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ABSTRACT

This review of the Parent and Child Education (PACE) program discusses the professional literature that supports the PACE model, data analysis of the program, and suggestions for improving the design of program evaluation. The PACE program is based on widely accepted ideas about the relationship between family characteristics and children's educational and social outcomes. An extensive literature shows that parental behaviors and attitudes are associated with children's vocational aspirations, and that these aspirations are related to educational achievement. Based on this literature, PACE hypothesized that an intergenerational cycle of undereducation in some families results in educational failure. The program hopes to change parental attitudes that undervalue education and to cause parents to serve as better educational role models and teachers of their children. Results of various investigations show that PACE met its initial objective of causing 70 percent or more of adult participants to obtain a GED (General Educational Development) diploma, improve academics by two grade levels, or complete one program cycle. An implicit objective of changing parental aspirations for their children's educational outcomes was also met. However, the program needs an evaluation effort capable of demonstrating its effectiveness and cost-efficiency. Seventeen tables and charts and 74 references are included. (RH)

Kentucky Department of Education
Office of Research and Planning

A REVIEW OF THE PARENT AND CHILD EDUCATION (PACE) PROGRAM

July 1989

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Division of Research

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Tables and Charts

EXECUTIVE SUMMARY

This review of the Parent and Child Education (PACE) program provides a discussion of the professional literature that supports the PACE model, a discussion of past and recent data analysis about the program, and some suggestions for improvement in evaluation design.

The PACE program is based on widely accepted ideas about the relationship between family characteristics and children's educational and social outcomes. An extensive literature shows that parental behaviors and attitudes are associated with children's vocational aspirations, which are related to their educational achievement. Based on this literature PACE hypothesized that there is an "intergenerational cycle of undereducation" in some families that results in children's educational failure. PACE sees this problem as a major contributor to Kentucky's status as a state with a low rate of high school completion and seeks to break this cycle by changing the family factors that are believed to perpetuate it. In particular PACE hopes to change parental attitudes that undervalue education and to cause parents to serve as better educational role models and teachers of their children.

Initially PACE lacked funding for program evaluation, but program staff were concerned about demonstrating program effectiveness. They employed individuals from two programs at the University of Kentucky to perform evaluation studies. These studies had unavoidable but serious methodological problems that limit them as demonstrations of PACE effectiveness. These methodological problems are due principally to lack of comparison data to show how the same individuals would have fared had PACE not been available, as well as problems in measurement procedures. The studies do provide some descriptive and anecdotal information about PACE.

Analysis of information about the adult participants in the Department of Education's 240 system Adult Education data base provided additional descriptive measures of PACE performance and information about adult and child participants was also provided by PACE projects.

The results of these various investigations show that PACE met its initial objective of causing 70% or more of adult participants to obtain a GED, improve academics by two grade levels, or complete one program cycle, and the implicit objective of changing parents' aspirations for their children's educational outcomes. The studies do not evaluate other objectives of the program. The information available about some objectives seems to show that they have not been met, but this information is so flawed that it cannot be viewed as conclusive. The PACE-collected child data produced inconclusive results, probably because it is too early to expect the program to have clear-cut effects on the children.

The PACE program needs an evaluation effort capable of demonstrating its effectiveness and cost-efficiency. The design of this system must compare PACE outcomes with expected outcomes had PACE not been available to the same population. This requires that the outcomes of similar individuals involved in other programs be compared to those of PACE participants. The research literature on educational disadvantage demonstrates that PACE is a reasonable design to deal with well-known problems, but this does not guarantee that PACE services will actually result in the desired outcomes. Demonstration of the value of PACE requires that certain causal relationships between PACE services and outcomes be demonstrated.

We need to classify PACE as a "family support program" so evaluation efforts can address appropriate outcomes. It is particularly important in thinking about PACE evaluation to remember that expected PACE outcomes will occur over a period of years due to changes in family factors related to achievement. Evaluation of the program on the basis of short-term indicators will not answer questions about its success.

Adequate evaluation of PACE effectiveness requires that a series of research studies be conducted beginning this year. These studies would evaluate the effect of particular services included in the PACE program and the effect of PACE services taken together. These studies should compare PACE participants to similar individuals who were served by other programs or not served by any program.

PACE is a reasonable design, but reasonable designs sometimes fail to accomplish their objectives. Since the PACE model is being replicated across the country, Kentucky must demonstrate the value of the PACE model. This demonstration requires improvements in program evaluation efforts.

Introduction

The Kentucky General Assembly authorized the Parent and Child Education (PACE) program in 1986 because they believed that a significant number of Kentucky families suffer from an "intergenerational cycle of undereducation" caused by limited parental basic skills and attitudes toward education, limitations in children's learning skills, and limitations in parental child care skills. The Division of Adult and Community Education designed the PACE program to respond to these problems by providing joint educational services to parents and children. PACE serves parents who lack a high school diploma or equivalency and their children aged 3 and 4. Program services include adult basic education for the parents, instruction in parenting skills, early childhood education, and joint parent-child interaction and learning. PACE funds are available on a competitive basis to school systems in Kentucky counties where more than 50% of the adults lack a high school diploma or equivalency (Heberle, 1988).

PACE has developed a reputation as a highly innovative and effective program and has drawn interest from diverse groups both in Kentucky and nationally. In addition to state funding provided by the General Assembly, the Ford Foundation and the Kennedy School of Government have funded certain dissemination activities beyond the scope of the current program, and the Kenan Family Charitable Trust has funded a project to replicate the PACE model outside of the Department of Education (Heberle, 1989).

PACE staff have not made a formal statement of their underlying model, but informational materials about the program imply specific and elaborate causal relationships among family educational history, family attitudes about education, childrearing practices, and the expected educational outcomes of children whose parents are poorly educated (Kentucky Department of Education, 1987a; Heberle, 1988, 1989; Weiss, 1988). PACE materials imply two types of causal relationships. The first type of relationship which theorizes about the effect of family variables on children's educational outcomes will be labeled the "explanatory model". The second which makes statements about the expected benefits of PACE instruction will be labeled the "prevention/remediation model". A description of these two models follows.

THE EXPLANATORY MODEL

1. Individuals whose parents have negative attitudes and expectations about education are more likely to perform poorly in school than individuals whose parents do not have these negative attitudes.

2. Children whose parents present poor educational role models are more likely to perform poorly in school than children who have good parental role models.

3. Some parental styles are more likely to produce children who perform poorly in school than are others.

4. Children who evidence deficiencies in learning skills in the preschool years are more likely to perform poorly in school than individuals who do not evidence these deficiencies.

THE PREVENTION/REMEDIATION MODEL

5. Positive changes in parental basic skills will improve children's school performance.

6. Parental modeling of positive attitudes and behaviors about education will improve children's school performance.

7. Positive changes in parenting skills will improve children's school performance.

8. Improvements in preschool learning skills will improve children's school performance.

9. Services delivered during a critical preschool time period will have a significant long-term effect on children's school performance.

10. A combination of services provided simultaneously to parents and children will be more effective than presentation of the same services by different providers on different occasions.

Following more than a year of program operation, PACE staff identified among other problems the initial lack of funds for evaluation. Since then they have turned to various post hoc evaluational procedures (Kim, 1987, 1989; Townley, 1987) which have failed to provide a clear analysis of the performance of the program. To remedy this problem the Division of Community Education requested that the Office of

Research and Planning assist them in summarizing existing information about the program and in designing an ongoing evaluation process to be incorporated into future PACE program services.

This paper responds to that request. It addresses three different PACE program evaluation problems:

1. The explanatory model is based on well-known relationships between adults' educational and social status and their children's educational and vocational attainment. PACE staff are familiar with the literature in these areas, but they have never explicitly summarized this literature as it relates to program design. Some of the research is so widely accepted that evaluation of these relationships in Kentucky by the PACE program would be an unnecessary duplication of effort. The first section of this paper provides a summary of this literature along with a discussion of its relationship to the design and operation of the PACE program.

2. At its inception the program had nine goals (Kentucky Department of Education, 1987b). Existing information does not show that all of these have been accomplished although information is available about some of them.

   Individuals associated with two programs at the University of Kentucky (Kim, 1987, 1989; Townley, 1987) have conducted three evaluation studies of PACE. These studies have unavoidable methodological flaws that call any causal conclusions into doubt, but they do provide some useful descriptive information.

   Additionally, the Division of Adult Education collects information about ABE students, including PACE students, and the Division of Community Education has collected information about PACE children and adults. Analysis of this information also provides some descriptive information about program operation up to the present.

   The second part of this paper describes the PACE program and its participants based on these sources of information.

