FOLLOWING CHILDREN OVER TIME:
CHILD DEVELOPMENT AND ITS LINKAGES WITH FAMILY SOCIAL AND ECONOMIC TRANSITIONS

Paula C. Baker and Frank L. Mott[1]

ABSTRACT

Using data from the NLSY Child surveys, this paper explores how family poverty and maternal employment are linked to changes in childrens' cognitive and behavioral outcomes. The analyses employ a change score approach to first assess short-term changes in child outcomes between two successive data points (1986 to 1988 or 1988 to 1990) and levels of family conditions in that interval, controlling for prior individual and family attributes. Results are then provided for a longer period over three survey points from 1986-1990 which suggest that cognitive and socioemotional change for children can vary, depending on the duration of time between base and end point as well as other factors such as the child's race and maturational level.

KEY WORDS: Child assessment, Family change, Change scores

1. INTRODUCTION

In an effort to explore the relationship between family conditions and child outcomes, this paper examines how family socioeconomic factors are associated with changes in childrens behavior and their performance on standard mathematics and reading achievement tests. Many studies have established the importance of parental attributes in the development of a child's intellect, both through the effects of differential parenting traits and varying ability to provide the requisite foundations for learning. Recent evidence suggests that a family's ability to offer economic security and a home environment characterized by appropriate levels of cognitive stimulation and emotional support differentially affect the way children perform in school and acquire social skills (Parcel and Menaghan, 1990).

While other researchers have looked at the associations between family attributes and child outcome levels, few have explored the extent to which family conditions are linked with changes in child well-being. The National Longitudinal Surveys of Youth (NLSY) and its linked child assessment information offer unique opportunities to explore connections over time between family and maternal traits and child development. The NLSY contains repeated measures of child cognition and socioemotional well-being for a large U.S. sample of children for three points in time, 1986, 1988 and 1990. The analyses presented here first use a pooled sample to assess changes in child outcomes between two successive data points (1986 to 1988 or 1988 to 1990) and levels of socioeconomic well-being in that interval, controlling for prior family attributes. Subsequent results based on a more restricted sample over three assessment points in the 1986-1990 period suggest that cognitive and socioemotional change for children can vary, depending on the duration of time between base and end point as well as other factors such as the child's maturational level.

2. METHOD

2.1 The NLSY Child Data

The National Longitudinal Surveys of Youth (NLSY) have tracked a national sample of more than 12,000 individuals through extensive annual interviews since 1979. The cohort, about evenly divided between males and

[1]P.C. Baker and F.L. Mott, Center for Human Resource Research, 921 Chatham Lane, Suite 200, The Ohio State University, Columbus, Ohio, U.S.A., 43221-2418, pbaker@magnus.acs.ohio-state.edu.

females, is a national probability sample of the noninstitutionalized population aged 14 to 21 in the base year. It also contains oversamples of military, Hispanic, black, and economically disadvantaged white youth.[2] The NLSY has gathered comprehensive information about the employment, education, training, and family-related experiences of the respondents as they have moved from adolescence into adulthood.

Starting in 1986, the children of the female NLSY respondents have been interviewed at two-year intervals to assess their cognitive ability, socioemotional development, and home environments. The child measures vary with the ages of the children, who range in age from newborn to midteens as of the 1990 interview. Response rates have remained over 90 percent for all waves.

2.2 The Analysis Sample

The analyses incorporate two types of child samples, a pooled sample for investigating outcome transitions over a two-year period and a more restricted sample for examining child outcomes over a four-year span. The pooled sample of 2010 consists of children at least age five at the time of the 1986 or 1988 assessment and who had valid scores on all three outcome measures in 1988 or 1990. Turning to the longer time span, the restricted sample is limited to 930 children at least age five in 1986 who were interviewed at all three points in time. Since children of the disadvantaged white oversample were not assessed in 1990, they were eliminated from analyses using the restricted four-year sample.

As of 1986, the mothers in the sample were between the ages of 21 and 28, and as of 1990 they were 25 to 32 years of age. Since the children in the sample were 5 and over in 1986, their mothers were relatively young when the children were born--averaging about age 19 at birth for the black mothers and closer to 20 for their white counterparts. The mothers (and their children) do <u>not</u> represent a full cross-section of mothers and children, but more appropriately may be viewed as typifying a national sample of relatively younger mothers and their children.[3] However, these mothers are far from being population outliers; they represent very well a cross-section of mothers and their children at a point several years--at least seven at the second outcome point--past their birth.

2.3 The Measures

Three assessments that tap the cognitive and behavioral dimensions were selected from the 1986, 1988, and 1990 NLSY child data: a behavior problems scale completed by all mothers of children age four and over and two achievement tests administered to children age 5 or older. Behavior problems are measured by a 28 item mother-report scale designed to gauge the frequency and type of recent problem behaviors exhibited by the child in the three months prior to the interview. An increase in scores on this index indicates greater behavior problems. The Math and Reading Recognition subtests of the Peabody Individual Achievement Test (PIAT) were used to assess mathematics and oral reading ability. The difference in percentile scores on these tests between the two assessment points was used to measure change in cognitive achievement. Increases on the two PIAT's indicate improvement in cognition. Noncompletion rates for all three outcomes ranged between 10 and 15 percent, depending on the child's age and race/ethnicity (Baker and Mott, 1989).

The NLSY Child dataset contains several measures useful for operationalizing the kinds of socioeconomic and maternal employment factors that are postulated to affect childrens outcomes. Table 1 lists these key determinants as well as the antecedents and basepoint factors that are used as controls to account for child characteristics, maternal traits, and other contemporaneous family attributes.

Change in family poverty is measured by averaging poverty levels over the span of time between the assessment points. The variable is a ratio of the family unit's total income to the officially established poverty level, defined as minimum need for a family, based on the family's size and age of household head. The extent of maternal employment is measured by taking the average of total weeks worked in the years intervening between the basepoint and the end point assessment date. For example, reports of weeks worked from the 1987 and 1988 mother interviews were used in creating the average for children assessed first in 1986 and again in 1988. Low work (less than 20 weeks) and moderate work (20 to 39 weeks) were distinguished from high levels of work (40 to 52 weeks). The full time schedule was the reference category in the equations.

