

## Dynamic Models of Poverty and Psychosocial Adjustment through Childhood

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Children exhibit significant variability in their poverty experiences and well-being through time, longitudinal realities that complicate the study of economic deprivation and adjustment in the early life course. Drawing on thirteen years of data from the Children of National Longitudinal Survey of Youth data set, we examine how children's poverty histories predict latent growth curves of their psychosocial adjustment using multiply imputed data sets. The duration of poverty between birth and 1986 predicts the level of antisocial behavior and anxiety-depression in 1986, while the proportion of time spent in poverty between 1986 and 1992 predicts the rate increase in antisocial behavior between 1986 and 1992. Controlling the duration of poverty, we find that transitions into poverty between birth and 1986 predict the rate of increase in anxiety-depression between 1986 and 1992 among boys. Hispanic boys seem especially vulnerable to early poverty experiences: transitions into poverty between birth and 1986 raise their 1986 level of antisocial behavior, while the duration of poverty between birth and 1986 sharpens their rate of increase in anxiety-depression between 1986 and 1992. These findings underscore the value of a life-history approach to children's family experiences and well-being.

## **Dynamic Models of Poverty and Psychosocial Adjustment through Childhood**

### **INTRODUCTION**

Nearly one-quarter of American children today are poor, a figure that is both higher than at any time since the mid-1960s (U.S. Bureau of the Census 1996) and likely to increase substantially with welfare reform (The Urban Institute 1996). In turn, many studies provide evidence that poverty is detrimental to the well-being of children, predicting decrements in cognitive ability (Duncan, Brooks-Gunn, & Klebanov 1994; Haveman & Wolfe 1995), school performance and attainment (Guo 1998; Teachman, Paasch, Day, & Carver 1997), physical health (Korenman & Miller 1997; Starfield et al. 1991), psychosocial adjustment (Duncan et al. 1994; Korenman et al. 1995; McLeod & Shanahan 1993) and a range of outcomes in adulthood (Hill & Sandfort 1995). However, excepting relationships involving cognitive ability and educational attainment, most of these observed effects have been small in magnitude (Duncan & Brooks-Gunn 1997, pp. 597-601; McLoyd 1998).

Yet there are many difficulties associated with the accurate assessment of how poverty affects children. First, children's poverty experiences are often highly complex across the early life course. While approximately 4 in 10 American children experience poverty before age 16, most poverty is episodic and short-lived (Bane & Elwood 1985; Devine, Plunkett, & Wright 1992; Duncan et al. 1984; Lichter 1997; Ruggles 1990). For example, Ashworth and his colleagues (1994) observe that almost half of the children in the Panel Study of Income Dynamics with complete income data experience multiple, brief episodes of poverty, while persistent poverty is relatively uncommon. Despite these highly variable experiences, most studies of poverty and children's well-being are based on cross-sectional comparisons between impoverished and nonimpoverished children (Walker 1994), an analytic strategy that is likely to misrepresent the lived experiences of children who are ever poor.

Second, virtually all previous research examines children's well-being in static terms, although growth curve models represent significantly more realistic assessments of adjustment. Children experience dramatic change in their psychosocial development, change that can be studied both in inter- and intra individual terms (Rogosa & Willett 1985). Longitudinal assessments of children's well-being are necessary to predict patterns of change, which, developmentalists observe, may differ from predictors of single-occasion scores (Baltes & Nesselroade 1979; Wohlwill 1979). Previous research also typically fails to address the reliability of measures of children's adjustment. Indeed, cognitive ability and educational attainment--factors that typically have large associations with poverty--can be assessed with high reliability. In contrast, factors with small or no association with poverty are typically latent variables with comparatively low levels of reliability (e.g., anxiety, social development, hyperactivity). Until these complexities of children's well-being are more adequately addressed, conclusions about the magnitude of the relationships between poverty and the unique dimensions of children's psychosocial development remain tenuous.

In this paper we examine how changing patterns of poverty experiences predict children's developmental trajectories of psychosocial adjustment. Our paper draws on repeated measures of children's psychosocial adjustment across 8 years of the early life-span in a nationally representative sample, the National Longitudinal Survey of Youth. The data also allow us to describe the child's complete life-history record of poverty experiences and interrelate these patterns of deprivation to latent growth curve models that describe children's psychosocial development. A multiple imputation procedure is implemented to correct for biases due to missing data, a potentially severe problem in

previous longitudinal research (Schafer 1997). However we first turn to conceptual matters, formulating a set of hypotheses about how longitudinal poverty experiences affect children's well-being.