3. PACE assumes that its approach is an improvement on traditional adult and early childhood programs because of the interactive effect of the various services provided. This is a causal statement that deserves an adequate evaluation. Public programs should demonstrate their cost

effectiveness (Barnett and Escobar, 1987), and PACE implies that its approach will be more effective than other alternatives that might be provided to the same population. Since the prevention/remediation model requires a more thorough and methodologically adequate evaluation than has been done, the third part of this paper recommends a design for conducting this causal and cost-benefit analysis.

A public program should have an evaluation system capable of monitoring program performance and isolating changes or problems that need to be addressed. The last section of this paper also addresses the design of a routine data collection and analysis system for the PACE program.

Review of the Literature

The PACE program is neither an adult basic education program nor is it an early childhood program. Both types of programs attempt to overcome economic and social disadvantage by providing compensatory services to individuals who suffer from educational and/or cultural deprivation. Because PACE combines both types of services into a single program founded on well-known relationships between family background and children's educational and occupational achievement, it qualifies as a "family support program" (Denton, 1989; Weiss, 1989).

PACE services are based on the belief that illiteracy and certain other educational problems are due to an "intergenerational cycle of undereducation", i.e., that poorly educated individuals tend to produce children who are also poorly educated. A substantial body of research literature supports this belief. The relationship of parents' socioeconomic status to children's educational and occupational outcomes has long been known although the strength of the relationship has generally been modest. Recent investigations have demonstrated that when measures of socioeconomic status are supplemented with measures of family environment, the relationships become considerably stronger (Walberg & Marjoribanks, 1976; Bloom, 1986).

A number of investigators have demonstrated the general relationship between parental behavior and children's educational performance. Datcher-Loury (1988) found that the amount of time that mothers spend with their children is related to the number of years' schooling completed by the child but that this relationship occurs only for mothers with less than 12 years of schooling. Entwisle and Hayduk (1988) found in a follow-up of school children in Baltimore that parental influences at an early age had a substantial impact much later in the schooling process but their design did not allow them to evaluate the specific parental behaviors that caused these effects. McGowan and Johnson's (1984) evaluation of the performance of the PCDC program in Houston found that mothers' number of years of schooling was related to children's educational attainment but concluded that the specific relationships were too complex to be evaluated with their statistical model. Martin (1981) in a study of dropouts in urban and rural counties in Kentucky found 32 factors associated with dropout, including family educational background factors, child characteristics, and socioeconomic status. He did not report the strengths of these relationships.

Other authors have demonstrated the strength of specific relationships. In an analysis of a 14-year longitudinal research project, Schiamberg and Chin (1987) found that youth occupational motivation was the best single predictor of children's educational and occupational attainment and that family background factors and child

characteristics are related to occupational motivation. Parental influence had an indirect effect on occupational attainment, mediated through the child's educational attainment. Marjoribanks (1984) found a relationship between parents' aspirations for their children and adolescents' occupational aspirations. In a study of Mexican-American children, Valencia and Henderson (1985) found that family background factors were the best predictors of children's educational performance. Laosa (1982) concluded from a study of Hispanic and non-Hispanic white families that parents' strategies for teaching their children had a significant effect on children's academic outcomes; that this effect occurred for both Hispanic and non-Hispanic white families; and that use of specific teaching behaviors that were associated with children's performance was significantly related to parents' educational level in both ethnic groups.

Specific parental behaviors as well as parents' educational status are related to children's educational outcomes. PACE intended to improve children's eventual academic and vocational success by providing parents with educational experiences that would change their behaviors to resemble those of families that encourage achievement. These services were combined with an early childhood education program because early childhood programs have been shown to improve the educational attainment of economically disadvantaged children.

Early childhood education has a long history as an attempted solution to the problem of social disadvantage. In a historical review Grubb (1987) traced the idea of early childhood intervention back into the early 19th century, noting that it has undergone several changes of philosophy which reflect changes in beliefs about the causes of poverty. In recent years early childhood education was selected by the "War on Poverty" of the 1960's as a means of compensating for social inequality (Jensen, 1985; Grubb, 1987) and more recently as a means of overcoming developmental lags due to childhood disability (Casto and Mastropieri, 1986). A number of controversies have arisen in this area, most often because of claims by proponents that early childhood programs could be expected to substantially increase the intellectual capacity of children (Hoegl, 1985; Jensen, 1969, 1985). Despite these controversies early childhood programs are widely accepted as desirable and effective.

A number of longitudinal studies have demonstrated the efficacy of early childhood programs. Of these, the best known and probably the best designed is the Perry Preschool Project (Berreuta-Clement, Schweinhart, Barnett, Epstein, and Weikart, 1984). Researchers associated with this project have demonstrated cost benefits in the areas of greater high school graduation rates, lower crime rates, better occupational adjustment, better school peformance, and reduced dependence on welfare (Barnett, 1985). The project provided benefits to society, to attendees, and to taxpayers and potential crime

victims. Other longitudinal studies have demonstrated similar results for other early childhood projects (Barnett and Escobar 1987; Lally, Mangione, and Honig, 1987; Schorr, 1989).

Early childhood programs vary widely in quality and methodology, and some types of programs may be more effective than others (Hebbeler, 1985). Controversy has arisen over whether full-day services are essential and over different types of instructional styles (Barnett, Frede, Mobashar, and Mohr, 1987; Bereiter, 1986; Gersten, 1986; Schweinhart, Weikart, and Larner, 1986).

The PACE program staff used the High/Scope approach to early childhood education based on the Perry Preschool Project. While there is no guarantee that this is the best possible approach, they avoid some of the controversies by using a method that has demonstrated its effectiveness.

The PACE program attempts to attack the problem of undereducation across generations in poor families with both adult basic education and early childhood services. This design responds directly to known relationships between family environment and children's educational achievement. PACE does not need to demonstrate the relationships of the explanatory model since literature in adult education, early childhood education, compensatory education, and dropout prevention provides support for the strength of these relationships.

That children's educational and vocational outcomes are associated with family background factors does not prove that these factors are the cause of the outcomes, nor does it guarantee that changes in family characteristics will cause changes in the outcomes. The prevention/remediation model is thus not validated by reference to the relationship between family background and outcomes because the causes of both the family background factors and the outcomes might be some third variable not evaluated in any of the previous research (Hayes, 1989). Questions about aspects of the prevention/remediation model that cannot be answered by the literature will be considered in the third section of this paper.

Existing evaluation of the PACE program

Efforts so far to evaluate the PACE program have been descriptive and anecdotal because the program lacked a built-in evaluation component. In this section I will discuss these previous efforts and discriminate between findings that tell us something useful about the program and those that are too methodologically weak to tell us much. In addition, information created from other data sources will be reported.

Previous evaluation studies

Two studies in 1987 and one study in 1988 attempted to demonstrate the effectiveness of the PACE program. All three studies encountered methodological difficulties that substantially reduce their validity. The researchers encountered problems that have been extensively discussed in the literature on educational and social science research design (Campbell and Stanley, 1963; Keppel, 1973; Keeves, 1988).

The problems with these studies stem primarily from their inability to eliminate alternative explanations for the outcomes of the PACE program. Evaluation of program effectiveness always requires a demonstration that the effects associated with the program could not have been due to some irrelevant factor not under the program's control. The studies also suffer from very weak measurement methodology. It may have been that strong program effects existed but were not demonstrated because they could not be isolated by the measurement methods. The 1987 Kim study for example used a questionnaire approach to evaluate whether parents had improved in parenting skills, but these behaviors are probably better measured by direct observation. The Townley study attempted to use the McCarthy Scales to measure the developmental status of children even though both PACE and High/Scope philosophies reject this type of information as an outcome criterion.

The studies do provide some descriptive information about the program which will be reviewed below.

Evaluation Results I: The 1987 Yun Kim Study

Yun K. Kim (1987), a graduate student at the University of Kentucky Human Development Institute, examined 77 individuals who were currently enrolled in 6 of the PACE projects and 59 Adult Basic Education students who were enrolled in 5 non-PACE projects. Two of the six PACE projects had been closed for lack of participants, so the actual number of PACE sites in the study was four. She reviewed students' records and administered a questionnaire to both groups and an additional questionnaire to PACE participants. An exploratory data analysis produced the following results:

1. The mean age of adult participants in the two types of projects was roughly equivalent, but the modal age for ABE participants was 4 years younger than that of PACE participants. She concluded based on differences in the interquartile range that the age distribution of ABE participants was much wider than that of the PACE participants.

2. The mean grade completed by participants in both groups was the ninth. ABE participants averaged a larger number of years out of school than did PACE participants due to the inclusion of a few "outliers" in the sample who had been out of school for more than 45 years. She did not reanalyze the data without these outliers.

3. The racial composition of participants in both types of projects was predominantly white.

4. PACE participants were almost exclusively (97.3%) female, while ABE participants included a much smaller proportion of females (59.3%).