Mother's intellectual resources are represented by her AFQT (Armed Forces Qualification Test) score, a measure of developed abilities (Profile of American Youth, 1982). Mother's level of schooling, measured by highest grade completed as of the 1986 interview, is used as an indicator of prior socioeconomic status of the family. Dummy variables indicating whether the mother drank or smoked in the twelve months preceding the child's birth represent a number of what might be considered "mothering" traits. Mother's age in years at the time of each child's birth is used to account for other prior unobservable traits. Child birthweight, measured in ounces, is an indicator

of potentially compromised development reported by the mother in the first interview following the child's birth.

Two measures of household composition were included: (1) the number of years in the assessment time span in which a grandparent was present in the child's household and (2) the number of years in this period that the mother's husband or partner was present.

2.4 Model

For all three dependent variables, straightforward models are estimated in which change in child outcome is treated as a function of levels of family income and maternal employment, in the intervening period, controlling for the base point child and maternal characteristics noted earlier (such as birthweight, nonmaternal childcare, education, AFQT, age at birth, prenatal practices, and household composition). Pre-existing family characteristics are incorporated into the analysis to control for possible selection effects that may result if one only considers family circumstances that are contemporaneous to the assessment period.

Selecting the most appropriate method for modeling this change process is problematic. The characteristics of the model do not entirely meet the criteria normally associated with the change score model, in which $Y_2 - Y_1$ is regressed on X, or with the regressor variable model in which Y_2 is regressed on both Y_1 and X (Allison, 1990). In an effort to avoid overestimating any possible change effects or underadjusting for prior differences, the change score was used as the dependent variable instead of the regressor variable model. While there may be some causal processes operative between Y_1 and Y_2, there is no compelling reason to assume that the period specific components of Y_1 are correlated with X. Placing intervening changes in the family conditions as temporally subsequent to the basepoint assessment should reduce the problems of measurement error in Y_1. Because so much research suggests that family processes and their linkages with child outcomes can vary in fundamental ways between black and white children, analyses were performed separately, stratified by race.

3. FINDINGS

Mean characteristics for all of the explanatory and outcome variables used in the analysis appear in Table 1. For both the mathematics and behavior problems scores, there is little net change in average score over the two-year period, although of course small net changes can and do mask some substantial gross flow, both up and down, at the individual level. In contrast, the overall sample, particularly the blacks, showed a substantial decrease in reading recognition scores over the period. Given that these assessment scores have been normed against a U.S. national sample, this decline implies that the NLSY children lost some ground in their reading skills during these early school years when contrasted with a full national cross-section of U.S. children comparable in age.

Given their relatively youthful age, these mothers and their families have characteristics that leave them somewhat disadvantaged when compared with a full cross-section of U.S. women; in particular, they are less likely to have completed high school and to have attended college, and more likely to be living in poverty. The black mothers and their families in the sample are substantially more disadvantaged than their white counterparts.

3.1 Levels versus Changes in Levels of Outcomes

The focus here is on examining changes in child outcomes in relationship to the various explanatory variables, in contrast to most research which has typically examined how levels of child outcomes are linked with various family and socioeconomic inputs. Table 2 indicates how these two perspectives can give very different results. The "level" equation uses the end point percentile achievement or behavioral score as the outcome variable. In the "change" equation, the outcome is the difference in the percentile scores (end point less base year percentile score).

Since evidence suggests that the association between the extent of maternal employment and child success may be fairly complex (Piotrkowski, Rapoport, and Rapoport, 1987), dummy variables were used to measure both inputs as a means to test for lack of linearity in the association between the input(s) and outcomes. The omitted reference groups are categories measuring higher income (at least twice the poverty level) and more maternal employment (at least 40 weeks a year), respectively. Rather than present all of the coefficients from the full equations, the explanatory coefficients of interest are highlighted by presenting only the poverty and maternal employment coefficients, "controlled" for the full range of explanatory variables discussed above.

Turning first to the linkages between poverty status and the child outcomes, for black children, it may be seen that after controlling for the full set of explanatory variables, there is no statistically significant association between poverty status and the levels of scores for any of the outcomes over the two year period. Paralleling this finding, it does not appear that either improvements or deterioration in these child outcomes over the two-year period are

linked with poverty status. In contrast, for white children, there are powerful associations between poverty and both levels of child cognition and behavior problems. For all three assessments there are statistically and substantively important relationships between being in poverty (or near poverty) and scoring poorly in mathematics or reading or having an above average level of behavior problems. As with the black children, there is no evidence of deterioration in scores associated with poverty status. It appears that for both black and white children, short-term transitions in cognitive or behavioral well-being are linked with factors other than those proxied for by the variables in our equations.[4] These could include ecological factors such as neighborhood characteristics, child peer networks and school characteristics as well as other unobserved maternal or family traits.

Shifting from poverty to maternal employment, a somewhat different story emerges. For black children, there is no association between the extensiveness of maternal employment and the level of a child's well-being. However, as highlighted in the bottom graph of Figure 1, for the two cognitive outcomes, moderate employment (working 20 to 39 weeks yearly) is associated with improvements in cognitive scores over the two-year period. What might be happening here is a "tradeoff" between the value of maternal time spent with a child and maternal quality time. The time a mother spends with a child can be linked with a child's intellectual capability, the more so if the mother brings intellectual capability to the interaction. The skills a mother learns on the job, be they reading or mathematics linked, can enhance her ability to teach her child. The more time she spends with a child, the better she is able to provide this training. For black families, moderate employment may represent an optimum balance in this regard.[5] A contrasting picture appears with respect to the behavior problems outcomes, as illustrated in the top half of Figure 1. It appears that for black children, a greater maternal time commitment in the home (working less than 20 weeks a year) is associated with a substantial improvement (declining score) in behavior problems. Controlling for other related factors (such as education and the presence of other family members), it appears that black children whose mothers do not work extensively are substantially advantaged emotionally compared with black children whose mothers work most of the year.

