# More is Better:

# A Meta-analysis of Home Visiting Programs for At-risk Families

M. Angela Nievar

University of North Texas

Laurie Van Egeren

Michigan State University

SRCD, April 8, 2005

*Abstract.* A meta-analysis of home visiting programs ($K$ = 12, $N$ = 2869) examined differences in the effects of home visitor programs for at-risk families on maternal behavior. Studies selected included only peer-reviewed publications and evaluations with a control group design. Although effect sizes varied, programs with more frequent visitation had higher success rates. Dosage, or the frequency of home visits, explained the variance in effect sizes ($Q$ = 22.87, $df$ = 1, $p < .05$). The year of study publication was not significantly related to effect size, suggesting that the potential effectiveness of home visiting has not diminished over the past two decades. Yet, historical trends indicate a dilution effect, with recent large-scale government programs tending to have lower dosage.

# A Meta-Analysis of Home Visitor Programs for At-Risk Families: 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, including an analysis of program characteristics potentially related to effectiveness.

The evaluation of home visiting interventions is interesting for two reasons. First, from an applied perspective, questions have been raised about the effectiveness of such interventions. While randomized controlled trials demonstrating effectiveness of individual programs have resulted in increased government funding, questions remain about which programs work and the reasons for success or failure (Olds & Korfmacher, 1997). Second, well-designed interventions may be viewed as experiments that test family

theories. For example, home visiting programs that succeed through involving parents in a supportive community confirm the relevance of systems theory models.

*Conceptual Basis*

Home visiting gives the provider license to observe and interact with the family in its natural setting. According to family process theory, understanding relationships between family members and between the family and the environment are essential to understanding family health (Broderick, 1993). A systems theory approach underlines the importance of the family and neighborhood interacting with the physical environment (Bubolz & Sontag, 1993). Most home visiting programs are based on ecological theory, which postulates that the child develops in a multi-faceted environment (Bronfenbrenner, 1992). Factors such as governmental family policy, neighborhood quality, income, and marital quality indirectly influence child characteristics. Programs attempt to improve indirect influences on the child by connecting the family with economic and social supports. Direct influences are addressed through parenting education, which in turn is theorized to affect the developing child by improving the parent-child relationship.

The present study is based in part on the theory of developmental contextualism (Lerner, 1991). According to Lerner, genetic endowment does not directly produce child characteristics. Child development is function of the environment, while taking into consideration certain heritable traits. Importantly, the environment changes within the individual family and also in historical context. The effectiveness of home visiting may vary between historical periods based on changing family resources and needs. For example, with the welfare-to-work program, home visitors may not be able to reach low-income mothers at home during the day. Working mothers may not be able to attend group

support programs. It may be that early childhood education enters homes through the television (e.g., Sesame Street) or the computer, decreasing the effectiveness of service delivery via an individual home visitor as technology partially serves this need. Quality child care improvement, including home visiting for family child care homes or relative care providers, may be more productive as increasing numbers of women with young children enter the workforce. Alternatively, historical changes in the home visiting programs themselves may reduce effectiveness.

*Overview of home visiting programs*

Home visiting programs for at-risk families vary in their design. They do, however, share the method of service delivery within the family home. Successful home visiting programs often have a lesson plan or curriculum aimed at improving maternal behavior that is presented on a regular basis by a trained home visitor. These lesson plans vary from a strict presentation of exercises and toys (e.g., Field, Widmayer, & Greenberg, 1982) to a more loosely constructed visit intended to refer families to services, provide social support, and model appropriate parenting (e.g., Diener, Nievar, & Wright, 2003).

One advantage of home visiting programs is the convenience of home-based service delivery (Gomby, Culross, & Behrman, 1999). Families often have difficulty engaging in intervention programs; however, the familiarity of the home environment as a setting for intervention may (a) improve participation rates, (b) give the provider more extensive knowledge of family background, and (c) achieve greater impacts with parents and children. In this respect, home visiting may be a more successful method of parent education among at-risk families than center-based services.

It is worthy of note that a meta-analysis of 81 interventions designed to improve maternal behavior found that home-based services were not significantly more effective than services received elsewhere (Bakermans-Kranenburg, van IJzendoorn, Juffer, 2002). However, this meta-analysis included multiple types of interventions ranging from intensive mother-child psychotherapy to viewing videotapes. Interventions conducted in the home had a small to medium effect size ($d$ = .29); however, not all programs in this group could be considered home visiting family support programs.