5. Almost all (97.3%) of the PACE participants were unemployed, while a smaller proportion (72.41%) of the ABE participants were unemployed.

6. "Informal assessment" indicated that PACE participants typically had incomes "...below the level set by the Department of Labor".

7. About twice as many (36.8% as opposed to 15.3%) of the PACE participants obtained a GED than did ABE participants. Follow-up indicated that the PACE program had met its goal of 70% GED completion, completion of one program cycle, or raising grade levels by two grades.

8. The mean number of months' retention in the two programs is similar, but ABE students tend to drop out a bit earlier than PACE participants.

9. The participants' descriptions of their long-range goals vary significantly between the two programs.

10. Data from the PACE questionnaire generally indicated that the participants were very positive about the program and agreed that the goals of the project had been met.

Because of its methodological problems this study should not be interpreted as a demonstration of the effectiveness of the FACE

program. The obvious demographic differences between the control group and the PACE students could easily explain the different outcomes of the two programs. As noted above the study also suffers from instrumentation problems. This study does provide some descriptive and anecdotal information which will be discussed below.

Evaluation Results II: The Kim Townley study

Kim Townley (Townley, 1987) of the University of Kentucky College of Home Economics, Department of Family Studies, performed an evaluation at one Harlan County PACE site in 1987. She intended to address the children's services component of the program by administering the PACE parent questionnaire, a self-report by the parents of their impression of the effects of the PACE program on them and on their children.

The Townley study is entirely a one-shot case study. No control group of any kind was used. In addition, as the author notes, she was able to include participants from only one of several sites. Even if adequate controls were available, this problem would impose serious restrictions on the generalizability of the evaluation results to other sites in the PACE program.

In addition to the parent questionnaire, Townley administered the McCarthy Scales to some of the children in the project, with no comparison group and no pretest. She noted that this information was difficult to interpret without control group data. Nonetheless she recommended certain curriculum improvements, apparently because she assumed that a completely successful application of the PACE concept should produce children without remarkable developmental weaknesses. Numerous other possible explanations exist for the weaknesses found on the McCarthy. For example, the children could have been severely developmentally delayed on enrollment, and the PACE program could have caused improvement to a less-impaired level. In fact studies of early childhood programs over the past twenty years have demonstrated that children served in these programs improve but continue to function behind their non-disadvantaged peers (Jensen, 1985; Barnett and Escobar, 1987). Without comparison data this part of the study is uninterpretable.

The Townley study provided some descriptive information about PACE participants, but this data is much weaker than the Kim studies because it is limited to participants in a single project.

Evaluation Results III: The Yun Kim 1989 Study

In addition to the 1987 study, Kim (1989) conducted a much more extensive data analysis of the PACE program using much the same approach as her earlier study but without a comparison group. She found the following:

1. PACE participants were 95% female, 98% white, 71% married, and 95% unemployed.

2. The mean age of adult participants was 28 years; the mean grade completed was the ninth; the mean number of years out of school was 11.

3. The mean number of children living with the adult participants was 2.5. Participants had an average of 3.8 other family members who had also dropped out of school.

4. The mean length of stay in the program was 6.38 months. 89% of participants agreed that they had achieved their goals for coming to the PACE program.

5. 44% of the adult participants were totally dependent on government sources of support, and they tended to come from families that traditionally had received one or more forms of government financial assistance. Of those supported at least in part by wages (53%), 20% were receiving food stamps. Thus more than half (64%) of the families were involved in one or more forms of public income support.

6. The majority of the adult participants had spouses who had obtained high school degrees. Participants' parents had levels of education similar to their own.

7. 52% of the adult participants exited the PACE program because they had obtained a GED, and 29% stayed until the end of the program year without obtaining a GED.

8. PACE adult participants appear to be somewhat different demographically from the usual ABE student.

9. The proportion of PACE participants who had a desire to attend further educational programs declined from pretesting to posttesting.

10. After program completion PACE participants had greater expectations that their children would complete high school and that they would attend a four year college program, but

they showed no change in their expectations that their children would attend a vocational school or two year college program.

11. Adult participants at program completion showed decreased expectations that they themselves would attend college or vocational school.

12. Both GED recipients and non GED recipients showed significant changes in TABE scores between pre- and posttesting with non GED recipients having significantly lower initial scores.

13. There were inconsistencies in program administration between projects.

14. A potential limitation on long-term program effects is imposed by the fact that adults who obtain their GED's are required to exit the program even if they have been enrolled such a short time that their children are unlikely to have derived much benefit.

15. No change appeared to occur in the extent to which PACE participants communicated with school authorities about their children.

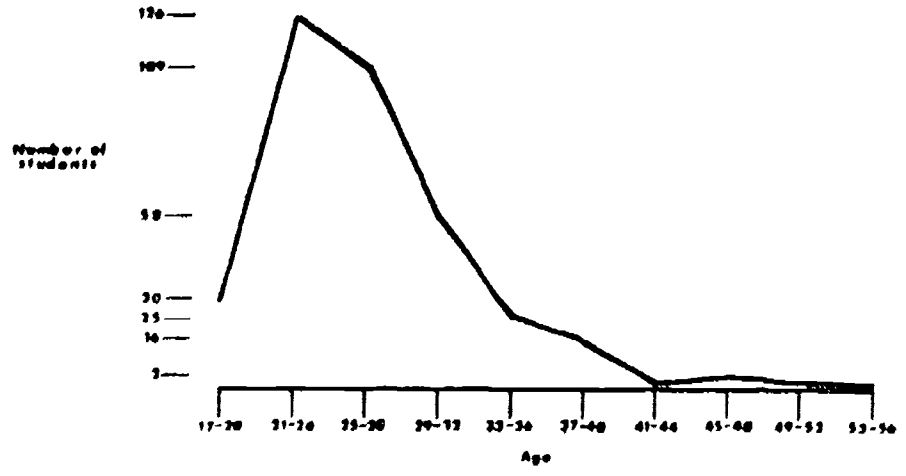
16. The mean pre- and posttest TABE scores for PACE participants were as given below (Table 4-14 from Kim, 1989):

Subtest	pretest	posttest
Reading	7.86	9.03
Mathematics	7.02	8.89
Language	7.61	9.04
Averaged Grade	7.26	9.02

Evaluation results IV: Recent data analysis

At the request of PACE program staff, projects submitted information in February 1989 on PACE adults and children and the siblings of PACE children. In addition, data from the Department of Education 240 system Adult Education data base and from the GED database was also analyzed.

The median age of adult participants was 25 with a mean of 26.8. The maximum age was 54 and the minimum was 17. This information is portrayed graphically on page 13.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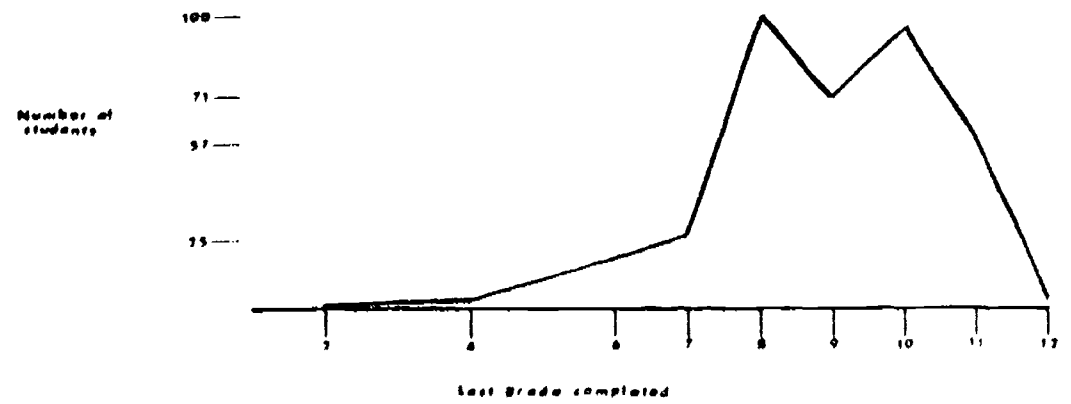
Age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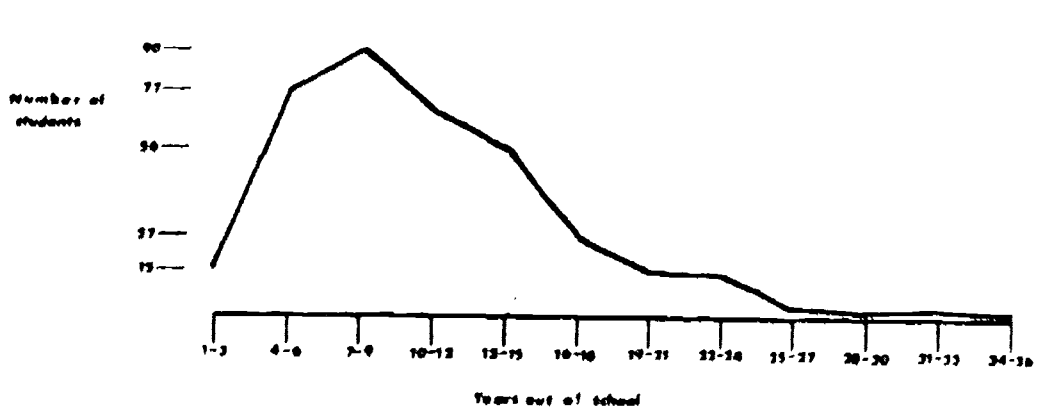
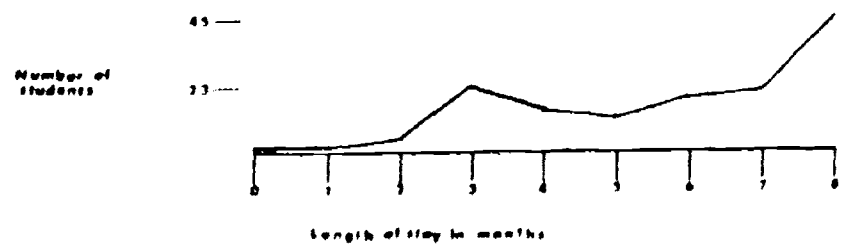

