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ABSTRACT

A meta-analysis including nine samples of mothers in home visiting programs (N=1,600) examined differences in the effects of home visitor programs on maternal behavior. Although effect sizes varied, programs with more frequent visitation had higher success rates. This dosage effect explained all of the variance in effect sizes. Other significant variables included number of participants, type of administrative organization, and year of study publication. Specifically, larger sample sizes predicted lower effect sizes. University programs were more successful than programs administered by nonprofits or government agencies. Studies conducted more recently had lower effect sizes. However, this last finding reflected the occurrence of less frequent visitation in later studies. The correlation between frequency of visitation and the year of the study was strong. (Contains 19 references.) (Author/EV)

A Meta-Analysis of Home Visitor Programs: Moderators of Improvements in Maternal Behavior

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Abstract. A meta-analysis including nine samples of mothers in home visiting programs (N = 1600) examined differences in the effects of home visitor programs on maternal behavior. Although effect sizes varied, programs with more frequent visitation had higher success rates. This dosage effect explained all of the variance in effect sizes ($Q = 19.01$, $df = 1$, $p < .0001$). Other significant variables included number of participants, type of administrative organization, and year of study publication. Specifically, larger sample sizes predicted lower effect sizes ($Q = 4.61$, $df = 1$, $p < .005$). University programs were more successful than programs administered by nonprofits or government agencies ($Q = 8.25$, $df = 1$, $p < .005$). Studies conducted more recently had lower effect sizes ($Q = 7.96$, $df = 1$, $p < .005$). However, this last finding reflected the occurrence of less frequent visitation in later studies. The correlation between frequency of visitation and the year of the study was strong ($r = -.86$)

A Meta-Analysis of Home Visitor Programs:

Moderators of Improvements in Maternal Behavior

Early intervention programs for families in poverty were established in the 1960s following the Supreme Court desegregation case affirming all children's right to an adequate education (Ramey & Ramey, 1998). Children who lived in poverty were determined to be at-risk for school failure due to social problems that often accompany poverty, such as parental illiteracy and family isolation (Schorr, 1988). Family support programs and other early intervention programs, such as Head Start, attempted to encourage cognitive development of young children in poverty. Evaluations of center-based and home visiting family support programs followed their development. This paper presents a meta-analysis of the home visiting evaluation literature and correlates of program effectiveness.

Two areas of focus among family support programs have been identified: mental health prevention and early childhood education (Durlak & Wells, 1997). Programs designed to improve children's mental health are aimed at preventing child abuse, children's mental illness, or juvenile criminal behavior. Educational interventions have been designed exclusively to affect academic outcome and are generally reviewed separately from programs aimed at mental health prevention. These different models of intervention have overlapping effects in two primary early childhood outcomes: socio-emotional and cognitive competence (Cowen, 1997). For example, the Perry Preschool

Project, which was originally designed to increase academic achivement, showed long-term effects of reducing negative socio-political outcomes, such as criminal behavior and welfare receipt (Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984). In keeping with this finding, home visiting programs may evaluate changes in parenting that affect both social-emotional and cognitive development. Improvements in maternal sensitivity serve as an indicator of changes in behavior that impact children's later social-emotional skills; improvements in the level of academic stimulation in the home serve as an indicator of changes in parental behavior that impact children's later academic aptitude.

Effects of home visiting programs may vary depending on the characteristics of the program. A narrative review of 31 home visiting program evaluations suggests that the frequency of home visits determines the size of effect (Olds & Kitzman, 1993). We reviewed the home visiting evaluation literature using meta-analytic techniques in order to quantify the effect of frequency of home visits and to examine other moderators of effect size. Three other moderators were of interest: size of program, type of administration, and date of study. Theoretically, larger home visitor programs may not have concentrated as many resources on individual participants. As programs expand in size, the original program direction may change course. Pilot studies run by universities in the early years of evaluation research may have achieved superior results because of their focus on a smaller group of participants, the quality of home visitor supervision, improved training of home visitors, or their high frequency of visitation.

Methodology

A search of the ERIC, Social Work Abstracts, and PsychLit yielded 93 articles. The keywords were 'family support programs,' or 'early intervention programs,' and 'not handicapped.' An initial search of the literature using keywords 'family support programs' or 'early intervention programs' and not 'handicapped' yielded 93 studies. An additional 9 studies from our files were also included for inspection. These 102 studies were reduced to 7 studies, including 9 different groups of participants (N = 1600). Criteria for exclusion from the study were: a pre-test/post-test study design, a center-based approach in addition to or instead of a home visitor model, program location outside of the United States, and programs for handicapped children. The effect size for this initial meta-analysis represents change in maternal behavior, particularly behavior that directly impacts the child's development.