None of these employment effects appear for white children. In the mathematics domain, white children are disadvantaged (both level of score and change in score) if their mother works a moderate amount during the year compared with a more intensive maternal work involvement. This may have to do with differences in selection biases implied by white and black women working. Also, whereas moderate employment was associated with improvements in black childrens' reading ability, no such pattern appeared for white children. Additionally, white children are affected only moderately in their behaviors if they have a mother who works less--and this effect shows up as a modest level effect with no linkage between maternal employment intensity and changes in child's behavior.

Separate equations not shown were examined to assess the degree with which the coefficients of the key explanatory variables are affected by the set of control variables. In almost all cases, the magnitude of the coefficients is not altered when the control variables are added to (or subtracted from) the equations. In no instance is the statistical significance of a coefficient materially affected when controls are added. Thus, the changes in cognition or behavior for black children associated with moderate employment appear to be independent of the other factors in the equation (at least in the form specified). Apparently the lack of association between poverty status and changes in cognition or behavior in the controlled equations for both the black and white children do not mask effects which would appear in uncontrolled bivariate associations.

3.2 Age of Child

A substantial amount of research in child development suggests that childrens' ability to acquire particular skills or respond to different stimuli can be closely linked with their stage of psychological or intellectual development-- which is closely linked with physiological or calendar age. Since child outcomes are often shaped by age, the equations were run separately by age to gauge the extent to which associations between family status and changes in child outcomes might be sensitive to the maturational level of the child. Results not shown here revealed that just as the overall associations between poverty (or near poverty) status and changes in the child outcomes tended not be significant, similarly age-specific associations also were not in evidence. For both blacks and whites there was virtually no systematic variation by age in the likelihood of poverty status affecting changes in cognition or behavior problems.

In contrast, Table 3 suggests that there may indeed be some important variations by age and race in how maternal employment may affect changes in child outcomes.[6] For black children, having a mother who works very little outside the home is associated with improvements in behavior problems for children at all ages.[7] In addition, for all except the oldest black children, mother staying home is associated with more reading improvement. In contrast, the overall association between moderate (20-39 weeks) maternal employment and improvement in

mathematics noted earlier for black children largely reflects a very large positive coefficient for the youngest black children. This pattern is consistent with the supposition that maternal nurturance may have its greatest effect for younger children. Shifting to the white children, it may be seen that the modest negative intermediate level effects of employment noted for the overall sample are more in evidence for older children.

3.3 A Four-Year Perspective

It is important to emphasize the short-term time constraints of the analysis thus far. It might be that child well-being could be closely associated with the duration of time a family or child experiences particular levels of poverty or maternal employment. Figure 2 illustrates this possibility by comparing four-year timelines in mathematics scores for children in different poverty situations. If one follows the black children from 1986 to 1988, there is some modest widening in mathematics percentile scores by whether or not the children are living in or near poverty. However, this gap by poverty status widens substantially between 1988 and 1990. Thus, it may be that the amount of time spent in poverty or the intensity of that poverty existence increasingly erodes achievement, and apparently is not ameliorated by external forces such as compensatory education. In contrast, for white children (who clearly start with higher levels of mathematics knowledge) a different picture emerges. The children in poverty show an initial decline (between 1986 and 1988) but then a substantial recovery, perhaps reflecting advantages being gained from better schools or better home environments.

To better understand the patterns suggested by the descriptive long-term trajectories, a more restricted sample of children assessed in 1986, 1988, and 1990 was used to help identify the processes at work that may be sensitive to the length of time a child spends in a particular status. Turning to the longer time period in a multivariate context, one sees from Table 4 that some new patterns emerge not seen in the two year equations. Black children in poverty and near poverty exhibit significant decreases in both reading recognition and math achievement relative to children in more economically affluent families. The latter finding is consistent with the pattern described in Figure 2. While moderate gains in math scores are evident for black children of mothers working low and moderate amounts, maternal employment now appears to have little effect on reading scores. The improvement in behavior for black children of mothers who work few weeks during the year, already seen in the two-year equations, appears to be increased when a four-year span is considered. A striking effect not seen in the two-year equations is the negative effect of poverty on behavior problems for black children. This result may suggest that duration of time in poverty ultimately takes its toll on black children, as shown by the dramatic increase in behavior problems associated with poverty for black children in the four-year equation. The change processes already seen for white children in the two-year equations appear relatively unchanged in the longer time line.

3.4 Home Environment

The NLSY dataset includes several items and psychometric scales linked with the children which may help interpret some of the poverty and employment results presented here. The NLSY HOME scale is an abbreviated and modified version of a widely used scale designed to measure the nature of mother-child interactions and the quality of home environments (Baker and Mott, 1989). The HOME taps a cognitive dimension (including language stimulation, variety of experiences, encouragement of child achievement) and an emotional support dimension (including responsiveness, warmth, encouragement of maturity). As shown in Table 5, how well children score on this assessment is very sensitive to a family's poverty status. Higher scores on the overall scale as well as the cognitive stimulation and emotional support subscales are closely linked with family income for both black and white children. Although the association is less pronounced, there are also positive associations between higher HOME scores and more extensive maternal employment. This latter association is particularly pronounced for black children. Apparently, factors within the black home which tend to be linked with greater acquisition of cognitive skills are also associated with more maternal employment.[8]

As a preliminary step in considering the independent importance of variations in the child's home environment, the overall HOME score was entered into the equations as an additional explanatory variable (results not shown). For black children, the HOME very slightly moderates the effect of poverty status on changes in reading scores and causes a negligible strengthening of the effects on math scores. There is virtually no change in the poverty and employment coefficients for white children when the HOME is added to the model. Overall the variable has little effect on the magnitude of the employment variables. It plays a significant role in predicting absolute outcome levels but __not__ in change in outcomes.

4. CONCLUSIONS

From a substantive perspective, these findings suggest that the relationships between family conditions and child outcomes can be sensitive to a variety of factors, including race and, to some extent, the time span being considered. When one moves from a two-year to a four-year time span, certain patterns are accentuated, particularly for black children. Over a four-year period, many children of the ages considered here pass through more than one maturational stage -- a development process that could well be linked with how they respond to stimuli from both within and outside the family. A lengthening time span also implies a greater probability that a child may be living in varying environments. To some extent some of the more "domestic" environmental changes have been incorporated into the analyses, but with an increasing time span the problem of "unobservables" in the outside environment becomes more significant. Characteristics of neighborhoods, schools, and peer groups could potentially affect the associations between child outcomes and the inputs considered here. Such influences can be particularly strong for black children, whose family poverty status may more closely mirror contextual community factors than is true for white children.