Number of students
Years out of school


Number of students
Length of stay in months

The median number of years out of school was 10 with a maximum of 38 and a minimum of 1.

The median grade completed by adult participants was 9 with a maximum of 12 and a minimum of 2.

The distribution of length of stay in PACE programs shows that there are probably two populations of PACE adults, those who stay briefly (four months or less) and those who stay longer. The former group consists largely of individuals with relatively high academic skills who quickly obtain a GED; the latter probably of individuals with lower skill levels who require more instruction.

The Adult Education database describes 95% of the PACE adults as female and 98% as white. Two percent of the adults were described as handicapped. Table 1 shows the distribution of number of children by participant from this database.

Table 1.

Distribution of Number of Children

Number of Children	Proportion
0	.01
1	.24
2	.40
3	.21
4	.12
5	.01
6	.01

Table 2 compares the status of PACE adults not currently enrolled who obtained GED's and did not obtain GED's, based on PACE-submitted data. Notable findings include the following:

1. Adults who achieved the GED are about as likely to be unemployed as adults who did not but they are more likely to be looking for work.

2. Those obtaining a GED are more likely to attend further educational programs. The proportion of these individuals however is small (about 8% of those obtaining a GED).

3. Individuals who failed to obtain a GED are more likely to have moved from the area.

Table 2.

Adults Exited from PACE
Statewide Totals

Current Status	of those not receiving GED		of those receiving GED	
	number	%	number	%
At home, not working	67	53.6	72	50.0
Employed	27	21.6	30	20.7
Seeking employment	3	2.4	17	11.7
Enrolled in vocational school	1	0.8	7	4.8
Enrolled in college	0	0	5	3.5
Enrolled in other ABE	2	1.6	0	0
On vocational school waiting list	0	0	3	2.1
Moved from area	17	13.6	4	2.7
Current status unknown	8	6.4	3	2.1
Total	125		145	

The absence of a comparison group makes it impossible to interpret the significance of these findings. The Division of Adult Basic Education does not conduct routine follow-up studies of individuals it has served, and as noted above PACE students are not similar demographically to individuals served by other ABE programs.

Another problem of interpretation is that logically both PACE and adult education are intended to have long-term effects, and only a short time has elapsed since these adults exited from PACE projects. Since most of these are young women with small children it should not be too surprising that they have not immediately obtained work or enrolled in college. That a small but significant number of them are enrolled in further educational efforts or looking for work is evidence of an immediate effect that might become a long-term trend.

Table 3a gives the pre- and posttest academic levels for PACE students for reading, math, and language, and the mean differences for individuals' pre- and posttest scores. These levels are similar to those found by Kim (1989), but note the cautions below about the use of change scores.

Table 3b shows the cumulative distribution of grade level scores for adult PACE students at pre- and posttest for reading and math. These scores are the pre- and posttest academic skills rounded to the nearest grade level. Twenty-two percent of the PACE adults gained two or more levels in reading; 35% gained two or more levels in math; and 34% gained two or more levels in language.

Table 3a.

	Entry Mean	Exit Mean	Mean Difference
Reading	8.3	9.3	1.1
Math	7.2	9.0	1.7
Language	7.7	9.1	1.1

Table 3b.

Cumulative Distribution

Academic Level	Reading Pre	Reading Post	Math Pre	Math Post
1	.00	---	---	---
3	.02	.01	.00	---
4	.05	.02	.03	.01
5	.13	.07	.13	.06
6	.20	.12	.36	.12
7	.36	.20	.61	.22
8	.49	.30	.80	.35
9	.66	.43	.93	.57
10	.88	.63	.98	.74
11	.92	.80	.99	.82
12	.96	.85	.99	.85
13	1.00	1.00	1.00	1.00

Table 4 shows the distribution of exited individuals obtaining a GED by site, based on the PACE-submitted data. The available information does not permit an analysis of the large differences among the various sites on this variable.

Table 4.

Site Location	Number Obtaining GED	Proportion
Estill	10	.77
Magoffin	7	.70
Harlan	29	.63
Monroe	5	.56
Fleming	5	.56
Spencer	6	.55
Butler	6	.50
Metcalfe	11	.50
Bell	17	.43
Hart	14	.41
Letcher	9	.38
Owsley	3	.25

Of 282 adults exited from the program, 147 or 52.1% were reported by the PACE data to have obtained a GED. The GED data base shows that of 310 former PACE students who took the GED test 222 or 72% passed, 76 or 24% failed, and 12 or 4% were incomplete. The total enrollment in PACE between program startup and January 1989 was 565 individuals. Due to defects in the Adult Education and PACE datasets, we cannot give a precise number for the individuals who have exited the program. The 222 individuals who have completed a GED represent 39% of those who have been enrolled, but this underestimates the GED rate since we should not judge the success of the PACE program on the basis of whether individuals still enrolled have received a GED. Results from the two databases seem discrepant and we are unable to resolve these discrepancies with the available information.

Tables 5a and 5b give the distribution of exit reasons for PACE students from the PACE-submitted and Adult Education data respectively. The categories used by the two datasets are not exactly equivalent but seem roughly similar.

Table 5a.

(PACE-submitted)

Exit Reason	87	88	Total
Obtained GED	30	59	89
End of program year		32	32
Moved		6	6
Other reasons	1	5	6
Got a job		4	4
Failed GED		3	3
Lack of interest	1	1	2
Parent still enrolled with younger child		2	2
Family problem		2	2
Child aged out	1		1

Table 5b.

(Adult Education data base)

Exit Reason	87	88	Total
Completed their objectives	11	105	116
End of program year	39	81	120
Health reasons	1	5	6
Child care/family problems	12	18	30
Class time/location or moved	3	13	16
Lack of interest	1	9	10
Other known reason	3	7	10
Unknown reasons	3	9	12

Table 6 gives the current enrollment status of PACE children as given in the PACE-submitted data. The majority of those children for whom current enrollment information was reported are currently enrolled in kindergarten. Information about the attendance of these children was also submitted. This information indicates that the PACE children when they entered school were absent an average of .81 days per month. 71% of the children missed no days of school, with the other 29% accounting for all of the days missed. Of the 90 children for whom kindergarten or first grade special services referral information was available, nine had been referred for speech and language services, three had been referred for remediation, and one had been referred to special education.

Table 6.
Former PACE children current enrollment

None	28
Kindergarten	82
First Grade	8
Headstart	3

In the absence of control group information, Table 6 tells us little about the success of PACE. We do not know how often a similar child is absent from school or how likely s/he is to be referred for special program services. Also keep in mind that these data are mostly from very early in the school careers of these children before there has been time to establish much of a trend.

Table 7 gives the income sources for PACE adults as given in the Adult Education data base. These numbers are similar to Kim's data in that they show that more than 90% of PACE adults are not employed at program entry. The majority of the participants are described as having no income. This might include those individuals described by the Kim data as deriving their living from their spouse's wages. The Adult Education data described 88% of PACE participants as below the poverty level based on the Department of Labor income status level.

Table 7.
Income Source of Adult PACE participants

Income Source	Number	%
Job or self-employed	31	8.3
Job training or work-experience program	1	0.3
Unemployment compensation	3	0.8
Welfare, ADC, Disability, Other public	102	27.4
Social Security	11	3.0
Other source	31	8.3
No income	194	52.0

Program staff felt that within-family comparison of absence and retention statistics would demonstrate a PACE effect if it were shown that children enrolled in the PACE program were less likely to be absent, referred for special programs, or retained than were their older siblings who had not been enrolled in PACE. Information submitted on 57 siblings of PACE children shows the siblings missed an average of 8.9 days per year, and that 29% of them were retained in at least one grade. The PACE child data shows the kindergarten and first grade former PACE children missed an average of .81 days per month.