Although all home visiting programs share the service delivery setting of the home environment, they vary in their area of focus. 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.

Yet, 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, improvements in parenting attributed to home visiting may affect both social-emotional and cognitive development. Improvements in maternal sensitivity may affect children's later social-emotional skills; improvements in

the level of academic stimulation in the home may affect children's later academic competence.

Home visiting programs also vary in aspects other than program focus. Effects of home visiting programs may vary dependent on intensity, program delivery, and provider training. A narrative review of 31 home visiting program evaluations suggested that the frequency of home visits is related to the size of effect (Olds & Kitzman, 1993). An early meta-analysis of home and center-based intervention programs indicated that the level of personnel training and the level of structure within the program were significant moderators of effect size (Casto & White, 1985). However, this meta-analysis included studies with a pre-test/post-test design. Earlier evaluations frequently lacked a strong research design; later evaluations were more likely to use experimental random assignment or, more commonly, quasi-experimental comparison groups. Hence, results from this meta-analysis may be called into question under current evaluation standards.

It is important to consider the client as well as the program to understand home visiting. Ecological theory suggests that multiple levels of influence contribute to family functioning over time (Hamilton & Luster, 2003). Time is an important element of this theory; historical cohorts may respond differently to home visiting. Although it ignores the possibility of historical change, a proposed theory of client engagement includes most elements of ecological theory (McCurdy & Daro, 2001). This theory suggests that providers, families, neighborhoods, and programs form different levels of influence that contribute to client engagement in home visiting programs.

A review of the literature indicates that others have taken into consideration characteristics of providers and clients. Olds and colleagues have suggested that

professional nurse home visitors have greater success engaging clients. Yet, a study of home visiting in the Chicago projects indicated that a mismatch between college-educated home visitors and clients prohibited client engagement. A study of ethnic variations in client retention found that African American clients valued provider education while Latino clients valued parenting experience (McCurdy, Gannon, & Daro, 2003). Home visiting programs outside of the United States (e.g., Armstrong, Fraser, Dadds, & Morris, 1999) may have a wider variation of effects; client expectations, additional governmental family programs, and available family resources may vary according to culture and country.

*Methods*

This meta-analysis reviewed evaluations of home visiting in the United States. Our purpose was 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, or an actual change in historical context.

*Sample selection*

A search of ERIC, Social Work Abstracts, and PsychLit included keywords of 'family support programs,' or 'early intervention programs,' and 'not handicapped.' A hand search was made of the past three years of Family Relations. An additional 9 studies

from our files were also included for inspection. These 102 studies were reduced to 10 studies, including 12 different groups of participants (N = 2869). Only programs serving at-risk families were included. Risk may be defined as living in a high-risk neighborhood, poverty status, or teenage childbearing. While not all families in these studies lived in poverty, all authors reported that the families in their respective programs were generally low-income. 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, published without peer review, 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: (a) basic identifying data, such as year of publication, (b) characteristics of subjects, such as average age of mothers, and (c) 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 sheets examined effect size information. 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 were tested 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*

Of the 10 studies included in the meta-analysis, 12 groups of participants included a total of 2869 participants. Three groups served only teen mothers. The age of child

assessment ranged from one to four years. For 10 of the 12 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 suggests that the studies are not homogeneous; that is, they do not share a common effect size. A chi-square test for homogeneity was significant ($Q = 35.79$, $df = 1$, $p < .05$), indicating that the studies were heterogeneous. The mean of the effect size, weighted by sample size, was 0.14, with a 95% confidence interval ranging from .06 to .21. This confidence interval did not include 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. However, using this information, we can compute a random-effects variance component and perform random effects analyses. The resulting confidence interval, though somewhat wider, ranges from .02 to .22, indicating a positive effect for home visiting.

In cases of heterogeneity, it is suggested that meta-analysts look for a moderating variable to explain the variance in effect sizes (Hedges, 1994). 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 $Q = 22.87$, $df = 1$, $p < .01$. This test excluded two groups because dosage information was unavailable. $Q_{Residual}$ (14.54, df = 9) was not significant. Thus, one variable, home visitation frequency, explained all of the variance in effect size for these studies. This indicated a positive effect of home visitation on maternal behavior across all nine studies included. A visual presentation of effect sizes by frequency of visitation is displayed in Figure 2.