#### DYNAMIC DESCRIPTIONS OF POVERTY AND CHILDREN'S ADJUSTMENT

Longitudinal descriptions of children's economic circumstances typically focus on the duration of poverty and provide evidence that persistently impoverished children have the most compromised developmental profiles among poor children (Duncan et al. 1994; Korenman, Miller, & Sjaastad 1995; Smith, Brooks-Gunn & Klebanov 1997). This undoubtedly reflects the extensive system of correlated disadvantages faced by those at the economic margin, disadvantages that may include the increased likelihood of chronic labor force detachment, single mother-headed households, dangerous and geographically isolated neighborhoods, racial discrimination, and deviant peer groups (Anderson 1989; Massey and Eggers 1990; Wilson 1987). Indeed, studies report significant relationships between the duration of poverty and compromised parenting and home environments (Bolger, Patterson, Thompson, & Kupersmidt 1995; Brooks-Gunn, Klebanov, & Liaw 1995; Hanson, McLanahan, & Thomson 1997; McLeod & Shanahan 1993) and the increased risk of residence in communities lacking economic and social capital (Garbarino 1992; Massey & Denton 1993; Wilson 1996). According to this deprivation hypothesis, the duration of poverty adversely affects children by depriving them of nurturing, safe, and stimulating environments: as the duration of poverty increases, these manifold disadvantages accumulate.

Yet studies of economic decrement suggest disadvantaged outcomes among children who experience multiple changes in their levels of economic resources. Elder (1974) formulated an equilibrium model positing that decrements in the household's economic resources often alter marital and parental relationships, alterations that in turn foster distressful outcomes in both parents and their children (Moen, Kain, & Elder 1983). Consistent with this model, studies of rural families provide evidence that economic loss is accompanied by greater marital conflict, which in turn is associated with elevated levels of depressed feelings in adolescents (Conger et al. 1992; Conger & Elder 1994). According to this decrement hypothesis, movements into poverty are often associated with the renegotiation of rights and responsibilities within the family, disrupting settled patterns of roles and relationships and leading to distress. Thus, duration and transitions may affect children's well-being through distinct mechanisms, suggesting that transitions into poverty represent a unique source of distress for families, beyond that of poverty's duration.

It may also be that past and present poverty experiences contribute in distinct ways to children's well-being. Some analysts argue that the effect of current poverty actually reflects the high levels of mental health problems among the persistently poor (Augustyniak, Duncan, & Liker 1985; Pearlin, Lieberman, Menaghan, & Mullan 1981), who are more likely to exhaust social supports (Aneshensel, Pearlin, & Schuler 1993; Coyne et al. 1987). According to this disablement hypothesis, current poverty status is of little consequence to children from families with extensive poverty histories. In contrast, others posit that current poverty status is associated with symptom levels because of immediate financial strains and their attendant family distress. That is, children's current poverty status predicts patterns of well-being, irrespective of prior poverty experiences.

Past and present poverty experiences also may interact to predict developmental patterns of

well-being, consistent with models of psychosocial stress that emphasize the critical role of an individual's history of exposure to stressors (Wheaton 1990). Limited exposure to poverty in the past may diminish the negative effects of present poverty by raising thresholds of reactivity, broadening the range of coping mechanisms, and promoting selection into more nurturing relationships and contexts. Such a perspective is consistent with conceptual models emphasizing the inoculative, or "steeling," effects of limited exposure to stressors (e.g., Rutter 1985). However, these same orientations suggest that extensive poverty histories may aggravate the effects of present poverty status by limiting coping efforts, draining social supports (Robertson, Elder, Skinner, & Conger 1991), and intensifying levels of material deprivation.

Finally, it may be that children's reactions to poverty experiences vary by race. Some theorists suggest that race is fundamental to the meaning of experiences, reflecting such factors as cultural identity and practice, as well as overt and covert discrimination (Spencer, Swanson, & Cunningham 1991). This line of reasoning suggests that race serves as a powerful moderator of the link between poverty and children's adjustment. However, others maintain that racial patterns reflect differences in levels of contextual variables (McLoyd 1990). According to this perspective, race serves as a proxy for differences in contextually-based experiences that can be measured, but often are not (e.g., level of financial reserves, Farley 1987; neighborhood characteristics, Wilson 1987). To date, few studies have examined whether race moderates the effects of poverty duration (McLoyd 1998) and the scant available evidence is mixed (Bolger et al. 1995; McLeod & Shanahan 1996).