Twenty-four items were included in the two coding sheets that addressed the individual study. These two pages listed study variables from three different categories: (1) basic identifying data, such as year of publication and status; (2) characteristics of subjects, such as average age of mothers; and (3) intervention characteristics, such as frequency of home visits. Regarding the frequency of home visitation, differences may arise between the intentional frequency and the actual frequency. In cases where both numbers were reported, we used the actual frequency of home visitation. Additional coding sheets for each study reported information related to calculation of effect sizes. All studies were double-coded; differences were resolved by consensus.

Measures

We identified two types of scales in these studies that directly measure maternal behavior. These two categories, which indicate maternal sensitivity or an academically stimulating home environment, were used to determine the effect sizes. It should be noted that the items within these two types of scales often address similar concepts. For example, a subscale of the HOME (Caldwell & Bradley, 1984), emotional and verbal responsivity, is basically a measure of sensitivity. Another home environment measure specific to the study contains questions about parental involvement (Jester & Guinagh, 1983). All of the home environment measures reviewed in this paper included some elements of maternal sensitivity.

When home environment and sensitivity measures were both used in the same study, we randomly selected one of the measures for inclusion in the data set. To justify random selection, we used the Q statistic, a chi-square value used in meta-analysis, to analyze differences between the two types of measures. A categorical analysis of effect sizes showed no significant difference between effect sizes from sensitivity and home environment measures ($Q_{between} = 1.76$, $df = 1$, $p < .25$). An examination of the data on an individual level indicated similar effect sizes for sensitivity and home environment within each of the three studies that used both types of measures. Given this evidence, we used both types of effect sizes from these two constructs within the meta-analysis.

Four measures acted as moderators of improvements in maternal behavior: (a) dosage, as defined by the number of visits per year, (b) number of participants, (c) date of study publication, and (d) type of administrative organization. The following section will

discuss moderating effects of these four variables and the relations among these moderators.

Results

Nine groups of participants from seven studies included a total of exactly 1600 participants. Two groups served only teen mothers. The age of child assessment ranged from one to four years. For six of the seven studies, the program lasted at least one year.

Figure 1 shows confidence interval plots of the effect sizes measuring the difference in maternal behavior between experimental and control groups. All but one of the effect sizes was positive. The study resulting in a negative effect size was somewhat different than other home visiting programs in that home visitors worked with clients on setting goals and controlling impulsivity, whereas other programs focused on parenting skills, case management, and social support. We included this program in the study because it met all other study criteria.

The confidence interval plot suggested that the studies were not homogeneous; that is, they did not share a common effect size. A chi-square test for homogeneity was significant ($Q = 29.58$, $df = 8$, $p < .005$), confirming that the studies were heterogeneous. The mean of the effect size, weighted by sample size, was 0.12, with a 95% confidence interval ranging from -.1 to .3. This confidence interval included an effect size of zero. However, these statistics are not meaningful, because the Q-statistic indicates that the fixed-effect model cannot be used in this case. The studies did not represent a single population of outcomes and should not be combined. In such cases, Hedges (1994) suggests looking for a moderating variable. Within sets of studies, certain characteristics may determine study outcomes.

A regression of effect size on home visitation frequency yielded the chi-square value of 19.02 ($df = 1$, $p < .005$). $Q_{Residual}$ (10.54, $df = 7$, $p < .025$) indicated that there was no significant residual variance. The variable of home visitation frequency explained all of the variance among effect sizes. Thus, the studies may be treated as a homogeneous set when home visitation frequency is controlled, and a synthesis of effect sizes is meaningful.

A categorical analysis indicated that effect sizes were more likely to occur when visitation frequency exceeded 30 times a year. The weighted mean for this middle category of home visitation was .29; the confidence interval (.02 to .56) did not include zero. This indicated a positive effect of home visitation on maternal behavior across all studies in this category. Effect sizes more than tripled in studies with 60 or more visits a year. The weighted mean of this category was equal to 1.14, with a confidence interval from .61 to 1.67.

Another test for significance of home visitation frequency uses the standard error of the beta from the regression equation. The standard error of b_1 is 0.002; therefore, the 95% confidence interval (.005 to .013) did not include zero. The resulting equation, $T = -.114 + .0093$ (number of visits per year), indicated that it is necessary to have more than 12 visits per year to achieve an effect size greater than zero (Figure 2). We concluded that home visitation does produce a positive effect, dependent on the level of home visitation frequency.

Other variables included in the hypotheses also proved to be significant predictors of effect size. Date of study publication ($Q = 7.96$, $df = 1$, $p < .005$), status of administrative organization ($Q = 8.25$, $df = 1$, $p < .005$), and size of sample ($Q = 4.61$, df

= 1, $p < .05$) were significant variables when entered individually. However, all of these variables left significant unexplained residual variance. These regressions show that earlier publications tended to have larger effect sizes. Government-based programs tended to have smaller effect sizes when compared with university or private programs. Programs administered through universities had the largest effect sizes. Larger programs tended to have smaller effect sizes. Adding these moderators to the model did not add significant explanation to the univariate model that included only home visitation frequency.

