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ABSTRACT

The paper presents an evaluation design for measuring the effectiveness of special education programs for handicapped preschoolers. Reasons for not selecting traditional evaluation designs are noted, and the use of a "change-index" is supported instead. A value-added analysis was selected to determine the value added by the program beyond that which would have been expected (due to maturation) without the program. Factors such as sex, race/ethnic group, handicapping condition, and family income were also taken into account. Analyses of child characteristics and program characteristics (center or home-based, occupational, speech, and physical therapy, and attendance) are underway and will be completed using multiple regression techniques. An appended chart lists steps in the value-added analysis. (CL)

APPROACH OF THE PRESCHOOL EVALUATION PROJECT TO MEASURING THE EFFECTIVENESS OF EARLY INTERVENTION[1]

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The purpose of this part of our presentation is to describe the approach we have selected to answering questions about the effectiveness of special education programs for handicapped preschoolers. Program evaluation in many people's minds translates to examining the impact of the program on the participants. The narrowness of this view has been justifiably criticized by those who feel the meaning of the phrase should be expanded to include other kinds of information collecting efforts such as needs assessments or an examination of a program's progress toward its objective (Sheehan & Gallagher, 1983). These other kinds of information can be very helpful to program administrators and service providers who want to improve their program. Unfortunately, when funding decisions are being made about programs for preschool handicapped children, program evaluation does reduce to that one narrow question:

> Do programs and services have a positive effect on those children who receive them?

This project is funded by the Maryland State Department of Education and, while the state is interested in learning any number of interesting things about programs for preschool handicapped children, the information most needed is data for the state legislature. Maryland is one of the few states that mandates special education services from birth, and one gets the impression that the continued existence of the mandate is always in jeopardy. The purpose of the project then was to provide the state with data on the efficacy of early intervention with handicapped children from birth through six.

Determining Effectiveness

There are a number of possible approaches to determining program effectiveness. One approach, a textbook approach in that sense that it meets all the methodological criteria for a good evaluation, is to begin with a sizable group of children, randomly assign some to one or more treatments/programs and give no treatment to the remainder. Obviously, the existence of a control group in a state which mandates services from birth is legally, not to mention ethically, out of the question.

A second approach provides everyone with services but randomly assigns children to different groups so relative amounts of growth can be compared across the groups. This approach is also legally inconsistent with placing children in programs most appropriate to their needs.

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[1] Paper presented at the Council for Exceptional Children Convention, Anaheim, California, April 1985.

What we had for the makings of our evaluation was the preschool handicapped population of Montgomery County. The county serves approximately 600 such children in a variety of program and service arrangements including center and home-based services; categorical private and public programs for a variety of handicapping conditions such as language delays or visual impairments; and itinerant speech services for children with mild speech or language delays. The children were placed in their programs according to the county's placements procedures, and it was our task to determine whether or not those programs had a positive impact on the children's development. Given that we could not do the most methodologically desirable kind of evaluation, we were left with several other choices. One possible approach would have been to compare the progress of the handicapped children to that of the norm group on some kind of a standardized test. This type of an evaluation makes statements like "The children made six months gain in eight months time." The first problem with this approach is deciding what amount of gain constitutes an effective program, or to state the problem another way, how much gain do you really expect the children to make? Six months gain in eight months for a severely handicapped child may be superb; six months gain for a mildly language impaired child may be the kind of progress the child was making without the program. The second problem with using a norm group as the standard of comparison is that the test's normative data was based on a group of non-handicapped children; it's applicability to measuring the growth of handicapped children is questionable.

A last approach, the approach we have selected, involves computing some kind of a "change index". Wolery and Bailey (1984) list a number of such change indices. The basic concept is to use what you know about the child from the pretest or first testing to project where the child should be functioning any number of months down the road. For example, a child who is 24 months old and functioning at the 12 month old level prior to intervention would be projected to be functioning at the 18 months old level at 36 months if all conditions stayed the same. If the child is functioning at a higher level, then the difference is attributed to the effective program. Various growth rates are indicated in Figure 1.

As Wolery (1983) points out, this kind of analysis assumes that the child's pretest age is a reflection of the child's rate of development. To the extent that rates vary and the child is pretested at a particularly "slow" time, the projected rate of growth is inaccurately low. The child may show a substantial amount of gain between pre and posttest due entirely to a developmental growth spurt. An analysis which uses a change index, however, will incorrectly attribute that growth to participating in a program. This type of situation is illustrated by the last graph in Figure 1.