To summarize, we examine (1) the predictive capacity of children's lifetime poverty experiences--characterized by duration and the number of transitions into poverty--on their developmental patterns of well-being, (2) the additive and interactive contributions of past and present poverty experiences and (3) how these relationships vary by race. We turn now to issues of sampling, measurement, and analytic strategy.

## SAMPLE AND MEASURES

The National Longitudinal Survey of Youth (hereafter "NLSY") is a nationally representative sample of 12,686 young men and women aged 14 to 22 in 1979 (Center for Human Resource Research 1995). Our research draws on data from the women who have been interviewed annually since 1979. The present study draws on data extending from the child's birth to 1992. These data include oversamples of Blacks, Hispanics, and poor non-Hispanic Whites.

In 1986, when the women were between the ages of 21 and 28, the first of a series of assessments was conducted relating to children's psychosocial adjustment. Children born to interviewed mothers originally numbered 5255. Child assessments, based on interviews with the mothers, have been completed every two years since 1986. To avoid marked heterogeneity in the developmental profiles of the children, we focus on children who were four to six years of age in 1986 ( $n=1651$ ).

Poverty is based on the mother's income reports, which are gathered retrospectively. Beginning in 1979, mothers reported their total family income for the previous calendar year. Excepting 1986, the annual indicator of poverty status is based on a comparison of the mother's reported income to official poverty levels for that year. (In 1986, official poverty levels had not been determined at the time of the

interviews. Those levels were estimated by the study's staff based on family size, farm/nonfarm residence, and state of residence.) Official poverty levels were based on thresholds established by the Census Bureau based on U. S. Department of Health and Human Services guidelines (Center for Human Resources Research 1995). Respondents missing income data were assigned poverty status based on whether they received Aid to Families with Dependent Children or food stamps. Although this imputation is not perfect, mothers living in poverty are six to seven times more likely than mothers not living in poverty to receive these benefits (McLeod & Shanahan 1996).

These data are ideally suited to address our research questions. First, of all existing data sets that are national in scope, the NLSY is unique in offering both detailed information about household income and diverse indicators of children's well-being over time. Second, the NLSY provides extensive repeated measures of children's adjustment, spanning eight years of their lives (1986-1992), and income data from birth through 1992. Finally, the repeated measures of children are based on well-established scales that have been selected by a panel of experts in childhood competencies. One potential limitation of these data is that the oldest children were born to disproportionately young mothers. However, age selection becomes markedly less severe with the declining age of the child. Our data cover 10 to 12 year olds in 1992; among children who were 10 years old in 1992, only 14.3% had teenage mothers. By comparison, the percentage of births to teenage mothers was 12.7% in 1985 (U. S. National Center for Health Statistics 1992), which suggests the our data are comparable in this respect to a nationally representative sample.

The poverty data were used to create duration and transition variables. Poverty duration reflects the proportion of years spent in poverty by the child. Past duration refers to the proportion of years in poverty before 1986 (i.e., number of years in poverty divided by the age of the child in 1986), while current duration refers to the proportion of years in poverty between 1986 and 1992. The transition variable also was measured as a proportion, given that the children differed slightly in age. Past transitions refers to the number of times the household fell below the poverty line divided by the age of the child in 1986, while current transitions refers to the number of times the household fell below the poverty line between 1986 and 1992, divided by eight.

Since 1986, the children have been assessed every two years with the Behavioral Problems Index (BPI). The Behavior Problems Index (BPI) is a modification of Achenbach and Edelbrock's (1981) Behavior Problems Checklist created by Zill and Peterson (Baker et al. 1993). The index is completed by the mothers who report six types of behavior problems: depression/anxiety, antisocial behavior, peer problems, headstrong behavior, dependency, and hyperactivity. Factor analyses of recent waves of the Children of the NLSY data set indicate that the items of the Behavior Problems Checklist generally derive from a single factor (Baker et al. 1993). Nevertheless, the relationship between poverty and mental health has varied across the subscales in prior research (e.g., McLeod & Shanahan 1996). /1/

The analyses presented in this paper focus on two prominent indicators of children's externalizing and internalizing symptoms, antisocial behavior and anxiety-depression, respectively. We focus on these dimensions of children's well-being since previous findings, based largely on cross-sectional analytic strategies, suggest that poverty has little or no effect on children's psychosocial adjustment (Duncan & Brooks-Gunn 1997; McLoyd 1998). The antisocial subscale is comprised of

four items that reflect how often the child cheats or tells lies, bullies or is cruel to others, does not seem to feel sorry after he/she misbehaves, and breaks things on purpose or deliberately destroys his or her own things or another's things. Anxiety-depression is measured with five items that reflect how often the child feels or complains that no one loves him or her, feels worthless or inferior, is unhappy, sad, or depressed, has sudden changes in mood or feeling, and is too fearful or anxious.