Intercorrelations among the moderator variables indicated that study characteristics may be confounded with frequency of visitation. It appears that programs evaluated in later studies had expanded in size. The number of participants in later studies tended to be larger than the number of participants in earlier studies ($r = .42$). Government funding may have increased the number of participants ($r = .66$), but the frequency of visitation also tended to diminish ($r = -.74$). In fact, there may be some problems with multicollinearity in a model that includes all variables. This finding is particularly interesting placed in the historical perspective of the family support movement. An analysis of early childhood interventions discussed the differences between early model programs and later government implementation (Gomby, Larner, Stevenson, Lewit, & Behrman, 1995). The intensity of early programs may have been diluted to meet fiscal constraints accompanying government funding and program expansion. Of course, substantive interventions must accompany frequent home visitation.

Limitations and Directions for Future Research

Although the our sample provided a much-needed focus on quality home visiting evaluation, it did not allow for measurement of the effects of home visitor training level or type of population. For six of the seven programs, the only educational qualification for home visitors was a high school diploma plus some training that was provided by the agency. One program's home visitors all had at least some college experience (Wagner & Clayton, 1999); however, this was not sufficient to examine differences in home visitors' educational levels.

The comparison of programs with differing levels of home visitor training is an interesting question. While higher levels of education are generally accepted as preferable, it is possible that higher education of home visitors combined with characteristics of families can have a negative effect on the success of programs. For example, in the Project Beethoven intervention involving the Robert Taylor housing project of Chicago, residents were unable to relate to college-educated home visitors (Curtis, 1995). When residents from the project were recruited for work as home visitors, outcomes of the program improved.

A few studies have indicated costs and benefits involved in home visiting programs (Olds & Kitzman, 1993). Others have listed only cost per family. The articles reviewed here did not indicate average cost; however, a cost variable in combination with other data from a broader range of studies may assist in the design of future home visitor programs. A meta-analysis including specific program characteristics, such as the level of structure within the program or the type of theoretical basis for the program, may also provide information that would be useful to practitioners. A variety of sample

characteristics may indicate that certain demographic groups benefit from family support programs than other groups. These questions have been debated in qualitative literature reviews (St. Pierre & Layzer, 1998; Yoshikawa, 1995).

In addition to future meta-analytic research, additional primary research is called for in engagement and retention of families. Our findings clearly indicate the importance of regular and frequent home visiting. Importantly, family support programs do appear to produce improvements in maternal behavior, given frequent and regular visitation by the home visitor.

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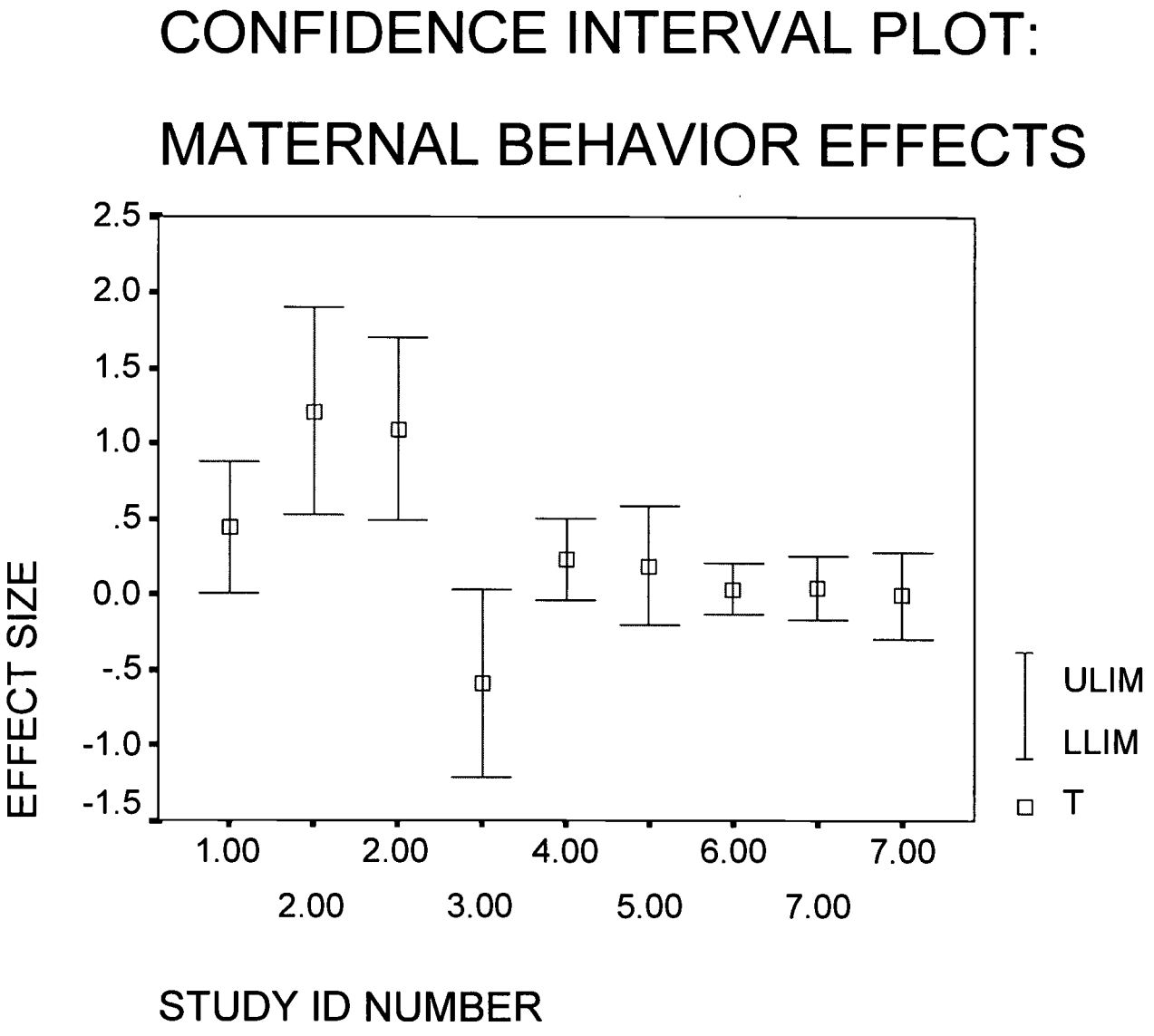