Approach of the Preschool Evaluation Project

The particular type of change index we have elected for this project is called "value-added" analysis (Bryk & Weisberg, 1976; Bryk, Strenio & Weisberg, 1980). The goal of the analysis is to determine the "value-added" by the program above and beyond that which would have been without the program. The growth shown by a child between pretest and posttest is partitioned into two pieces:

- the amount of growth due to maturation
- the amount of growth due to the program.

The amount of growth due to maturation is done by projecting where the child would have been expected to score based on the results of the pretesting. The value-added method is not as prone to error due to developmental spurts because the growth rate are computed for the entire group or subgroups of children through a regression equation rather than for each child individually through the use of a ratio. I have outlined the technical steps involved in Figure 2 of your handouts. I will very briefly go through those steps. It is a complicated statistical procedure but it is also understandable even without a background in statistics.

The particular analysis that we are using with the project is slightly more complicated that presented above because in Step 1 we incorporated a number of other factors we hypothesized might be related to developmental growth in our population. These factors were:

- sex
- race/ethnic group (white, black, Hispanic and other)
- handicapping condition (speech and language impaired, multi-handicapped, other)
- family income (low income, not low income)

Based on their pretests score, the analysis calculated a different growth rate for children who differed on these characteristics. For example, a black, speech and language impaired male from a non-low income family had a different growth rate from a white, multi-handicapped female from a low income family.

The value-added approach allows us to determine the extent of gain due to program participation in each domain of the BDI for the 123 children with complete data. The amount of gain in each domain was then tested to see is it was significantly different from 0. I'm not able to share the results of this analysis with you because the report has not yet gone to our Board of Education. Furthermore, I want you to know that we are interpreting our first year results very cautiously because the average amount of time between our pre and posttest was only 4.5 months. The second round of posttesting with these children will take place at the end of this school year and these results should be considerably more meaningful.

What Factors are Associated with Program Gains?

Our analyses did not stop with asking were there gains due to program pariticpation. We also sought to determine which children and which program factors were associated with the largest amount of gain due to program participation. The initial model we are exploring is represented in Figure 3 of your handouts. The child characteristics being examined are:

- sex
- race/ethnic group
- family income
- age
- handicapping condition

The program characteristics are:

- o center or home-based mode of delivery
- o number of minutes in program
- o amount of speech therapy
- o amount of physical therapy
- o amount of occupational therapy
- o attendance

These analyses will be able to answer questions like "did boys make more progress in programs than girls?" or "was the amount of gain in expressive language due do program participation related to the amount of speech therapy received?" This analysis involves the use of multiple regression with the "value-added" as the dependent variable and the factors listed above as independent variables. Unfortunately, I cannot share the results with you but even if I could I would have to warn you that they are based on a very short amount of time in program. The data we are about to collect at the end of this year will be considerably more helpful in answering these questions.

One extremely important feature of the model which is missing is detailed information on what is actually happening in classrooms with the children. For instance, indicators such as the amount of time the child is working with an adult, with other children, or alone would be most helpful in exploring the relationship between gains and services. Detailed information about service provision is omitted from the model because the only way to get this kind of information is through classroom observations which are very costly data to collect. As important as such information may be to explaining progress, there was simply no way we could afford to collect it.

Conclusion

In closing the topic of our approach to effectiveness, I would like to remind everyone that this type of an evaluation design is far from perfect. As you may have noticed, the type of approach we have been forced to use is light years away from a control group, random assignment design. The literature in this area has often criticized evaluations of programs for handicapped preschoolers have many serious methodological flaws (Tindal, 1985; White, Mastropieri & Castro, 1984). The many problems of past evaluations demonstrate that it is very difficult to do a good evaluation this area. Possibly, it is time to recognize that the old notions about program evaluation do not hold for this populations -- or at least, they don't hold at this particular point in time and right now happens to be when those holding the purse strings are asking the questions. One solution is not to do evaluations at all if all the criteria for a tight evaluation cannot be met; such a solution will hardly be satisfying decision-makers. Another solution, as suggested by Strain (1984) is to shift the focus of the question from "is intervention effective?" to "what is the optimum level of change possible?" Our solution is to try at some level to answer both of those questions. We want to know whether the children have shown more growth than they would have without the program, but we also want to know the conditions under which children show the most growth.