PACE children's absences are given in months rather than years because most of the former PACE children are in their first (kindergarten) year of school. The two figures do not look very much different, but it is really too early to tell whether a difference exists. We would also expect (given the PACE prevention/remediation model) that the siblings' school performance would improve. Demonstration of the success of the PACE program in this area requires a reduction in absences and referral to special programs by the siblings of PACE children, and an even greater reduction in these areas by former PACE children.

Conclusions

Since the PACE program is now in its third year of operation, program staff by now have responded to those problems that can be identified on an anecdotal basis. The attempts at quantitative evaluation have been troublesome because they were conducted after the fact when it is very difficult to avoid serious methodological errors. The available results indicate that some of the original goals of the program have been met, but we cannot show that PACE is doing anything that other programs could not do. In the long run PACE must show this to justify its existence.

The explanatory model establishes the appropriateness in theory of the PACE concept as an intervention for individuals who are undereducated. The literature in this area suggests that undereducation is a family phenomenon. If one accepts this literature as demonstrating causal relationships between family factors and children's outcomes, it is reasonable to believe that a program that addresses these family factors could ameliorate their effects on children's educational outcomes (Denton, 1989). PACE is an appropriate design to deal with these problems.

The problem for PACE is that its existing evaluation capacity and procedures cannot demonstrate that it is effective. Programs based on well-founded designs sometimes do go astray despite the best of intentions and in the absence of an evaluation system it is impossible to determine that this has occurred. Even when a statewide program such as PACE is generally successful, there is usually some variation among the performance of particular sites, and administration of the program demands that a more detailed view of the various sites be available. PACE needs to develop an ongoing evaluation system, including a demonstration of its cost-effectiveness and cost-benefit as well as routine monitoring reports.

The following specific conclusions are supported by the available evaluation information:

A. Achievement of PACE goals.

PACE originally established nine goals. Some have been met, some have not, and others have not been evaluated, as described below:

1. Raise the educational level of the parents of preschool children through instruction in basic skills

It seems clear that this goal has been accomplished to some extent. The Kim 1989 study showed that adults enrolled in

PACE projects had increased an average of 1.17 grade levels in reading, 1.87 grade levels in mathematics, and 1.43 grade levels in language as measured by the Tests of Adult Basic Education. She did not report statistical tests of these differences, but these are obviously significant. PACE has increased the educational levels of adult participants to some extent.

One of the measurable objectives given by the program was that 70 percent of parents would successfully complete the GED test and/or raise skill levels on the TABE and/or enroll in further educational or job training programs. This objective has been accomplished as reflected both in the Kim and Division of Community Education data. Note that this result is due to the program's number of GED's and retention information alone. The data as reported do not support an unduplicated analysis of the participants' gain in academic skills.

2. Enhance parenting skills

The PACE program established a clear standard for success in the adult basic education component (obtaining a GED, improving by two grade levels, or enrolling in further education) and used a standard curriculum with established outcome expectations for the child component. The program established no such standard for parenting skills. Background materials about the program identify enhancement of parenting skills as a program goal but fail to establish a model for adequate functioning as a parent.

Kim's 1989 study attempted to evaluate this issue by asking parents about changes in their approach to disciplining their children. Since the model to which this information relates is unclear, the results are inconclusive. Townley asked parents how their responses to their children had changed but also did not seem to have a particular model of effective parental behavior in mind. She found changes in how parents deal with their children, but these cannot be evaluated in light of this failure to specify a model. Keep in mind as well that this result occurred at a single site, and that the measurement procedure (survey data) could have been contaminated by participants' knowledge of the expectations of project staff.

Enhancement of parenting skills is an important element of the explanatory model because specific parental behaviors have been shown to be related to children's educational outcomes. Any theoretical statement about this population's achievement levels or PACE's value as an effective remedial effort must address this relationship (Hayes, 1989). If the PACE program continues to pursue this goal it should specify the changes in parenting skills that are desirable and should measure their change over the course of program participation.

The researchers measured one parental behavior known to be related to children's educational performance (reading to children) and produced equivocal results. This could have been either because the program was ineffective or because the instrumentation and data collection were faulty. Kim's attempt to measure this behavior used two different indicators on two occasions. The alternative hypotheses due to such methodological errors need to be eliminated in future analysis of this issue. Even had an adequate evaluation of changes in this behavior been done, however, the lack of a theoretical framework would have obviated any conclusions that could be drawn. "Reading to children" might be a cause of their educational outcomes, or it might be an indicator of a deeper level of relationship between parental behavior and the outcomes. Only a clearly elaborated theoretical model can make it possible to test such ideas.

3. Increase developmental skills of preschool children to better prepare them for academic success

No adequate analysis of this issue has been done. Kim collected information in this area but it was all survey data and probably was too weak to tell us anything for certain. No pretest was given. Townley used the McCarthy Scales to evaluate this issue but noted that the absence of either pretest or comparison group data did not allow her to show that improvement had taken place. An analysis of Child Observation Record pre- and posttest scores done in 1987 showed an overall 28% improvement in childrens' scores. Since this improvement could have been due to maturation of the children, the results cannot be interpreted as a specific program effect.

Further evaluations of PACE need to specify the particular developmental skills of interest and the instruments to measure them. All children need to be both pre- and posttested, and a baserate of change in these skills due to maturation needs to be established either through use of an instrument with known norms or through the use of a control group.

4. Enable parents to become familiar with and comfortable in the school setting.

   No attempt was made to directly evaluate this goal of the program.

5. Provide a role model for the child of parental interest in education

   PACE materials make it clear that the program's primary indicator of parental educational role-modeling is whether the parent obtains a GED. Since more than half of the adults enrolled in PACE projects eventually do obtain a GED, one can say that this goal has been substantially met.

   Equating parental role-modeling with obtaining a GED ignores a substantial body of literature that shows that parents' attitudes about education and educational aspirations for their children are strongly related to children's academic and vocational outcomes. Inclusion of these other elements of parental role-modeling in PACE evaluation would do a better job of demonstrating the program's effectiveness.

   PACE staff see participation by parents in an educational program as modeling behavior. It would be possible to measure the effect of this variable on the children. The effect of this and other specific parental behaviors on children's thinking and performance need to be measured if an adequate evaluation of PACE is to be done.

   The measurable objective of improving parental willingness to communicate with school personnel and personnel of other social service agencies fits here to some extent. Program efforts to measure this objective showed no improvement, but the measurement methodology was very weak.

6. Enhance the relationship of the parent and child through planned structured interaction

As with the program's goal of enhancing parenting skills the major problem with evaluating this goal is that PACE has not established clear expectations for what is to be accomplished. Part of the PACE program is joint interaction and learning between parents and children and the prevention/remediation model hypothesizes that this is one of the important interactive effects that sets PACE apart from other programs. Survey information from the Kim and Townley studies attempts to address this area with inconclusive results because of methodological problems mentioned above. PACE must specify what is to be accomplished in this area before this important goal of the program can be evaluated.

7. Demonstrate to parents their power to affect their child's ability to learn

No effort was made to directly evaluate this goal.

8. Encourage early identification and treatment of physical or mental handicaps that may inhibit the children's learning ability

No effort was made to directly evaluate this goal.

9. Encourage identification and treatment of any handicapping condition in the adults that may inhibit their ability to care for their children

The Adult Education database identifies 2% of the PACE adults as handicapped, but does not support an analysis of disability types. The University of Louisville Urban Studies Center estimates that in the age range 16-64, 14.1% of the population of Kentucky have a handicapping condition (Weir, Bonham, & Hunter-Manns, 1989). The 2% reported by the database is certainly significantly different from this figure, but this could be due either to recruitment from a population with a low incidence of handicaps or to a low rate of reporting by project staff. In either case this information tells us nothing about the achievement of this goal because identification of individuals with known handicapping conditions is not the same as encouraging the identification and treatment of conditions not previously identified or treated.

B. Description of the population served.

A substantial proportion of the PACE adult participants derive some or all of their income from government programs and nearly half derive no income from either their own or their spouse's wages. The Adult Education data show that the majority of PACE adults live below the federal poverty level.

Kim's analysis of TABE scores placed mean pretest scores for reading, mathematics, and language for PACE participants at about the seventh-grade level. Some individuals involved in the program had scores much lower than this but PACE students generally had relatively high academic skills pretest scores. Pretest scores from the Adult Education database placed 80% of the participants' reading pretest scores at or above the seventh grade level. The distribution of mathematics pretest scores placed the particpants at lower levels in this area than in reading.