When viewed over a four-year period, the inputs central to this study, poverty status and, to a lesser degree, maternal employment, seem to exhibit more variability in the longer run. The influence of such changes can be further explored by examining the temporal ordering of poverty and employment status within the period being considered. One might also pursue how the association between the ordering of these inputs and the outcomes may be moderated by the child's maturational status or race. While this analysis has treated family socioeconomic success and maternal employment as equivalent in terms of their meaning as status variables, there are perhaps important differences between them which may affect the results presented here.

Despite many unanswered questions, this analysis has helped clarify some important issues; black children do respond differently in several important respects to within-family status and behaviors. The importance of a mother's employment behavior on how a younger child develops should not be discounted; more importantly, effects are not uniform across outcomes. It is still unclear how the benefits associated with low and moderate levels of maternal employment are linked with the quality of the mother's employment. Most surprisingly for black children, is the pattern of weak direct associations between poverty per se and both short-term levels or changes in levels of cognition or behavior problems. This pattern is significantly altered when one shifts from a two to a four-year time line. While the patterns of employment effects on child outcomes appear generally consistent regardless of the time span considered, an exclusively short-term approach to the data may underestimate the effects of other family conditions on child outcomes that may only be revealed by taking a longer view.

5. REFERENCES

Allison, P.D. (1990). "Change scores as dependent variables in regression analysis." *Sociological Methodology* 20: 93-114.

Baker, P.C. and F.L. Mott (1989). NLSY Child Handbook 1989: A Guide and Resource Document for the National Longitudinal Study of Youth 1986 Child Data. Columbus: Center for Human Resource Research, Ohio State University.

Profile of American Youth: 1980 Nationwide Administration of the Armed Services Vocational Aptitude Battery (1982). Washington, D.C.: Office of the Assistant Secretary of Defense.

Parcel, T.L. and E.G. Menaghan (1990). "Maternal working conditions and child verbal facility: Studying the intergenerational transmission of inequality from mothers to young children." *Social Psychology Quarterly* 53: 132-147.

Piotrkowski, C.S., R. N. Rapoport, and R. Rapoport (1987). "Families and work." In M.B. Sussman and S.K. Steinmetz, eds., *Handbook of Marriage and the Family*, pp. 251-283, New York: Plenum.

6. NOTES

2. Individual case weights are constructed for each survey year to make the sample conform to independently derived population totals for individuals aged 14 through 21 on January 1, 1979. The weights take into account the probability of selection at the baseline interview, differential nonresponse at the initial baseline phase, and random variation associated with sampling. The weights produce group population estimates when used in tabulations.

3. Child weights are based on mother weights with an adjustment factor used to account for different interview rates for children in various age, race, and sex groups. These factors use counts of children known to exist as well as estimates of fertility for women who have attrited. Child attrition does not, however, adjust for differential child assessment completion rates.

4. It should be noted that the equations include two other proximate family variables, measuring the presence of a man in the home and the presence of a grandparent. For black children, these household composition variables did not attain significance in any of the change equations; for white children, the presence of grandparents was associated with higher mathematics scores.

5. Interacting occupation or educational level with intensity of employment might clarify the separate quality-intensity dimensions.

6. This conjecture is somewhat tenuous since we have not yet tested for statistically significant differences in effects between the age-race categories.

7. Additional analysis is needed to clarify the direction of causality between these factors. Mothers of children who have significant behavior problems might well be less likely to work (or more likely to reduce their work) than other mothers.

8 . This scale includes some items which have a higher face validity than others in being predictive of mathematical and verbal skills. We plan to examine the extent to which these items, which have considerable cognitive content, help explain the relationships between maternal employment and, in particular, mathematics skill acquisition for black children.

Table 1. Mean Statistics for Explanatory and Outcome Variables by Race: Pooled Sample

	BLACK	NONBLACK
Difference in PIAT Reading Rec. (Percentile), Base to Endpoint	-8.7	-3.1
Difference in PIAT Math Percentile, Base to Endpoint	+0.4	-0.9
Difference in Behavior Problems Percentile, Base to Endpoint	+0.9	+1.9
% Received Nonmaternal Child Care, First 3 Years of Life	0.5	0.5
Birth Weight (Ounces)	108.7	116.6
% of Mothers with Less than 12 Years of School	39.6	46.2
% of Mothers with 12 Years of Schooling	41.7	41.5
% of Mothers Drinking Alcohol During Pregnancy	31.5	41.2
% of Mothers Who Smoked Cigarettes During Pregnancy	32.1	42.1
Mean Age of Mother at Birth of Child	18.8	19.6
% of Mothers with AFQT Score Below 50+ Percentile	91.7	70.2
Mean Survey Points Grandparents in Home, Base-Endpoint	0.5	0.2
Mean Survey Points Mother's Spouse in Home, Base-Endpoint	1.0	2.0
% of Families with Pov. Ratio < 1, Base-Endpoint	48.1	25.1
% of Families with Pov. Ratio of 1-1.99, Base-Endpoint	25.3	30.8
% of Mothers Worked < 20 Weeks Per Year, Base-Endpoint	44.6	40.6
% of Mothers Worked 20-39 Weeks Per year, Base-Endpoint	16.0	20.4
SAMPLE SIZE	744	1266