In order to model change in these constructs across four waves of repeated measures, it is first necessary to determine that they are structurally invariant (i.e., that the indicators of antisocial behavior and anxiety-depression have the same relationship to their respective composite scores through time). Thus, we examined nested confirmatory factor models to determine whether the indicators of these constructs have essentially the same relationship to their latent factor scores across the four waves; because previous research suggests differences in antisocial behavior and anxiety-depression between boys and girls (e.g., Cairns et al. 1988; Angold & Rutter 1992), these models were estimated using a multiple group comparison strategy that distinguished between these subgroups. The first model allowed the factor loadings to be freely estimated across waves of data and between boys and girls. A second model then constrained the corresponding factor loadings across waves of data, while a third model constrained factor loading across waves and between genders. Differences in model fits represent nested Chi-square tests, which indicate whether the constrained models fit significantly worse than the freely estimated model.

The preliminary analyses indicated that the lambda factor loadings changed significantly through the four waves for antisocial behavior and anxiety-depression. These models were examined in detail and items were deleted from further consideration in both cases (for antisocial behavior, breaks things on purpose; for anxiety-depression, sudden mood changes and too fearful). The confirmatory factor models were re-estimated and a comparison of the models revealed that the fully constrained model did not fit the data significantly worse than the freely estimated model for antisocial behavior (difference in Chi-square = 17.48 with 14 degrees of freedom) or anxiety-depression (difference in Chi-square = 22.90 with 14 degrees of freedom). Composite scores were created by averaging these items.

## ANALYTIC STRATEGY

We approach our research questions using individual growth curve models estimated in a structural equation framework (McArdle 1986; Meredith & Tisak 1990) with corrections for missing data. This requires (1) identifying the most appropriate pattern of growth for the observations, (2) estimating models that interrelate the resulting growth models with the children's poverty experiences, and (3) implementing a multiple imputation procedure.

Identifying a Pattern fo Change. First, an individual growth model is chosen to represent the change that each person experiences through repeated longitudinal assessments. For example, the observed score of antisocial behavior  $Y$  for the  $i$ th individual at time  $t$  with a quadratic function can be represented as:

$$Y_{it} = \delta_{0i} + \delta_{1i}(\text{time}) + \delta_{2i}(\text{time})^2 + e_{it}. \quad (1)$$

That is, the antisocial score  $Y$  of individual  $i$  at time  $t$  reflects an intercept ( $\delta_{0i}$ ), a rate of change

$(\delta_{1i}(\text{time}) + \delta_{2i}(\text{time})^2)$ , and a random within-subject error of prediction ( $e_{it}$ ). All sample members are assumed to experience the same function of change (quadratic in this example), although they may differ in their initial status (intercept) and rate of change (curvature). In the latent growth curve framework, two latent variables, the intercept (or level),  $\zeta_1$ , and the slope (or shape),  $\zeta_2$ , account for the observed value  $y$ :

$$\mathbf{y} = \mathbf{\ddot{E}}_y \boldsymbol{\zeta} + \mathbf{\hat{a}} \quad (2)$$

$\boldsymbol{\zeta}$  is a vector containing the latent intercept and slope scores;  $\mathbf{\ddot{E}}_y$  contains the weights indicating the pattern of temporal change; and  $\mathbf{\hat{a}}$  is a vector of error scores.

The four waves of data allow us to examine change patterns that correspond to linear, quadratic, and logarithmic patterns of change, as well as the square root of time. These models were estimated separately for boys and girls. Multiple criteria were then used to determine the best-fitting model, including the overall fit of the models, patterns of residuals, and the squared multiple correlations for the four observed scores. Based on this procedure, the square root of time was determined to be the most descriptive pattern of change for both the antisocial and anxiety-depression scores. That is, children's antisocial behavior and anxiety-depression increases between ages 4/6 and 10/12 at a rate somewhat less than a linear pattern.