Information from both the Adult Education and Kim data shows that PACE participants are typically young white women who dropped out early in high school and have been out of school for several years.

Kim's analysis that the spouses of a majority of PACE participants had high school diplomas or equivalencies confuses the picture somewhat. PACE assumes that an intergenerational cycle of undereducation exists, caused by parental negative attitudes about education, reflected in part by failure to obtain a high school degree. If one of the parents has a high school degree, some of this intergenerational devaluation of education might have been ameliorated.

C. The program's effect on its participants

The 1989 Kim study does provide some information about positive changes in adult participants. The most important and apparently the most reliable of these is that the participants' expectations for their children's educational outcomes (finishing high school and attending college) increased from pretest to posttest. This is almost certainly a true change in parental attitude and probably is due to program participation (although it could be a general effect which would occur in any adult education program). A related and problemmatic finding is that parents apparently

reduced their expectations about their own possible further educational accomplishments. Kim assessed this as implying that the adult participants became more realistic about their educational possibilities. This is plausible, but there is no really good reason to accept her interpretation. About all that can be said is that on posttest the participants were less likely to endorse college or vocational school as further educational possibilities for themselves.

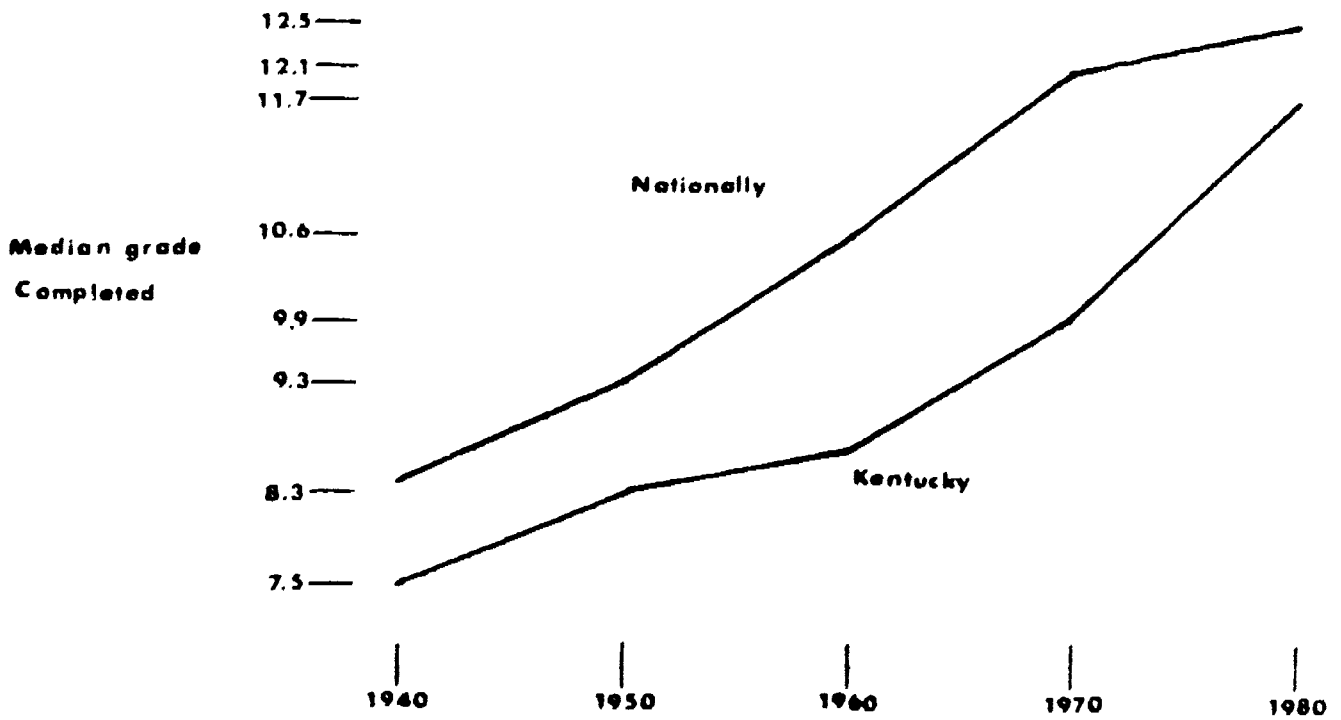
This one result demonstrates that the PACE program is effective in causing change in at least one of the areas central to the explanatory model. The literature review demonstrated that parental aspirations for their childr n are related to children's academic outcomes and this is evidence that PACE has caused a change in parental aspirations.

D. A better model for the "cycle of undereducation".

It is necessary to clarify a few issues related to the logic of PACE's theory about how the "cycle of undereducation" relates to program outcomes. As noted above, there is sufficient reason to believe that this problem exists. It is however important to keep a few things in mind.

1. The definition of "undereducation" has changed considerably in recent years and continues to do so. The idea of high school graduation as a standard of educational success is of relatively recent origin. Until the 1940 Census the standard of educational performance was literacy, i.e. whether an adult could read and write (U.S. Bureau of the Census, 1943). In the 1940 and subsequent Censuses the definition became the number of years of school completed, and it was not until the 1970 census (U.S. Bureau of the Census, 1973) that the proportion of high school graduates was reported as a separate statistic.

Within this framework significant changes have occurred in the educational status of the population both in Kentucky and nationally. This chart shows the median grade completed by individuals in Kentucky and the nation for the Census years 1940-1980. During this period the proportion of Kentuckians over age 25 wno were high school graduates rose from 15.5% to 57.1%.



The implications of this information help clarify the problem addressed by PACE. Educational levels in Kentucky and in the nation have risen steadily throughout this century, and graduation from high school is now considered a minimum educational outcome. Rising expectations about the educational levels of individuals have resulted from changes in the complexity of information skills required to participate and work in an increasingly technological society (Chall, 1987; Whimbey, 1987). This progression of expectations implies that families with an "intergenerational cycle of undereducation" are those whose members persistently achieve less than is educationally expectable for their generation, because they do not share values about education of others in their culture.

Identification of the parents and grandparents of these individuals as high school dropouts is not a very good measure of this intergenerational pattern because until recently the majority of adults at most socioeconomic levels would have had similar family histories. It is necessary in judging family patterns of undereducation to compare the educational attainment of individuals with the expected achievement of the generation of which they are a member.

2. The understandable tendency to look for immediate indicators of program success is counterproductive to operation of the PACE program. The focus on the intergenerational cycle

implies that the principal changes intended by the program will occur over a lengthy period of time. The usual standards of success for adults in ABE programs are not necessary to these changes except as they represent intermediate steps in the process. PACE should of course attempt to obtain as many GED's as possible for its adult participants, but obtaining a GED need not be the sole or even a major outcome of the program. The ultimate evaluation of PACE's success must depend on its ability to show that the children over their school lives are less likely to be undereducated than they would be if PACE were not provided.

Recommendations

1. Develop an ongoing management information and evaluation system.

PACE has had some problems because of a lack of an organized data collection and analysis system. This type of system is essential to the management of any human services program, and it is recommended that PACE develop such a system. A substantial part of the system could easily be developed from existing sources of information. The Division of Adult Education collects an extensive data set on each individual served, and PACE projects are part of this system. A routine analysis of this data would provide the PACE program with an ongoing management information and program evaluation system. Because of the special nature of the PACE program, some additional information needs to be collected. This information includes:

- Parent and child public program participation
- Child's previous enrollment in educational programs
- Parent questionnaire data
- Child educational skills measures
- Child's handicap status
- GED completion status
- Child follow-up information
  - Number absences in primary grades
  - Promotion/retention status
  - Academic achievement (grades and test scores)
  - Referral to special programming
- Parent follow-up information
  - Work status
  - Further educational enrollment

Routine reports might include:

- Demographic descriptions of participants
  - Income levels
  - Age, gender, educational history
  - Handicap/health status
- Relationship of PACE to other programs
  - Number of participants also served by each program
  - Referral patterns from other programs
- PACE outcomes
  - Number of individuals achieving GED's
  - Children's school entrance and progress

These are just examples: many other reports would be supported by the data and it would not be difficult to develop a system

that routinely produced these reports. Examination of these statistics on a routine basis by PACE staff would be helpful in identifying and resolving program problems.

It seems true that PACE projects have sometimes been less than diligent in supplying information for the adult education database. Program monitoring in this area should be improved.

2. Define the size and location of the service population.

The chronology of the program in the Harvard Family Research Project (Weiss, 1988) notes that of the initial six sites opened in 1986 two were closed because of limited participation. Evaluating participation at these sites would provide information about recruitment methods and whether they are reaching the target poopulation. It would be very useful to have an estimate of the number of candidates for the program in existing and proposed counties. Program staff have recently made an effort to deal with these problems, buc good program management in the future dictates that some ongoing measure of program coverage be available.