Table 2. Comparing Poverty and Maternal Employment Effects on Levels and Changes in Levels of Child (Percentile) Outcomes (O.L.S Coefficients): Pooled Sample

| | PIAT MATHEMATICS | | | | PIAT READING RECOGNITION | | | | BEHAVIOR PROBLEMS | | | |
	Level		Change		Level		Change		Level		Change	
Black												
Poverty												
In Poverty	-3.6	(2.9)	1.4	(3.2)	-5.6c	(3.3)	-3.4	(2.8)	3.6	(3.1)	4.2	(3.2)
"Near Poverty"	0.2	(2.7)	2.4	(3.0)	-2.7	(3.1)	-1.2	(2.6)	0.1	(2.8)	-3.6	(2.9)
Maternal Employment												
Mom Works < 20 Weeks Yearly	-3.1	(2.3)	2.1	(2.5)	-1.3	(2.6)	4.8b	(2.3)	-2.1	(2.4)	-9.0a	(2.5)
Mom Works 20-39 Weeks Yearly	2.1	(2.6)	7.4a	(2.8)	3.4	(2.9)	7.2a	(2.5)	-3.9	(2.7)	-3.5	(2.8)
Non Black												
Poverty												
In Poverty	-7.3a	(2.4)	0.6	(2.4)	-8.9a	(2.7)	-2.0	(2.3)	8.7a	(2.5)	1.2	(2.2)
"Near Poverty"	-6.3a	(1.7)	-0.1	(1.7)	-7.0a	(1.8)	-1.3	(1.6)	4.8a	(1.8)	-0.8	(1.6)
Maternal Employment												
Mother Works < Weeks Yearly	-2.0	(1.6)	-1.3	(1.6)	-0.6	(1.8)	-1.3	(1.6)	-3.2c	(1.7)	-1.1	(1.5)
Mother Works 20-39 Weeks Yearly	-5.4c	(1.9)	-5.5a	(1.9)	-0.4	(2.1)	3.2c	(1.8)	-4.1b	(2.)	1.3	(1.7)

Note: The poverty and employment variables are controlled for all of the explanatory variables listed in Table 1. The poverty and employment variables are average statistics for the assessment period. Omitted reference categories are: Poverty Ratio ≥ 2.0 and Mother Works 40-52 weeks yearly respectively. The poverty ratio is a ratio of the family unit's total income to the officially established poverty level (minimal family need level for a family, based on the family's size and age of household head). Statistics are from separate black and non-black equations.
a = coefficient significant at p ≤ .01; b = ≤ .05; c = ≤ .10.

Table 3. Maternal Employment Linkages with Changes in Cognition and Behavior Problem Scores By Race and Age (O.L.S. Coefficients): Pooled Sample

| | MOTHER WORKS LESS THAN 20 WEEKS PER YEAR | | | | | | MOTHER WORKS 20-39 WEEKS PER YEAR | | | | | |
	PIAT Math.		PIAT Reading Rec.		Behavior Problems		PIAT Math.		PIAT Reading Rec.		Behavior Problems	
Black												
7-8 Years	6.2	(4.1)	7.9b	(3.8)	-8.8b	(3.7)	11.5a	(4.5)	8.5b	(4.1)	-2.7	(4.1)
9-10 Years	-0.3	(4.3)	7.2c	(3.7)	-11.6b	(5.4)	5.9	(5.2)	12.1a	(4.5)	-6.4	(6.6)
11 and Over	-5.5	(5.0)	2.4	(4.2)	-12.0b	(5.0)	-1.8	(5.1)	4.5	(4.3)	-0.4	(5.1)
Non Black												
7-8 Years	0.5	(2.3)	-2.2	(2.4)	1.6	(2.2)	-3.9	(2.6)	3.1	(2.7)	2.4	(2.5)
9-10 Years	-6.9b	(3.1)	-2.1	(3.0)	-5.6c	(3.0)	-5.6	(3.6)	4.8	(3.5)	-4.6	(3.5)
11 and Over	0.8	(3.4)	1.2	(2.3)	-4.2	(2.9)	-8.7	(4.1)b	3.5	(2.8)	6.5c	(3.5)

Note: See Table 2.

Figure 1

Net Change in Outcomes (Percentile Scores) Linked with LOW EMPLOYMENT

PIAT MATH ■ PIAT READING ■ BEHAVIOR PROBLEMS

Figure 2

PIAT MATH scores (avg) for WHITES by poverty ratio (avg 86-89) (weighted)

0-9 ■ 1-1.9 ■ 2+

Net Change in Outcomes (Percentile Scores) Linked with MODERATE EMPLOYMENT (reference group=high employment)