While the boys and girls share the same functional form of change across the eight years of data, they may differ in their latent mean levels or variances, or the reliabilities of the observed indicators. Therefore, a final series of models was estimated to determine the level of invariance between the boys' and girls' trajectories of antisocial behavior and anxiety-depression. The results from these nested comparisons are presented in Appendix A. (An alpha criterion of  $p=.01$  is used for model comparisons given the relatively large sample sizes and the substantial similarity of the models that differ at lesser alpha criteria). Results indicate that the reliabilities and variances of the growth curve models can be constrained between the boys and girls.

-- Table 1 --

The parameters for the final growth curves are presented in Table 1. The variances of the errors associated with observed scores, the latent levels, and the latent slopes have been constrained to be equal between boys and girls, although the mean level and shape are freely estimated. The t-values associated with the level and shape parameters indicate that the children differ significantly amongst themselves in their levels and rates of change; that is, there is significant variability to be explained in children's 1986 stability and change between 1986 and 1992. The mean levels indicate that boys have higher levels of antisocial behavior but lower levels of anxiety-depression than girls in 1986, although these differences are not great in magnitude. The mean shape parameters show a significant decrease in antisocial behavior for girls and a significant increase in anxiety-depression for both boys and girls. The indicators of model fit document that the data fit the specified model very well for antisocial behavior and adequately for anxiety-depression.

Examining Predictors of Growth Curves. Equation (1) can now be extended to predict interindividual differences in intercepts and slopes with poverty experiences. For example, variability in the individual antisocial intercepts can be modelled as

$$\delta_{0i} = \hat{a}_{00} + \hat{a}_{10}(\text{number of transitions into poverty}) + u_{0i}. \quad (3)$$

Variability in the antisocial intercepts reflects the sample's antisocial score at the intercept ( $\hat{a}_{00}$ ), interindividual differences due to the number of transitions into poverty ( $\hat{a}_{10}$ ), and a random effect of person  $i$  on the antisocial intercept ( $u_{0i}$ ). In the structural equation framework, the growth parameters (i.e., the intercept and slope) can be modelled as

$$\zeta = \hat{a} + \hat{a}\zeta + \mathbf{a}\epsilon \quad (4)$$

where  $\hat{a}$  is a vector of population means,  $\hat{a}\zeta$  contains the effects of predictors of growth, and  $\mathbf{a}\epsilon$  is a vector of residuals. Thus, variables describing children's poverty experiences ( $\hat{a}\zeta$ ) predict variability in the intercept and the slope of indicators of antisocial behavior.

Corrections for Missing Data. Analyses of longitudinal data are often hampered by missing values. For example, the 1986 data include 1339 valid values for the antisocial indicators, although the longitudinal listwise deletion includes 811 cases. Following Rubin (1987), we used multiple imputation to construct complete data sets using Schafer's (1997) software (NORM). Beginning with EM estimates as starting values (Dempster, Laird, & Rubin 1977), we augmented the data to construct posterior distributions for missing data. Independent draws were performed every 1,000 iterations (to avoid autocorrelation) and values for missing data were imputed to create 10 complete data sets containing the dependent variable composites (i.e., antisocial behavior and anxiety-depression) for 1986 1988 1990, and 1992, as well as their potential predictors. These ten data sets were created separately for boys and girls for each of the two dependent variables (antisocial behavior and anxiety-depression) for a total of 40 imputed data sets. Each of these data files was then analyzed separately. Parameter estimates from each analysis were combined through the process of multiple imputation inference to obtain the results presented in this article. /2/

Multiple imputation assumes that the data are missing at random (MAR), which means that the values of the missing information can be explained by the available, observed data. Unfortunately, the MAR assumption can not be tested formally and it is not likely that the mechanisms for missingness are completely understood or represented in the data set. Nevertheless, estimates based on a reasonable approximation of missingness mechanisms are more accurate than estimates with no corrections for missingness (Schafer 1997). The present analyses include variables that are likely to be related to missingness, including mother's education and age at the child's birth and extensive descriptions of poverty and marital experiences. /3/

We evaluate tests of our expectations with one-tailed significance level, reflecting the specific nature of our hypotheses. All analyses were performed with SAS, PRELIS/LISREL, STATA, and NORM.

## RESULTS

### Poverty and Family Experiences of the Children of the NLSY

We begin with a descriptive account of the children's poverty experiences and home settings. As shown in Table 2 (Panel A), the mean duration of poverty between birth and 1986 varies among the three racial categories, as is commonly observed (Danziger & Gottschalk 1995; Hernandez 1993): Black children spend significantly more time in poverty than Hispanic and White children, with over half of the period (.55) between birth and ages 4 to 6 in economic deprivation and somewhat less than half of the period (.44) between ages 4/6 and 10/12 in poverty. Hispanic children also spend more time than Whites in poverty. Similarly, Black and Hispanic children experience more transitions into poverty than Whites. Thus, Black and Hispanic children show more disadvantaged backgrounds in terms of poverty than White children.