While two studies did not provide dosage information, both described their home visiting services as intensive. We created a sub-group including these two studies and all other programs reporting weekly or bi-weekly home visits ($k = 6$). Effect sizes within this group were not homogeneous; thus we used a random-effects model again. The weighted average of effect size for this group was .34. The 95% confidence interval ranged from .16 to .53.

Another test for significance of home visitation frequency uses the standard error of the beta from the original regression equation. The standard error of the coefficient is .003; therefore, the 95% confidence interval (.007 to .013) did not include zero. The resulting equation, T = -.11 + .01 (number of visits per year), indicated that it is necessary to have more than 11 visits per year to achieve a nonsignificant but positive effect size.

Other tested moderators included date of publication, number of participants, and nonprofit/university or government administration. These moderators did not add significance to the model. In addition, all variables left significant unexplained residual variance in individual tests. It is of interest, however, that some moderators were significant if one outlier ($z = 4.49$) was dropped from the sample. Type of program administration showed a trend towards significance. University programs were more

successful than programs administered by nonprofits or government agencies ($Q$ = 11.25, $df$ = 1, $p$ < .10). Home visiting programs with a larger number of participants also tended to be less effective ($Q$ = 10.33, $df$ = 1, $p$ < .10). However, this last finding may be confounded with less frequent visitation in larger studies. A nonsignificant but high correlation between frequency of visitation and the sample size was noted ($r$ = -.54).

Although additional moderators did not completely explain variance, relations between moderators supported the hypothesis that diminished effectiveness over time was related to dilution of program intensity rather than historical changes in family process. Government funded programs on average had the largest number of participants ($t$ = 2.88, $p$ < .05) and tended to be more recently published ($t$ = 1.93, $p$ < .10), but the frequency of visitation tended to be smaller than model programs administered through universities ($t$ = 2.24, $p$ < .10). Date of publication was negatively related to frequency of visits ($r$ = -.80, $p$ <.01).

*Discussion*

Certainly, home visiting programs for at-risk families are not created from the same mold. Programs vary in design, implementation, administration, and size. Successful home visiting programs may be located in rural or urban settings (Olds & Korfmacher, 1997). Some programs have a special focus on serving only Latinos, African Americans, or teenage mothers (e.g., Luster et al., 1996). Other programs incorporate mothers of varied ages who are from diverse cultures and largely immigrant populations (e.g., Diener, Nievar, & Wright, 2003).

Our results indicated that effects of home visiting programs are diverse also. One program had a strong negative effect on maternal behavior (Wasik, Ramey, Bryant, &

Sparling, 1990). Two studies showed no significant effects (Duggan et al., 1999; Wagner & Clayton, 1999). Yet, on average, programs were successful, even when we controlled for heterogeneity by using a random effects model. The weighted random mean of program effects ($d$ = .15) was not substantial; however, a 15% improvement in maternal behavior is certainly worth of note.

The research community has already established that early intervention does work (Shonkoff & Phillips, 2000). A recent meta-analysis confirms that interventions aimed at clinical or high-risk families are most effective (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). While universal services may be attractive due to the lack of stigma attached, it may be more productive to target at-risk families. Questions remain concerning what type of intervention works to support families in stress.

In the case of home visiting, such programs for at-risk families fell into disfavor in the late 1970's; over a decade later government funding was recommended again (Olds & Korfmacher, 1997). During this time, early intervention focused on center-based programs such as Head Start. In the defense of home visiting, research designs before the early 1980's were often inadequate and programs were not always implemented properly. Although problems with design still may exist, particularly among self-evaluated, under-funded programs, current access to multiple peer-reviewed publications allows us to draw some tentative conclusions.

We found that home visiting for low-income families does work; however, programs with infrequent visitation may not be as successful. Program effectiveness was more than double among programs that either described their services as intensive or reported visiting families at least weekly. Studies of more recent home visiting

interventions were more likely to report lower dosage; however, two later interventions reported both intensive services and positive results (Cole, Kitzman, Olds, & Sidora, 1997; Heinicke et al., 1999). Relations between moderators indicated trends toward state-run government programs with larger numbers of participants but fewer services. Thus, perceived historical changes in the effectiveness of home visiting programs are likely to be caused by changes in program delivery rather than changes in the way families are. Although the way that families live changes with time, successful home visiting programs continue to publish results.