PIAT MATH ■ PIAT READING ■ BEHAVIOR PROBLEMS

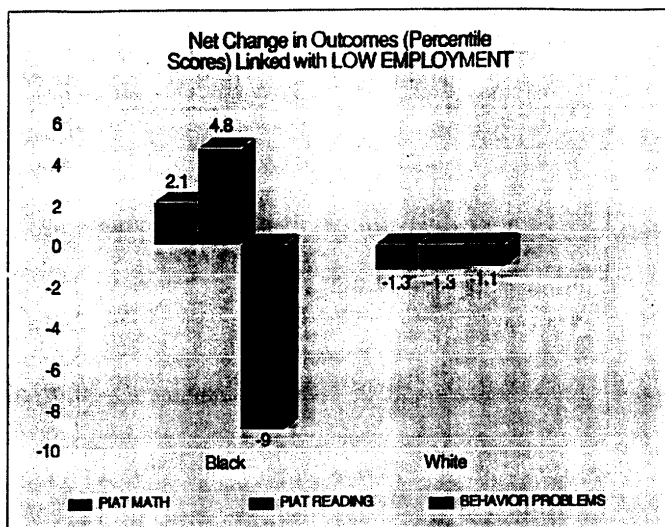PIAT MATH scores (avg) for NON-WHITES by poverty ratio (avg 86-89) (weighted)
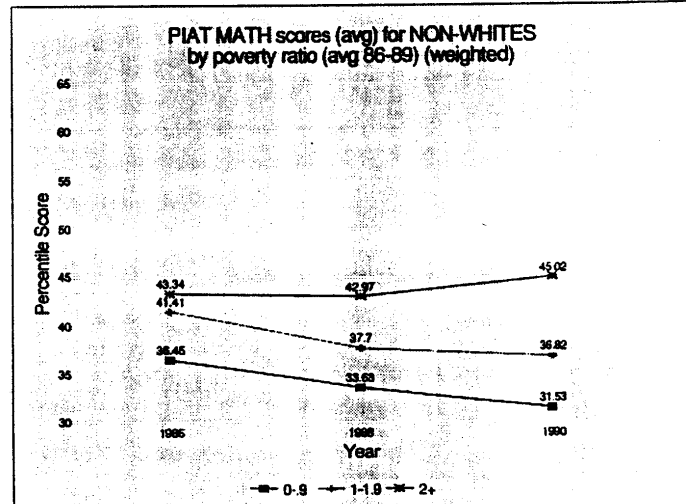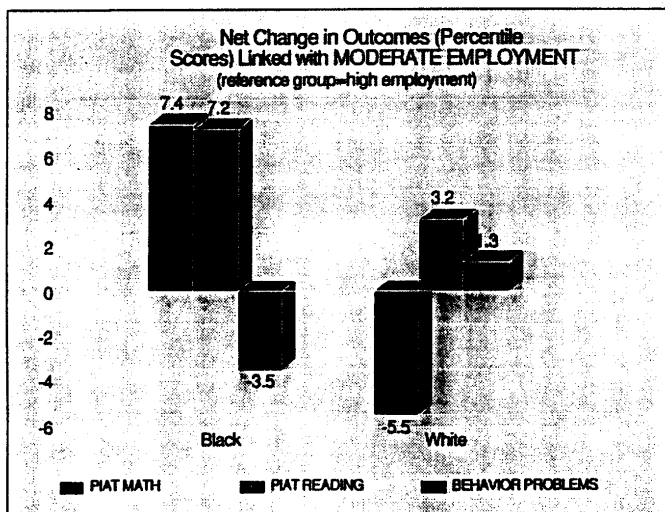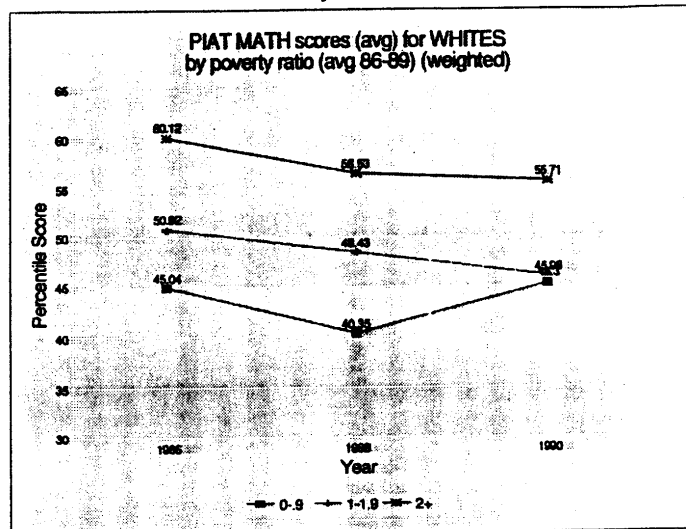
0-9 ■ 1-1.9 ■ 2+

Table 4. Employment and Poverty Linkages with Changes in Cognition and Behavior Problem (Percentile) Scores by Race: Children Assessed in 1986, 1988, 1990 (O.L.S. Coefficients)

	PIAT MATHEMATICS		PIAT READING RECOGNITION		BEHAVIOR PROBLEMS	
Black						
Poverty						
In Poverty	-11.5ᵃ	(4.6)	-11.7ᵃ	(4.5)	12.3ᵃ	(4.7)
"Near" Poverty	-6.7ᶜ	(3.9)	-7.2ᶜ	(3.8)	.2	(4.0)
Maternal Employment						
Mom Works < 20 Weeks Yearly	7.9ᵇ	(3.8)	.88	(3.7)	-11.7ᵃ	(3.8)
Mom Works 20-39 Weeks Yearly	6.8ᶜ	(3.9)	-3.2	(3.8)	-1.5	(4.0)
Non Black						
Poverty						
In Poverty	8.0ᶜ	(4.4)	.2	(4.2)	-3.8	(4.0)
"Near" Poverty	.4	(2.8)	-4.5ᶜ	(2.7)	-2.3	(2.9)
Maternal Employment						
Mom Works < 20 Weeks Yearly	-4.9ᶜ	(3.1)	-4.4ᶜ	(3.0)	4.5ᶜ	(2.9)
Mom Works 20-39 Weeks Yearly	-5.5ᶜ	(3.1)	-.9	(2.9)	3.3	(2.8)

Note: See Table 2.

Table 5. Average HOME Percentile Scores by Poverty Status and by Extent of Maternal Employment: Children Assessed in 1986, 1988, 1990

	Total HOME Score	Sample Size	Cognitive Stimulation Subscore	Sample Size	Emotional Support Subscore	Sample Size
Black	36.9	404	43.1	393	37.0	350
Poverty Status						
0 - .9 Pov Ratio	29.2	176	33.4	169	34.0	146
1 - 1.9 Pov Ratio	36.9	109	41.4	107	40.5	95
2 + Pov Ratio	49.8	85	59.1	185	39.5	77
Maternal Employment						
< 20 Weeks	33.1	161	38.7	154	33.3	139
20 - 39 Weeks	37.6	79	40.8	79	38.3	70
40 - 52 Weeks	40.3	164	48.4	160	40.0	141
Non Black	57.4	492	55.7	484	57.2	463
Poverty Status						
0 - .9 Pov Ratio	34.6	79	35.7	79	39.1	75
1 - 1.9 Pov Ratio	50.4	147	49.1	144	53.2	137
2 + Pov Ratio	67.0	232	63.8	228	64.7	220
Maternal Employment						
< 20 Weeks	52.5	177	51.0	174	54.9	172
20 - 39 Weeks	56.6	115	52.0	112	59.1	106
40 - 52 Weeks	61.8	200	61.3	198	58.1	185