-- Table 2 --

This greater economic instability about the poverty line may in part reflect distinctive features of family life in this sample. Panel B shows that the children tend to be born to younger Black mothers than White or Hispanic mothers and indeed younger mothers often face greater challenges in their transition to adulthood. Furthermore, a significantly greater proportion of Black mothers were never married, which in turn is often associated with economic challenges (Eggebeen & Lichter 1991; Lichter, McLaughlin, & Ribar 1998). Blacks are less likely to be married and, as shown in Panel B, Whites and Hispanics are significantly more likely to experience a divorce (cf. Cherlin 1992). Blacks likewise show an advantage in terms of the mother's education, although the magnitude of these differences is small: the means for all three groups reflect approximately eleven years of education. In short, Black and Hispanic children show clear disadvantages in the early life course in terms of the length of poverty, the number of transitions into poverty, and the mother's age and marital status.

Yet do these factors play a similar role as social mechanisms that give rise to children's distress? To answer this question, we turn to causal models that interrelate poverty experiences with the growth curve models of antisocial behavior and anxiety-depression.

### Children's Poverty Experiences and Psychosocial Adjustment in Longitudinal Perspective

We expect that past and present poverty duration and transitions into poverty predict developmental patterns of antisocial behavior and anxiety-depression. The models were specified to insure that all predictor variable were temporally antecedent to predicted outcomes: past poverty (covering birth to 1986) predicts the antisocial intercept, which represents the latent score in 1986, while both past and current measures of poverty predict variability in the antisocial slope, which represents change between 1986 and 1992. The models also test for race differences by including dummy variables for Hispanic and Black identity, as well as interaction terms between the race dummies and the poverty variables.

Given the potentially large number of predictors, an initial model that included the additive and interactive effects of the poverty and race variables was estimated for boys and girls simultaneously. The variables were centered in order to avoid multicollinearity (Jaccard, Turrisi, & Wan 1990). These

models were trimmed (any variable significant in either equation was retained) and re-estimated with control variables typically included in studies of poverty and children's well-being (mother's age at the child's birth, the mother's education, and whether the mother was never married or ever divorced). Finally, these analyses were performed both for the listwise longitudinal deletion and the multiply imputed data sets.

- Table 3a -

Antisocial Behavior. Table 3a shows the listwise results for antisocial behavior. A nested Chi-square comparison revealed that the effects of the predictors could be constrained to be equal across genders (difference in Chi-square=21.79 with 17 degrees of freedom). Indicators of model fit show that the model specification fits the observed data well.

Variability in the intercept of antisocial behavior, which approximates the observed initial value of antisocial behavior in 1986, is significantly and positively predicted by the duration of past poverty ( $b=.38$ ,  $t=2.81$ ). The within-group standardized effect of past duration is .19 for both boys and girls (results not tabled), the largest effect size observed among the predictors. Thus, as children spend a greater proportion of their time from birth to 1986 in poverty, their level of antisocial behavior in 1986 increases.

Neither the past nor current duration of poverty is a significant predictor of change in antisocial behavior between 1986 and 1992. However, differences are observed among the races, with Hispanics experiencing slower rates of increase than Whites ( $b=-.09$ ,  $t=-1.68$ ) and Blacks experiencing faster rates of increase than Whites ( $b=.08$ ,  $t=1.65$ ). A significant interaction between race and poverty is also observed: the Black by current duration interaction term is significant and, in the context of the additive effects, indicates that the longer Black children are in poverty between 1986 and 1992, the slower their rate of increase in antisocial behavior. This runs contrary to expectations and is difficult to explain. Finally, when compared with the children of married mothers, the children of mothers who have ever experienced a divorce experience a significantly faster rate of increase in their antisocial behavior ( $b=.12$ ,  $t=2.52$ ), while the children of more highly educated mothers experience a slower rate of change ( $b=-.02$ ,  $t=-1.70$ ).

-- Table 3b --

Table 3b presents findings from the analyses based on multiply imputed data sets. /4/ As observed in the listwise deletion, the effect of past duration on level is significant and positive for both boys ( $b=.44$ ,  $t=2.81$ ) and girls ( $b=.42$ ,  $t=2.84$ ). The within group standardized solution--reflecting an average of the standardized estimates across the 10 sets of results--shows a standardized effect of past duration of .22 for boys and .22 for girls (results not tabled).