Our findings are particularly interesting placed in the historical perspective of the family support movement for low-income families. 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.

Yet, preliminary results from an Early Head Start demonstration site that exclusively used a home visiting model show promise (Schiffman et al., 2004). This relatively new government program combined quality home visits with intensive services. A government-university partnership incorporated a quality curriculum and professionally trained home visitors with federal oversight, bringing together the best of both worlds.

*Limitations and Directions for Future Research*

Although our sample of studies 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. In seven of the programs, the only educational qualification

for home visitors was a high school diploma plus some training that was provided by the agency. Two programs had home visitors with professional qualifications; only one had dosage information (Heinicke et al., 1999). This was not sufficient to examine differences in effectiveness related to home visitors' educational levels. Although we were not able to test this question empirically, it is worthy of note that positive effects were achieved with mostly paraprofessionals.

While higher levels of home visitor education are generally considered 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. Certain demographic groups may benefit more from home visiting programs than other groups (McCurdy, Gannon, & Daro, 2003). These questions have been discussed in qualitative literature reviews (St. Pierre & Layzer,

1998; Yoshikawa, 1995). Ideally, evaluation design and reporting will continue to improve to allow for an empirical review of multiple studies.

Although large randomized study designs may be able to answer these questions more definitively (LeLorier, Gregoire, Benhaddad, Lapierre, & Derderian, 1997), a large-scale randomized clinical trial of home visiting services with several different study designs is unlikely to occur in the near future. In fact, randomized studies are relatively rare in this literature with the exception of work by Olds and colleagues (Olds & Korfmacher, 1997). It is difficult for nonprofit agencies and government programs to deny services to half of the eligible families in order to examine study effects. Large studies with randomized designs are often plagued by high amounts of attrition, particularly in the control group. Thus, meta-analysis may be the preferred method of determining future directions for family support programs.

*Conclusion*

Our findings clearly indicate the importance of dosage in home visiting programs for low-income families. On average, such programs do appear to produce improvements in maternal behavior, given frequent and regular visitation by the home visitor. Of course, substantive interventions must accompany frequent home visitation. In support of a systems theory model, home visiting programs that add access to resources, social support, and parent education to families appear to improve parental effectiveness. We conclude that home visiting for low-income families is a beneficial intervention, improving the environment of children's development.

It is also important to note that diminishing effect sizes over time appear to be related to changes in program intensity rather than family changes. Yet, future meta-

analyses may find changes related to broader historical context, as published studies showing post-welfare reform results begin to accumulate. With more low-income mothers in the workforce, provision of quality child care for at-risk families may be equally effective as home visiting programs.

References

*Administration for Children and Families (2002). *Making a difference in the lives of children and families: The impacts of Early Head Start programs on young children and their families.* Mathematica Policy Research, Inc.: Princeton, NJ.

Armstrong, K. L., Fraser, J. A., Dadds, M. R., & Morris, J. (1999). A randomized, controlled trial of nurse home visiting to vulnerable families with newborns. *Journal of Paedeatric Child Health, 35,* 237-244.

Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological Bulletin, 129,* 195-215.

Berrueta-Clement, J. R., Schweinhart, L. J., Barnett, W. S., Epstein, A. S., & Weikart, D. P. (1984). *Changed lives: The effects of the Perry Preschool program on youths through age 19.* Ypsilanti, MI: High/Scope Press.

Broderick, C. (1993). *Understanding family process.* Newbury Park, CA: Sage.

Bronfenbrenner, U. (1992). Ecological systems theory. In R. Vasta (Ed.*), Six theories of child development* (pp. 187-249). London: Jessica Kingsley Publishers, Ltd.

Bubolz, M. M., & Sontag, M. S. (1993). Human ecology theory. In P. G. Boss, W. J. Doherty, R. LaRossa, W. R. Schumm, and S. K. Steinmetz (Eds.), *Sourcebook of family theories and methods: A contextual approach* (pp. 419-448). New York: Plenum.

Caldwell, B. M., & Bradley, R. H. (1984). *The Home Observation for the Measurement of the Environment.* Little Rock, AK: University of Arkansas at Little Rock.

Casto, G., & White, K. R. (1985). The efficacy of early intervention programs with environmentally at-risk infants. *Journal of Children in Contemporary Society, 17,* 37-50.

*Cole, R., Kitzman, H., Olds, D., & Sidora, K. (1998). Family context as a moderator of program effects in prenatal and early childhood home visitation. *Journal of Community Psychology, 26,* 37-48.

