .19 N.S.
	Gross motor	N	19	8	17	t1-2 = .52 N.S.
		M	5.00	4.62	5.12	t1-3 = -.19 N.S.
		S.D.	1.86	1.22	2.00	t2-3 = -.65 N.S.
	Language	N	20	8	17	t1-2 = -.08 N.S.
		M	4.20	4.25	3.59	t1-3 = 1.12 N.S.
		S.D.	1.40	1.56	2.00	t2-3 = .82 N.S.
	Personal-Social	N	20	5	17	t1-2 = 1.15 N.S.
		M	5.95	5.20	5.65	t1-3 = .69 N.S.
		S.D.	1.16	1.60	1.53	t2-3 = -56 N.S.
4.10-4.11 YEARS	Fine motor	N	13	9	7	t1-2 = .71 N.S.
		M	7.62	7.22	7.86	t1-3 = .40 N.S.
		S.D.	1.08	1.55	1.55	t2-3 = -.78 N.S.
	Gross motor	N	13	10	7	t1-2 = .87 N.S.
		M	5.54	5.00	5.57	t1-3 = -.04 N.S.
		S.D.	1.39	1.55	1.40	t2-3 = -.74 N.S.
	Language	N	13	9	7	t1-2 = .04 N.S.
		M	4.46	4.44	4.86	t1-3 = -.90 N.S.
		S.D.	.75	1.16	1.24	t2-3 = -.66 N.S.
	Personal-Social	N	13	10	5	t1-2 = .51 N.S.
		M	6.31	6.00	6.20	t1-3 = .17 N.S.
		S.D.	1.26	1.61	.75	t2-3 = -.24 N.S.

Three year-old children who have been in PCC since birth or since very earliest infancy show a superiority of language development over children who became members once they were toddlers. None of the other DDST areas shows any significant differences.

In the next age group (3.4-3.9) there is a significant difference in favor of long-term participants in the area of gross motor development.

In the 3.10-4.3 year-old age group longer-term participants are at an advantage in both fine motor and in long range development over children who joined only after they were toddlers.

In the oldest two groups (4.4-4.9 and 4.10-4.11) there are no differences whatever in terms of longevity of membership.

Table III-8. Mean scores by age and involvement.

AGE	DDST SECTION		LOW(1)	HIGH(2)	
3.0 - 3.3 YEARS	Fine motor	N	23	22	t1-2 = 1.15
		M	4.78	4.27	N.S.
		S.D.	1.53	1.63	
	Gross motor	N	20	17	t1-2 = .73
		M	3.15	2.82	N.S.
		S.D.	1.49	1.38	
	Language	N	22	18	t1-2 = 1.90
		M	1.68	1.11	P < .05
		S.D.	1.10	.94	
	Personal-Social	N	22	22	t1-2 = -1.08
		M	4.41	4.91	N.S.
		S.D.	1.56	1.68	
3.4 - 3.9 YEARS	Fine motor	N	29	49	t1-2 = -1.18
		M	5.38	5.82	N.S.
		S.D.	1.47	1.78	
	Gross motor	N	29	41	t1-2 = -.17
		M	3.69	3.76	N.S.
		S.D.	1.80	1.79	
	Language	N	30	43	t1-2 = .59
		M	2.73	2.51	N.S.
		S.D.	1.71	1.66	
	Personal-Social	N	28	48	t1-2 = .02
		M	5.07	5.06	N.S.
		S.D.	1.73	1.76	
3.10 - 4.3 YEARS	Fine motor	N	36	47	t1-2 = -.42
		M	6.92	7.06	N.S.
		S.D.	1.72	1.62	
	Gross motor	N	36	42	t1-2 = -1.71
		M	4.42	4.90	P < .05
		S.D.	1.40	1.48	
	Language	N	38	46	t1-2 = -3.53
		M	3.05	4.11	P < .001
		S.D.	1.50	1.59	
	Personal-Social	N	33	45	t1-2 = -1.19
		M	5.52	5.89	N.S.
		S.D.	1.54	1.30	
4.4 - 4.9 YEARS	Fine motor	N	17	25	t1-2 = -1.08
		M	6.94	7.48	N.S.
		S.D.	2.16	1.27	
	Gross motor	N	19	25	t1-2 = .07
		M	5.00	4.96	N.S.
		S.D.	1.81	1.84	
	Language	N	20	25	t1-2 = -1.36
		M	3.60	4.28	N.S.
		S.D.	1.62	1.71	
	Personal-Social	N	19	23	t1-2 = -1.41
		M	5.42	6.00	N.S.
		S.D.	1.43	1.32	
4.10 - 4.11 YEARS	Fine motor	N	10	19	t1-2 = -2.30
		M	6.80	7.95	P < .05
		S.D.	1.33	1.23	
	Gross motor	N	11	19	t1-2 = -2.25
		M	4.64	5.79	P < .05
		S.D.	1.49	1.28	
	Language	N	10	19	t1-2 = -2.77
		M	3.90	4.90	P < .01
		S.D.	.83	.97	
	Personal-Social	N	11	17	t1-2 = .00
		M	6.18	6.18	N.S.
		S.D.	1.40	1.29	

Turning to the variable of involvement, in the youngest age group, low involved children do significantly better in terms of language development than do children in the high involved group. If taken seriously, this would suggest that children who come sporadically and inconsistently are at an advantage but this is not likely to be the case. It seems more reasonable to suggest that chance fluctuations in scores account for one such difference.

In the 3.4-3.9 year-old groups there are no significant differences in terms of involvement.

In the 3.10-4.3 year old groups there are significant differences which favor those children who attend regularly and consistently both in the area of language development and in the area of gross motor skills.

There are no significant differences between the 4.4-4.9 year-old groups.

In the oldest age group, there are significant differences in terms of fine motor, gross motor, and language development which favor those children who participate in the program consistently.

Summary of DDST findings

The overall findings on the DDST do not provide support for the notion that PCC has a major impact on children, at least in the areas measured. The lack of consistent significant differences between PCC, the norms, or Home Start data can be interpreted in two different ways:

- PCC has no impact on children in the areas measured by the DDST.

- The DDST was developed as a gross screening measure to identify children with serious developmental lag. The DDST was not designed to yield scale scores, although these have been derived for the PCC and Home Start samples. It may be that the DDST is not sensitive to differences which are within normal range.

In light of the fact that there are some differences on the PSI, it seems more likely that the second explanation is correct. That is, there exist some differences between the treated PCC and untreated Home Start children; however, this particular test is not sensitive to these differences. Moreover, within-PCC comparisons, on the PSI but not on the DDST, across length of membership and level of involvement, show differences in the expected direction.

While no clear picture has emerged because of the lack of significant differences in the DDST data, it can be stated that PCC does seem to have some impact on low-income children when compared to other low-income children who have not been in the program. The evidence is not strong, but the data are supportive of the hypothesis that PCC has an impact on children.