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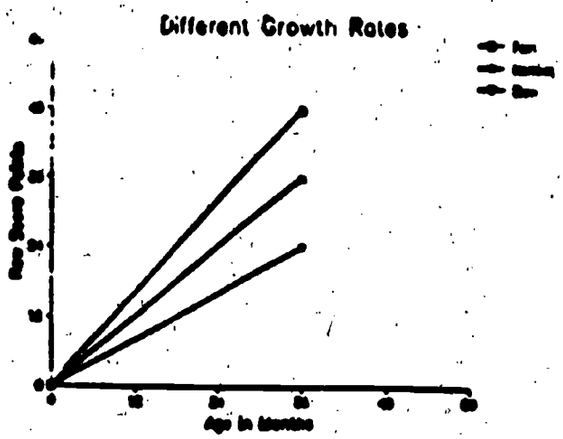
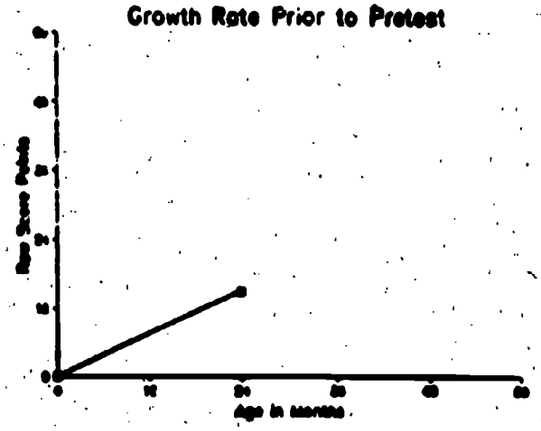
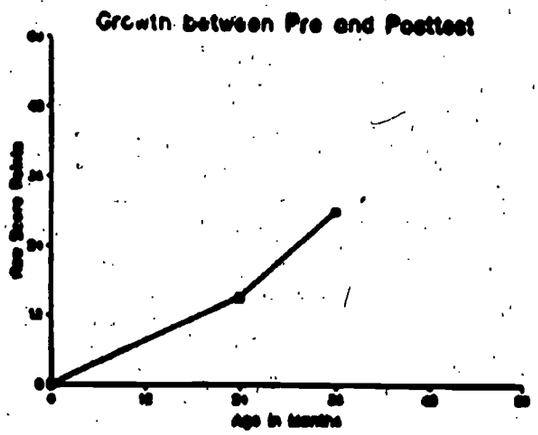
FIGURE 1







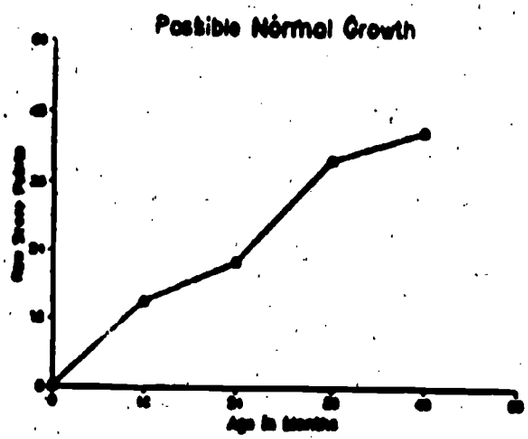
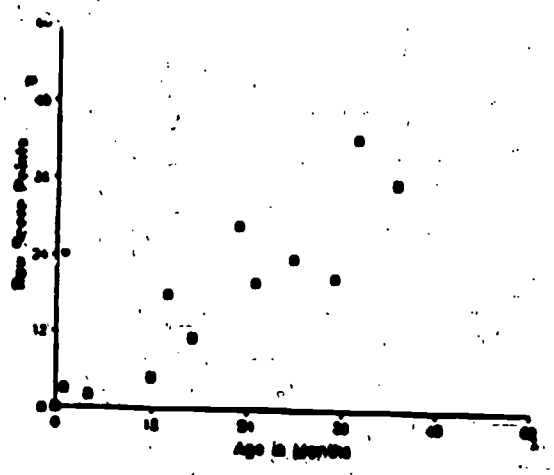


FIGURE 2

Steps in Value-Added Analysis

Progress = Growth due to maturation + growth due to program participation

Step	Example
1. Regress pretest on age.	Pretest = .8 Age
	
2. Use coefficient from the regression as the growth rate prior to pretest.	Coefficient = .8
3. Multiply rate by the amount of time in program to determine the amount of growth due to maturation.	.8 x 10 months = 8 points
4. Subtract pretest from posttest to determine the total amount of growth.	36 - 24 = 12
5. Subtract growth due to maturation from total growth to determine growth due to program participation.	12 - 8 = 4 points