However, in contrast to the results based on listwise deletion, these estimates show a significant race and poverty interaction involving Hispanic boys and the frequency of their transitions into poverty between birth and 1986 ( $b=1.55$ ,  $t=2.21$ ). In the context of the additive effects, this interaction term indicates that as Hispanic boys experience more transitions into poverty prior to 1986, their antisocial

behavior score in 1986 increases more sharply when compared with White boys. This effect is observed controlling the past duration of poverty, suggesting that transitions into poverty reflect a unique source of distress. The imputed results also reveal that the sons of mothers who were never married have higher levels of antisocial behavior in 1986 when compared with the sons of married mothers ( $b=.35$ ,  $t=2.21$ ). These two effects are limited to boys, which may reflect their heightened vulnerability before pubescence (Angold & Rutter 1992) or greater validity in the measure for boys (Carins et al. 1988). However, one significant effect is observed for girls only: girls with younger mothers have higher antisocial scores in 1986 ( $b=.03$ ,  $t=1.74$ ).

Turning to the predictors of the antisocial slopes, we likewise observe differences between the listwise and imputed results. First, the current duration of poverty significantly predicts the rate of change in antisocial behavior for both boys ( $b=.15$ ,  $t=1.98$ ) and girls ( $b=.15$ ,  $t=1.91$ ). That is, as the proportion of time spent in poverty between 1986 and 1992 increases, the rate of increase in children's antisocial behavior becomes faster through the same time period. The within-group standardized estimates are .20 for boys and .19 for girls (results not tabled). To put this and the standardized effects of past duration in perspective, we note that the standardized effect of Mother Never Married on the boy's 1986 level, the other highly significant predictor in this model, is .18.

Second, the imputed results do not replicate the anomalous finding with respect to Black children and current duration. With corrections for missingness, there is no indication that increased exposure to poverty improves the psychosocial profile of Black children. Finally, the significant effect of divorce is limited to girls: when compared with girls with married mothers, girls whose mothers have ever experienced a divorce show faster rates of increase in their antisocial behavior ( $b=.13$ ,  $t=1.87$ ).

Because of the discrepancies between the listwise and imputed results, an additional set of analyses were conducted to learn more about potential mechanisms of missingness. For each wave of data, missing status for antisocial behavior (0=no, 1=yes) was predicted with the past poverty experiences, race variables, and controls using logistic regression. Results (not shown) indicate that mother's education and divorce status consistently predictors of antisocial behavior's missingness. Divorce has a relatively large effect: the children of mothers who ever experience a divorce are typically over twice as likely to have a missing value on the dependent variable, when compared with children whose mothers have not experienced a divorce. Mother's education has a smaller, negative effect (e.g., odds ratio = .85,  $z=-2.49$ , in 1988). The results also show that Blacks are significantly more likely than Whites to have a missing value for antisocial behavior in 1988 (odds ratio = 2.56,  $z=2.81$ ), while Hispanics are more likely than Whites to have a missing value in 1990 (odds ratio = 1.75,  $z=2.044$ ). Thus, the results based on listwise deletion underrepresent Black and Hispanic children of divorced, less-educated mothers. These underrepresentations violate the listwise assumption of missingness that is completely at random (Little & Rubin 1987), which in turn leads to biased results with the listwise procedure.

-- Table 4a Here --

Anxiety-Depression. The listwise results for anxiety-depression are presented in Table 4a. A nested Chi-square test indicates that the effects of the predictors can be constrained to be equal between boys

and girls (difference in Chi-square = 33.68 with 21 degrees of freedom). The indicators of model fit show that the data fit the model reasonably well.

As observed for antisocial behavior, the effect of past duration on the intercept of anxiety-depression is positive and significant ( $b=.50$ ,  $t=4.17$ ): as children spend a greater proportion of time between birth and 1986 in poverty, their level of anxiety-depression in 1986 increases significantly. The standardized effect of past duration on the 1986 level is .23 for boys and .24 for girls (results not tabled). The estimates also indicate that, compared with White children, Black children show lower levels of anxiety-depression.