3. Define the socioeconomic characteristics of the population.

A good description of the socioeconomic characteristics of the PACE participants would provide data essential to the eventual analysis of the cost efficiency of the program. Kim did this in part but did not collect anything more than impressionistic information about the income status of the participants. This analysis should be done both as a process of further goal setting and as an ongoing program evaluation effort.

4. Determine the best siting for the program.

The General Assembly required that PACE services be provided through local public schools, and PACE staff believe that services provided in the public school context will contribute to positive attitudes about school. No evidence exists showing that the public school setting is likely to be more effective than other possible placements of the program. A test of this (implicit) hypothesis would determine whether this is really the best approach.

5. Test the PACE/High Scope supplementary hypothesis of the inefficacy of readiness skills as a predictor of educational achievement

High/Scope and PACE both object to the use of "readiness skills" and the use of academic skills as measures of program outcomes

on the grounds that the measurement of academic skills at these early ages is not predictive of the eventual performance of children. This adds an additional hypothesis to the prevention/remediation model, that measured readiness skills are less predictive of eventual school performance than attendence in a preschool program. This requires a longitudinal design with children in a direct-instructional group as a control, and with a nontreatment control.

6. Reconsider the program objectives.

The nine program objectives established at the beginning of the program should be reconsidered. Some of them are central to the program's mission (e.g., raising parental educational levels), but others are incidental. One reason why evaluation efforts have been so thorny is that program staff did not give enough attention early in the program's history to the objectives, how they could be accomplished, and how they could be measured. It is understandable that at the beginning of a new program there would be some fuzziness in the establishment of objectives. The program has enough experience at this point however to allow some decisions to be made about its future standards.

7. Improve PACE - Headstart interfacing.

Headstart staff report that they have waiting lists for their services and children who are enrolled in PACE are not continued on Headstart waiting lists. If the PACE child leaves the project for some reason s/he often does not immediately re-enter Headstart, but instead re-enters the waiting list. This may result in the child losing any chance of re-entering Headstart. This is significant in light of the fact that program services are often terminated when the parent obtains a GED, even if parent and child have been enrolled only briefly.

8. Demonstrate the causal links in the prevention/remediation model.

PACE generated an elaborate -- if sometimes implicit -- model that predicts that certain remedial and preventive services should result in improvements in the educational and social outcomes of disadvantaged children. This model is based on well-accepted beliefs about a causal relationship between family constellation factors and child outcomes, from a literature that shows relationships between certain family patterns and outcomes. PACE theory is based on the assumption that the relationships exist because family patterns are the cause of the outcomes even though the relationships do not constitute prima facie evidence of causality. Thus, PACE services are intended to change the outcomes by changing the family patterns.

Because the causal relationships have not been proven, doubt exists about the expected effectiveness of the PACE program. If it were true that the family factors and the outcomes were both the result of some unseen third factor, then changing the family factors would be unlikely to change the outcomes. In this case PACE would have no effect even though it is well-founded in existing research literature. For this reason it is important to test the hypotheses of the prevention/remediation model. If these tests demonstrate a program effect, then substantial support will be given to the causality of the relationships in the explanatory model.

A design of a research program to test the prevention/remediation model is given in the next section.

DEVELOPMENT OF A RESEARCH DESIGN

The PACE program suggests as a major cause of undereducation that children are affected by the educationally-related attitudes and behaviors of their parents. Substantial research supports this view and to the extent that the program is designed to cause changes in these attitudes and behaviors, it appropriately addresses the problem of educational disadvantage.

The appropriateness of the PACE model in theory does not guarantee that it will have predictable positive effects in practice at different sites administered by different organizations. The adult basic education, early childhood, and family service areas accomodate many possible program designs, some of which existed prior to PACE. It has not been shown that family constellation factors and parental behaviors are the causes of undereducation, only that a relationship exists. In the long run the value of PACE depends on showing that it accomplishes in practice what theory predicts and that it is a more desirable alternative for the appropriate population than other equivalent options that might be pursued with the same funding. This requires at minimum that PACE establish clear expectations for what participant behaviors and abilities are to be modified by program services.

Demonstration of the value of an intervention requires that its outcomes be compared to what would have happened if no intervention had taken place. We cannot make these comparisons on the basis of current evaluations of the PACE program.

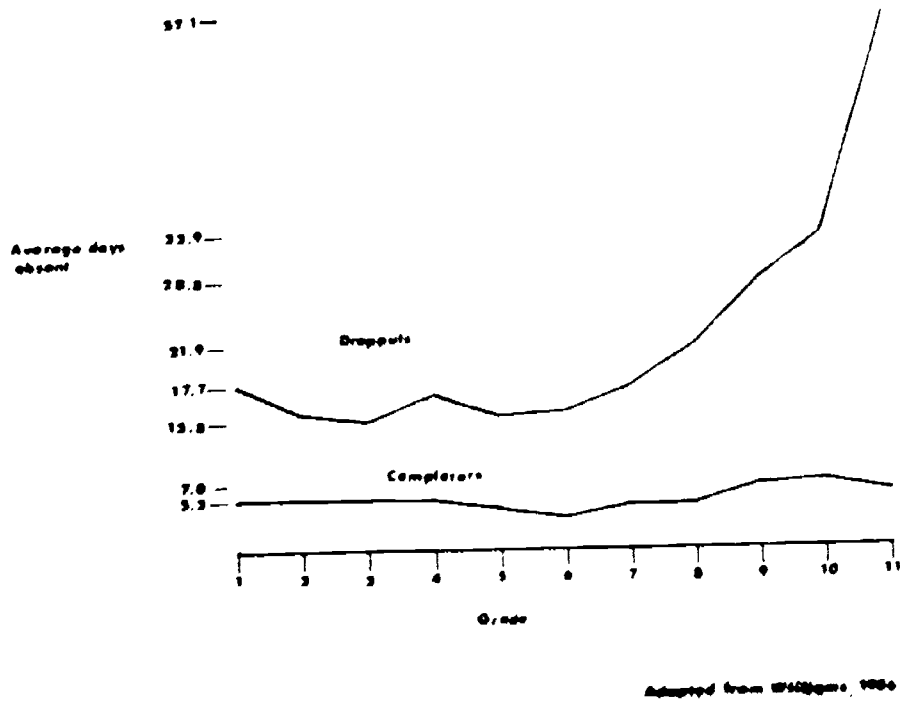
Kim's comparison of information about non-PACE Adult Basic Education students with information about PACE students failed to solve this problem (Kim, 1987) because the two populations are quite different. As her study shows, ABE participants were much more likely to be employed than PACE participants and were much less likely to be female. Given that PACE programs provide services that are not provided by ABE programs (early childhood education, lunch, transportation) and the requirement that PACE participants have 3 or 4 year old children, the motivations for enrollment of ABE participants were probably quite different from those of PACE participants. Kim notes that the ABE group included a "few outliers" who had been out of school for extended periods of time. Outliers are usually individuals from populations other than the one of interest (Snedecor and Cochran, 1976). Since the ABE data probably includes information from at least two distinct populations, the interpretation of differences from the PACE group is in doubt.

PACE is not an Adult Basic Education program alone, but an effort to combine adult and child services into one program (Heberle, 1988; 1989). Comparison of PACE with ABE programs fails to evaluate the program in terms of its express intent -- to overcome the intergenerational cycle of undereducation by changing family environment factors that perpetuate this cycle. While PACE theory would suggest that obtaining a GED is an important goal of the program to be pursued in its own right, program services could result in realization of the program's long term objectives even if PACE adult students do no better than other ABE students. For this reason we must evaluate the effects of the early childhood education component and the interaction of the various services provided by the program.

Evaluation of these latter two aspects of the program is not as simple as evaluating the success of the adult education component. Assessing the effects of early childhood services and of the total program calls for a longitudinal design since the program is based on the belief that services should result in long-term effects on the children and families who participate. Ideally the PACE staff should judge the program on the basis of twenty years or more of evaluation, as was done by the Perry Preschool Project. An ideal design would also include a nontreatment control group and at least one control group that was provided an alternative form of treatment.

The need for such a complex evaluation over so long a period is problemmatic. Funding sources usually prefer to know fairly soon whether a program is working so that problems can be solved or so the funds can be reallocated to some other program. Fortunately shorter-term indicators can tell us whether PACE is having an effect. These indicators relate to the known relationship between school performance -- even in the early years -- and the likelihood that an individual will drop out of school.

Individuals who are likely to drop out of school can be identified as early as the primary grades. In a study of school dropouts in Boone County, West Virginia, Williams (1985) found that dropouts were absent from school many more days per year than graduates, beginning in the first grade and continuing through the eleventh grade. Lloyd (1978) established that dropouts can be predicted with a fair amount of certainty from third grade school records. The most predictive variables were retention in one or more grades, number of siblings, grade point average, and reading achievement (multiple R=.509). Stroup and Robins (1972), in a retrospective study of black children in St Louis, found that grade retentions, number of absences, involvement with the legal system, and reading achievement were good predictors of dropout status.