Table 2. Comparing Poverty and Maternal Employment Effects on Levels and Changes in Levels of Child (Percentile) Outcomes (O.L.S Coefficients): Pooled Sample

| | PIAT MATHEMATICS | | | | PIAT READING RECOGNITION | | | | BEHAVIOR PROBLEMS | | | |
	Level		Change		Level		Change		Level		Change	
Black												
Poverty												
In Poverty	-3.6	(2.9)	1.4	(3.2)	-5.6^c	(3.3)	-3.4	(2.8)	3.6	(3.1)	4.2	(3.2)
"Near Poverty"	0.2	(2.7)	2.4	(3.0)	-2.7	(3.1)	-1.2	(2.6)	0.1	(2.8)	-3.6	(2.9)
Maternal Employment												
Mom Works < 20 Weeks Yearly	-3.1	(2.3)	2.1	(2.5)	-1.3	(2.6)	4.8^b	(2.3)	-2.1	(2.4)	-9.0^a	(2.5)
Mom Works 20-39 Weeks Yearly	2.1	(2.6)	7.4^a	(2.8)	3.4	(2.9)	7.2^a	(2.5)	-3.9	(2.7)	-3.5	(2.8)
Non Black												
Poverty												
In Poverty	-7.3^a	(2.4)	0.6	(2.4)	-8.9^a	(2.7)	-2.0	(2.3)	8.7^a	(2.5)	1.2	(2.2)
"Near Poverty"	-6.3^a	(1.7)	-0.1	(1.7)	-7.0^a	(1.8)	-1.3	(1.6)	4.8^a	(1.8)	-0.8	(1.6)
Maternal Employment												
Mother Works < Weeks Yearly	-2.0	(1.6)	-1.3	(1.6)	-0.6	(1.8)	-1.3	(1.6)	-3.2^c	(1.7)	-1.1	(1.5)
Mother Works 20-39 Weeks Yearly	-5.4^c	(1.9)	-5.5^a	(1.9)	-0.4	(2.1)	3.2^c	(1.8)	-4.1^b	(2.)	1.3	(1.7)

Note: The poverty and employment variables are controlled for all of the explanatory variables listed in Table 1. The poverty and employment variables are average statistics for the assessment period. Omitted reference categories are: Poverty Ratio $\geq$ 2.0 and Mother Works 40-52 weeks yearly respectively. The poverty ratio is a ratio of the family unit's total income to the officially established poverty level (minimal family need level for a family, based on the family's size and age of household head). Statistics are from separate black and non-black equations.
a = coefficient significant at $p \leq .01$; b = $\leq .05$; c = $\leq .10$.

Table 3. Maternal Employment Linkages with Changes in Cognition and Behavior Problem Scores By Race and Age (O.L.S. Coefficients): Pooled Sample

| | MOTHER WORKS LESS THAN 20 WEEKS PER YEAR | | | | | | MOTHER WORKS 20-39 WEEKS PER YEAR | | | | | |
	PIAT Math.		PIAT Reading Rec.		Behavior Problems		PIAT Math.		PIAT Reading Rec.		Behavior Problems	
Black												
7-8 Years	6.2	(4.1)	7.9^b	(3.8)	-8.8^b	(3.7)	11.5^a	(4.5)	8.5^b	(4.1)	-2.7	(4.1)
9-10 Years	-0.3	(4.3)	7.2^c	(3.7)	-11.6^b	(5.4)	5.9	(5.2)	12.1^a	(4.5)	-6.4	(6.6)
11 and Over	-5.5	(5.0)	2.4	(4.2)	-12.0^b	(5.0)	-1.8	(5.1)	4.5	(4.3)	-6.4	(5.1)
Non Black												
7-8 Years	0.5	(2.3)	-2.2	(2.4)	1.6	(2.2)	-3.9	(2.6)	3.1	(2.7)	2.4	(2.5)
9-10 Years	-6.9^b	(3.1)	-2.1	(3.0)	-5.6^c	(3.0)	-5.6	(3.6)	4.8	(3.5)	-4.6	(3.5)
11 and Over	0.8	(3.4)	1.2	(2.3)	-4.2	(2.9)	-8.7	(4.1)^b	3.5	(2.8)	6.5^c	(3.5)

Note: See Table 2.

Figure 1

Figure 2

Net Change in Outcomes (Percentile Scores) Linked with LOW EMPLOYMENT

	Black	White
	2.1, 4.8, -.9	-1.3, -1.3, -1.1

■ PIAT MATH ■ PIAT READING ■ BEHAVIOR PROBLEMS

PIAT MATH scores (avg) for WHITES by poverty ratio (avg 86-89) (weighted)

●— 0-.9 —◆— 1-1.9 —✳— 2+

Net Change in Outcomes (Percentile Scores) Linked with MODERATE EMPLOYMENT
(reference group=high employment)

	Black	White
	7.4, 7.2, -3.5	3.2, 1.3, -5.5

■ PIAT MATH ■ PIAT READING ■ BEHAVIOR PROBLEMS

PIAT MATH scores (avg) for NON-WHITES by poverty ratio (avg 86-89) (weighted)