Cowen, E. L. (1997) The coming of age of primary prevention: Comments on Durlak and Wells's meta-analysis. *American Journal of Community Psychology, 25,* 153-167.

Curtis, L. (1995). Nurturing children and their schools. In Families International, Inc., *The State of Families: Family, Employment and Reconstruction: Policy based on what works.* New York: Families International, Inc.

*Diener, M., Nievar, M. A., & Wright, C. (2003). Attachment security between disadvantaged young children and their mothers: Associations with maternal, child and contextual characteristics. *Merrill Palmer Quarterly, 49,* 154-182.

*Duggan, A. K., McFarlane, E. C., Windham, A. M., Rohde, C. A., Salkever, D. S., Fuddy, L., Rosenberg, L. A., Buchbinder, S. B., & Sia, C. C. J. (1999). Evaluation of Hawaii's Healthy Start Program. *Future of Children, 9,* 66-90.

Durlak, J. A., & Wells, A. M. (1997). Primary prevention mental health programs for children and adolescents: A meta-analytic review. *American Journal of Community Psychology, 25,* 115-152.

*Field, T., Widmayer, S., Greenberg, R., & Stoller, S. (1982). Effects of parent training on teenage mothers and their infants. *Pediatrics, 69,* 703-707.

Gomby, D., Culross, P., & Behrman, R. (1999). Home visiting: Recent program evaluations—Analysis and recommendations. *The Future of Children, 9,* 4-26.

Gomby, D. S., Larner, M. B., Stevenson, C. S., Lewit, E. M., & Behrman, R. E. (1995). Long-term outcomes of early childhood programs: Analysis and recommendations. *Future of Children, 5,* 6-24.

Hamilton, S. & Luster, T. (2003). Ecological systems theory. In J. M. Miller, R. M. Lerner, L. B. Schiamberg, Anderson (Eds). *Human ecology: An encyclopedia of children, families, communities, and environments.* Santa Barbara, CA: ABC-Clio.

Hedges, L. (1994). Fixed effect models. In H. Cooper & L. V. Hedges (Eds.) *The Handbook of Research Synthesis.* Russell Sage Foundation: New York.

*Heinicke, C. M., Fineman, N. R., Ruth, G., Recchia, S. L., Guthrie, D., & Rodning, C. (1999). Relationship-based intervention with at-risk mothers: Outcome in the first year of life. *Infant Mental Health Journal, 20,* 349-374.

*Huxley, P., & Warner, R. (1993). Primary prevention of parenting dysfunction in high-risk cases. *American Journal of Orthpsychiatry, 63,* 582-588.

*Jester, R. E., & Guinagh, B. J. (1983). The Gordon Parent Education Infant and Toddler Program. In Consortium of Longitudinal Studies (Ed.), *As the twig is bent . . . Lasting effects of preschool programs.* Hillsdale, NJ: Lawrence Erlbaum.

LeLorier, J., Gregoire, G., Benhaddad, A., Lapierre, J., & Derderian, F. (1997). Discrepancies between meta-analyses and subsequent large randomized, controlled trials. *New England Journal of Medicine, 337,* 536-542.

Lerner, R. (1991). Changing organism-context relations as the basic process of development: A developmental contextual perspective. *Developmental Psychology, 22,* 27-32.

*Levenstein, P., O'Hara, J., & Madden, J. (1983). The Mother-Child Home Program of the Verbal-Interaction Project. In Consortium of Longitudinal Studies (Ed.), *As the twig is bent . . . Lasting effects of preschool programs.* Hillsdale, NJ: Lawrence Erlbaum.

*Luster, T., Perlstadt, H., McKinney, M., Sims, K., & Juang, L. (1996). The effects of a family support program and other factors on the home environments provided by adolescent mothers. *Family Relations, 45,* 255-264.

McCurdy, K., & Daro, D. (2001). Parent involvement in family support programs: An integrated theory. *Family Relations, 50,* 113-121.

McCurdy, K., Gannon, R. A., & Daro, D. (2003). Participation patterns in home-based family support programs: Ethnic variations. *Family Relations, 52,* 3-11.

Olds, D., & Kitzman, H. (1993). Review of research on home visiting for pregnant women and parents of young children. *The Future of Children, 3,* 54-89.