It is important to stress that longitudinal research on the PACE program is essential to demonstrating its cost-benefit and that this research ought to be undertaken. In the shorter-term a research strategy that evaluates the impact of PACE on children in the primary school grades will provide appropriate measures of the program's benefits. Follow-up of children on these measures has already begun and should continue, but follow-up of the children and their parents without the use of a control group will not provide a valid measure of the program's performance or a basis for estimation of program cost-benefit.

A demonstration of PACE's effectiveness must show that outcomes occur that would not occur if the same individuals were not involved in PACE. This requires that we have a comparison of the success in education of children similar to PACE children who do not attend PACE.

An attractive approach is Campbell and Stanley's (1963) "nonequivalent control group" design which assembles a control group on the basis of some assumption about their similarity to the experimental group. The PACE program allows the creation of this type of group because of the available measured information. Each of the PACE participants in the 1987 Kim study completed the PACE participant questionnaire which includes quite a bit of demographic information, and all PACE participants could be pre- and posttested using the Tests of Adult Basic Education (TABE) as are all ABE students. Administration of the PACE questionnaire to non-PACE ABE participants would give enough data along with TABE information to demonstrate the similarity of a control group of adults to the PACE adults. Use of similar measures of

children's preprogram performance would demonstrate the similarity of a group of children enrolled in some other non-PACE early childhood program, and children who attend no EC program, to PACE children.

The PACE program introduced the following factors which might have caused a program effect:

1. the nonspecific effect of attention from helping persons;
2. the effect of Adult Basic Education instruction;
3. the nonspecific effect of child care;
4. the general effect of early childhood education;
5. the effect of the High/Scope materials;
6. the effect of training in parenting skills;
7. the effect of providing transportation;
8. the effect of recruitment and selection;
9. the effect of simultaneous services to parents and children;
10. the effect of teaching and management strategies at specific program sites;
11. interaction effects among all of the above.

A pure research design could sort-out the effects of all of these but would be very expensive and might not even be possible. Constructing all of the groups with enough subjects to completely cross all of these effects would involve an enormous number of participants.

Our inability to perform a methodologically flawless design should not deter us from performing as good an evaluation as circumstances will allow. A first step in an adequate evaluation study is the construction of an explaratory causal model of PACE services (Bryk & Raudenbush, 1988). This model would assure that we had been thorough in our design of evaluation components and would allow us to design mathematical models that have the greatest explanatory power for the amount of money and effort expended.

The following is proposed as a general strategy to be elaborated after a causal model has been developed:

A. Use a nonequivalent control group design to test the main effect -- i.e., whether the PACE model without consideration of the specific causes improves the educational performance of disadvantaged children and whether it gets results equal or superior to other programs available to its clientele. Estimate cost-benefit and cost-efficiency on the basis of this study.

B. Use smaller studies to test the simple effects of some of the components of the program, such as child care and transportation.

To evaluate the PACE program we should test the following hypotheses:

H1: Positive changes in parental basic skills will improve children's school performance.

A test of this hypothesis requires that there be pre- and posttest measures of basic skills for adult PACE participants. Its proof requires that positive changes in basic skills be associated with changes in children's school performance. It is not necessary to show that the PACE program is more effective than other interventions that improve parents' basic skills, but it is necessary to show that children of parents whose basic skills improve make better educational progress than similar children whose parents' basic skills do not improve.

H2: Parental modeling of positive attitudes and behaviors about education will improve children's educational performance.

Direct measurement of parental modeling of attitudes and behaviors requires observational assessment on several occasions. The PACE program defines obtaining a GED as modeling behavior but this is really just an indicator that an attitudinal change has already occurred. Direct ecological measurement of attitudinal change -- as opposed to indirect measurement of an indicator like getting a GED -- is not excessively expensive or difficult. Kim clearly had some sort of direct measurement of this kind of behavior in mind when she asked parents how often they read to their children. Some studies of early childhood programs have actually measured this type of behavior in the participants' homes (Jensen, 1969; Lally, Mangione, and Honig, 1987). Comparison of the differential performance of otherwise similar children whose parents did or did not obtain a GED should partially evaluate this hypothesis, but the addition of ecological measures would improve the evaluation. At minimum, it would be possible to collect observations of parent and child interactions during PACE

sessions. If there is a differential effect for children of PACE participants versus those of equivalent ABE participants then the superiority of the PACE model has been established.

H3: Positive changes in parenting skills will improve children's educational performance.

Parenting skills training is nested in PACE/ABE participation status. ABE programs do not teach parenting skills and it is doubtful that a nonequivalent control group of individuals who have had this service from some outside source could be easily assembled. PACE might conduct a small study that trains non-PACE ABE participants in parenting skills. ABE students who were not taught these skills would be essential as a non-treatment control group.

It is important that we develop a model of what particular parenting skills are to be evaluated and improved before we begin a test of this hypothesis. This was a serious defect in the previous studies' approach in this area. The literature review above should give us a good description of those parental behaviors that are important for child educational achievement.

H4: For children for whom it is an appropriate alternative, early childhood education within a family literacy program will be a more effective alternative than other programs intended to improve the educational performance of children.

Some early childhood education programs have been shown to reduce dropout risk and to improve all of the factors that predict school dropout. Early childhood services are available from a number of programs including Headstart, the Office of Education for Exceptional Children, local Mental Health-Mental Retardation Boards, and private organizations. Part of the process of demonstrating the cost-benefit of PACE is demonstrating that for those children for whom it is appropriate, PACE works better. This requires two control groups of children who are similar to PACE children. One group should receive some other type of early childhood education and the other group should receive both early childhood and have parents who are receiving ABE services.

It would be helpful in general to enumerate the number of alternatives available to PACE children before making these comparisons. It also is very important to establish exactly which population and exactly what gaols are equivalent across these programs.

H5: Services delivered during a critical preschool time period will have a long-term effect on an individual's school performance.

Evaluation of the PACE program must include evaluation of this hypothesis and the one that follows. PACE treatment occurs only when children are in a narrow age range, which implies that the effect of services is likely to be greatest when provided to a child in this range. We must eliminate competing hypotheses relating to the age and duration of remediation if this key element of the PACE prevention/remediation model is to be evaluated. Comparing the performance of PACE children to a nonequivalent control group of children who received learning skill remediation (preferably with the High/Scope materials) at a different age would evaluate this hypothesis.

H6: A combination of services provided simultaneously to parents and children will be more effective than the presentation of the same services separately by different service providers on different occasions.

This hypothesis allows us to test the effect of child care, transportation, and joint parent-child interaction and learning and ideally would involve the evaluation of the interaction effect as well, i.e., would involve examining groups who had these services separately and in combination. I doubt that it would be possible for us to conduct this ideal test since it is unlikely that parents of young children could attend basic education programs at all without some form of transportation and child care. However we could test the simple effect of child care provided by the PACE program compared to child care obtained independently by participants of ABE programs, crossed with transportation and joint parent/child learning. We could also evaluate the effect of in-home vs. school-based services.

H7: Mothers who participate in PACE projects will increase the amount of time they spend doing the following and will continue these behaviors after program completion:

reading to their children;

directly involving themselves in school activities;

talking with/listening to children.

Assessing this requires pre- and posttest measures of parents' behaviors in these areas. Kim attempted to measure these with questionnaires with at best equivocal results. Actual measurement of the behaviors is possible and would be helpful.

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Appendix A

A note about the use of change scores

Educational programs frequently use the difference between pre- and posttest scores as a measure of program performance. These "change scores" have intuitive appeal as indicators of how much gain has been made by students. They should not be interpreted without caution, however, because of a couple of problems.

Change scores by their nature are unreliable, and the amount of unreliability is directly related to the strength of the relationship between the pre- and posttest scores (Cronbach, 1970; Linn, 1988). As aggregate measures of program performance they are acceptable, but as measures of the gains made by individuals they should be viewed with caution.

There is a more serious problem with change scores in the PACE program. Table 8 shows the crosstabluation of reason for program exit with whether or not posttest reading scores were on an individual's file in the Adult Education database. This table resulted in a chi-square statistic of 46.48. With 2 degrees of freedom, this is significant at the .001 level. The implications of this result are that an individual who exits unsuccessfully from the PACE program is less likely to have his or her scores represented in the database. This implies that the mean posttest scores are probably biased upwards, since individuals who leave before program completion can be expected to have learned less than individuals who completed the program.

Table 8.

Exit reason	reading score present	reading score absent
Achieved goals	71	26
End of program year	52	76
noncompletion	17	