■— 0-.9 —◆— 1-1.9 —✳— 2+
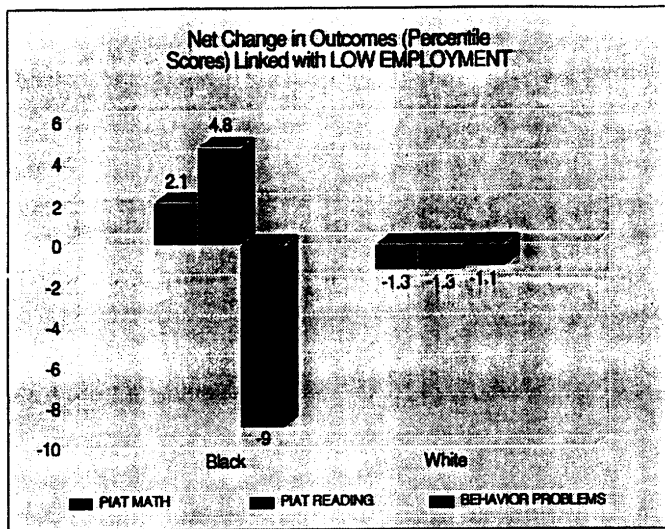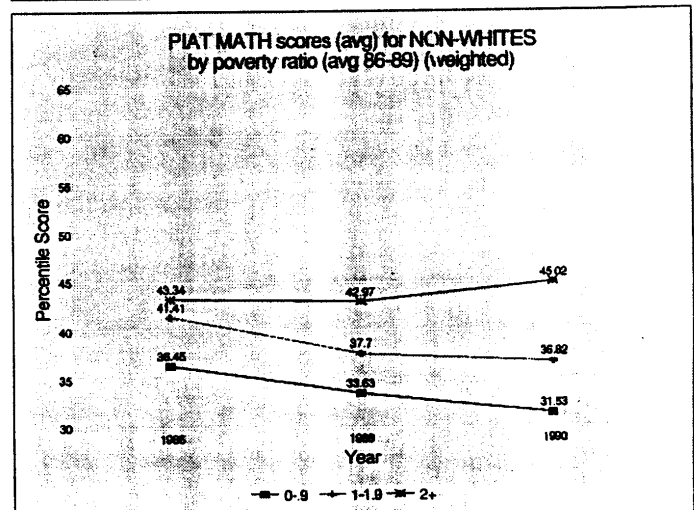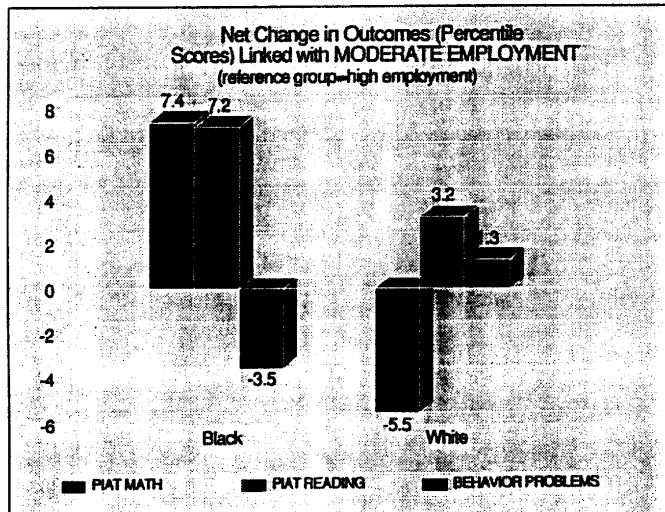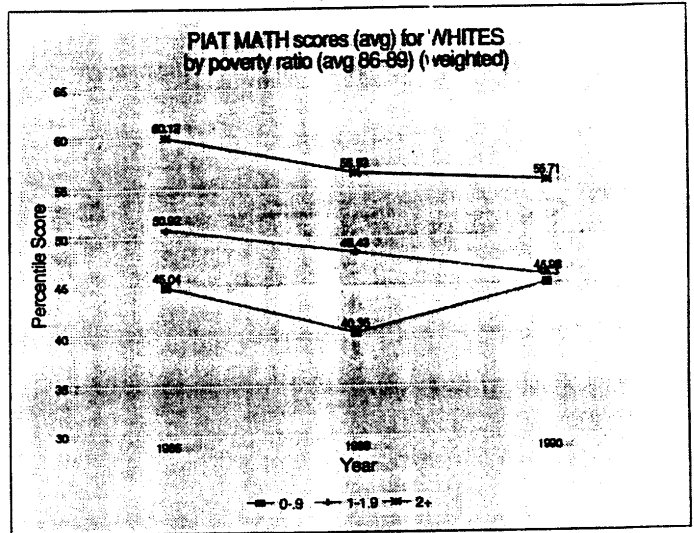
Table 4. Employment and Poverty Linkages with Changes in Cognition and Behavior Problem (Percentile) Scores by Race: Children Assessed in 1986, 1988, 1990 (O.L.S. Coefficients)

	PIAT MATHEMATICS		PIAT READING RECOGNITION		BEHAVIOR PROBLEMS	
Black						
Poverty						
In Poverty	-11.5ª	(4.6)	-11.7ª	(4.5)	12 3ª	(4.7)
"Near" Poverty	-6.7ª	(3.9)	-7.2ª	(3.8)	2	(4.0)
Maternal Employment						
Mom Works < 20 Weeks Yearly	7.9ᵇ	(3.8)	.88	(3.7)	-11 7ª	(3.8)
Mom Works 20-39 Weeks Yearly	6.8ᶜ	(3.9)	-3.2	(3.8)	-1.5	(4.0)
Non Black						
Poverty						
In Poverty	8.0ᶜ	(4.4)	.2	(4.2)	-3.8	(4.0)
"Near" Poverty	.4	(2.8)	-4.5ᶜ	(2.7)	-2.3	(2.9)
Maternal Employment						
Mom Works < 20 Weeks Yearly	-4.9ᶜ	(3.1)	-4.4ᶜ	(3.0)	4.5ᶜ	(2.9)
Mom Works 20-39 Weeks Yearly	-5.5ᶜ	(3.1)	- .9	(2.9)	3.3	(2.8)

Note: See Table 2.

Table 5. Average HOME Percentile Scores by Poverty Status and by Extent of Maternal Employment: Children Assessed in 1986, 1988, 1990

	Total HOME Score	Sample Size	Cognitive Stimulation Subscore	Sample Size	Emotional Support Subscore	Sample Size
Black	36.9	404	43.1	393	37.0	350
Poverty Status						
0 - .9 Pov Ratio	29.2	176	33.4	169	34.0	146
1 - 1.9 Pov Ratio	36.9	109	41.4	107	40.5	95
2 + Pov Ratio	49.8	85	59.1	185	39.5	77
Maternal Employment						
< 20 Weeks	33.1	161	38.7	154	33.3	139
20 - 39 Weeks	37.6	79	40.8	79	38.3	70
40 - 52 Weeks	40.3	164	48.4	160	40.0	141
Non Black	57.4	492	55.7	484	57.2	463
Poverty Status						
0 - .9 Pov Ratio	34.6	79	35.7	79	39.1	75
1 - 1.9 Pov Ratio	50.4	147	49.1	144	53.2	137
2 + Pov Ratio	67.0	232	63.8	228	64.7	220
Maternal Employment						
< 20 Weeks	52.5	177	51.0	174	54.9	172
20 - 39 Weeks	56.6	115	52.0	112	59.1	106
40 - 52 Weeks	61.8	200	61.3	198	58.1	185