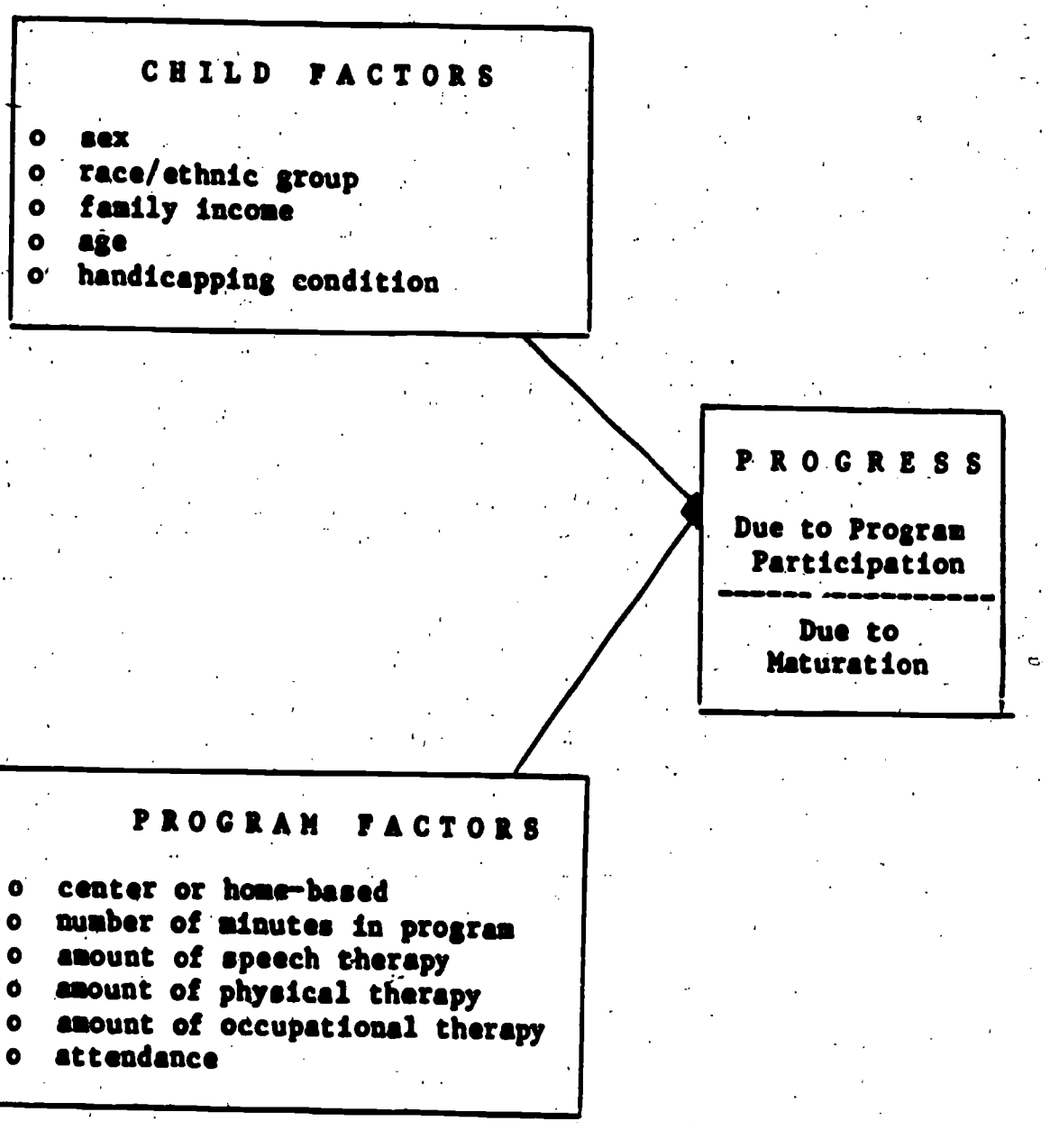
Growth due to program participation = 4 points

Computing Coefficients for Different Groups

1. Regress pretest on age, sex, race, handicapping condition, family income	Pretest = .8Age -.3Multi-handicapped + .1Male...
2. Use "corrected coefficient" which depends on child's characteristics.	$Coefficient_{MHmale}$ = .8 - .3 + .1 = .6
	$Coefficient_{MHfmale}$ = .8 - .3 - .1 = .5
Continue as above.	

FIGURE 3

What Factors Are Associated with Gains
Due to Program Participation
for Handicapped Preschoolers?



PROGRESS = Growth between pretest and posttest

= Gains due to program participation + gains due to maturation