Olds, D., & Korfmacher, J. (1997). The evolution of a program of research on prenatal and early childhood home visitation: Special issue introduction. *Journal of Community Psychology, 25,* 1-7.

Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist, 53,* 109-120.

Schiffman, R. F., McKelvey, L. M., Reischl, T. M., Fitzgerald, H. E., Nievar, M. A., Gu, L., Hawver, M., Cunningham-DeLuca, M. (2004, June). *Examining outcomes of an Early Head Start program.* To be presented at Head Start's Seventh Annual Research Conference. Washington, DC.

Schorr, L. (1988) *Within our reach: Breaking the cycle of disadvantage.* New York: Doubleday.

Shonkoff, J. P. & Phillips, D. A. (2000). *From neurons to neighborhoods: the science of early childhood development.* Washington, DC: National Academy Press.

St. Pierre, R. G., & Layzer, J. I. (1998). Improving the life chances of children in poverty: Assumptions and what we have learned. *Social policy report: Society for Research in Child Development.* 12:4.

*Wagner, M. M., & Clayton, S. L. (1999). The parents as teachers program: Results from two demonstrations. *The Future of Children, 9,* 91-115.

*Wasik, B. H., Ramey, C. T., Bryant, D. M., & Sparling, J. J. (1990). A longitudinal study of two early intervention strategies: Project CARE. *Child Development, 61,* 1682-96.

Yoshikawa, H. (1995).Long-term effects of early childhood programs on social outcomes and delinquency. *The Future of Children, 5,* 51-75.

---

*Articles used in meta-analysis.

Figure 1. Confidence interval plot of heterogeneous effect sizes.

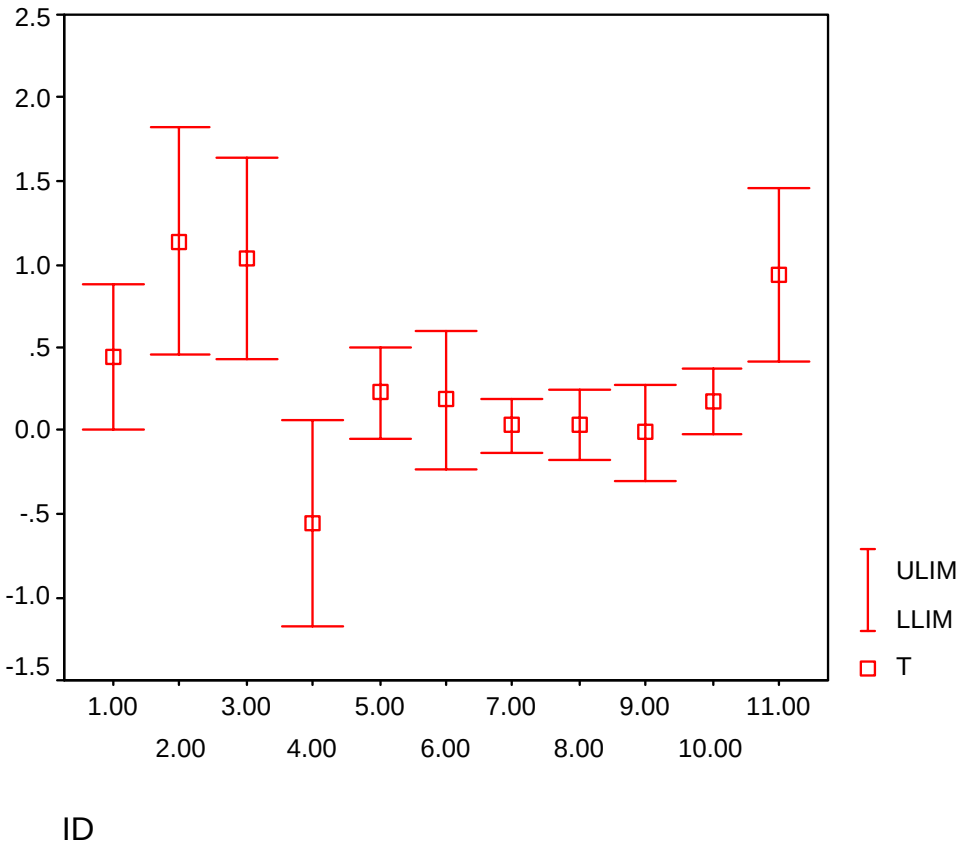

Figure 2. Effect size by frequency of visits.