Figure 1. Confidence interval plot.

This figure suggests that effect sizes are heterogeneous.

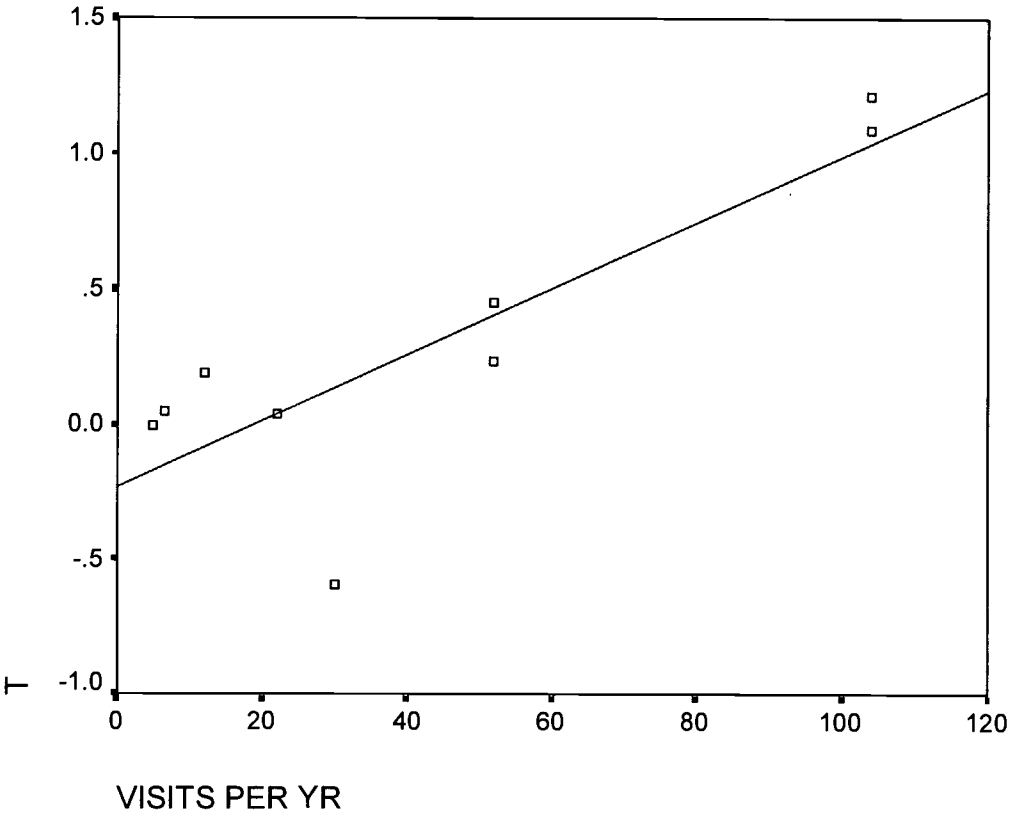

Figure 2. Visits per year vs. effect size.

This indicates that intensity of home visitation has a positive effect on program outcome.

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