With respect to the slope of anxiety-depression, the past transitions into poverty variable is significant ( $b=.25$ ,  $t=1.76$ ): the more transitions into poverty children experience between birth and 1986, the more sharply their anxiety-depression increases between 1986 and 1992. This finding suggests that not only can poverty experiences have delayed effects on children, but these effects manifest in rates of change, not levels. The within-group standardized effect of past transitions is .09 for boys and .09 for girls (results not tabled), which is small in magnitude. The Black by Past Duration interaction is also significant and indicates that poverty experiences between birth and 1986 are especially detrimental to Black children's rate of change in anxiety-depression, when compared with White children. Finally, as the mother's age at the child's birth increases, the rate of change in anxiety-depression increases ( $b=.02$ ,  $t=2.74$ ). This finding runs counter to expectations.

-- Table 4b Here --

The results based on multiply imputed data sets are presented in Table 4b and again show both similarities and differences when compared to the listwise results. Consistent with the listwise findings, past duration significantly increases the level of anxiety-depression in 1986 ( $b=.35$ ,  $t=2.97$  for boys,  $b=.40$ ,  $t=3.44$  for girls). The within-group standardized solution shows a standardized effect of past duration of .18 for boys and .20 for girls (results not tabled). Also consistent with the listwise results, the effect of past transitions on the rate of change is significant, although this is observed only among the boys ( $b=.26$ ,  $t=1.81$ ); the standardized effect is .10, suggesting a small effect. The imputed results also show that Black boys have slower rates of increase in anxiety-depression ( $b=-.21$ ,  $t=-3.66$ ) and Black girls have lower levels of anxiety-depression ( $b=-.31$ ,  $t=-3.29$ ). Finally, the interaction term between Hispanic and past duration is significant among the boys ( $b=.31$ ,  $t=2.38$ ); interpreted in the context of the additive effects, this interaction indicates that the effect of poverty's duration between birth and 1986 is especially acute for the Hispanic boys' rate of increase in anxiety-depression between 1986 and 1992. This finding likewise raises the possibility the poverty can have delayed effects on later patterns of growth.

Finally, an analysis of missing value status for anxiety-depression was conducted in the same manner as reported for antisocial behavior (see above). Consistent with previous results, the children of mothers who ever experience a divorce are typically over twice as likely to have a missing value for anxiety-depression, while the children of more educated mothers are slightly less likely to have a missing value. Also consistent with previous results, Black children are more likely in 1988 and Hispanic

children are more likely in 1990 to be missing on anxiety-depression. That is, the multiple imputation procedure corrects for biases stemming from the underrepresentation of Black and Hispanic children of divorced, less educated mothers.

## CONCLUSIONS AND DISCUSSION

Children's poverty experiences and psychosocial adjustment are dynamic and their study requires developmentally-sensitive conceptualizations, measurement strategies, and methods. First, our analyses point to the importance of conceptualizing poverty experiences in dynamic terms. The results support both the deprivation and the decrement hypotheses, suggesting that duration and transitions represent unique sources of distress for families. Thus, as the proportion of years spent in poverty increases between birth and 1986, the children's levels of antisocial behavior and anxiety-depression in 1986 are likely to worsen. Yet, controlling duration, we find that past transitions significantly predict the rate of change in anxiety-depression among boys between 1986 and 1992. As boys experience more transitions into poverty between birth and 1986, their rate of increase in anxiety-depression between 1986 and 1992 increases.

Furthermore, these relationships are frequently contingent on the timing of durations and transitions. The past duration of poverty (extending from birth to 1986) predicts levels of antisocial behavior and anxiety-depression in 1986, but it is the current duration of poverty (extending from 1986 to 1992) that predicts the rate of increase in antisocial behavior after 1986. The results also provide evidence that past transitions into poverty predict children's well-being. Interestingly, past transitions predict both level in 1986 (antisocial behavior among Hispanic boys) and rate of change between 1986 and 1992 (anxiety-depression among boys). Thus, contemporaneous and delayed effects of poverty on children's well-being represent distinct analytic possibilities. However, the results provide no support for interactive relationships between past and current durations or transitions. Contrary to expectations based on notions of "disablement" or "stealing," past and present poverty experiences do not appear to interact, but rather have additive effects on children's development.

The results also underscore the need for statistical methods that can examine children's developmental patterns of well-being. Of the nine significant relationships observed between poverty and psychosocial adjustment, four involved rates of change between 1986 and 1992 and five involved level in 1986. Consistent with insights derived from the emerging interdisciplinary field of developmental science (Cairns, Elder, & Costello 1996), we observe that the predictors of rates of change are not necessarily coterminous with predictors of levels of a variable. Virtually all previous research has examined children's well-being cross-sectionally, a measurement strategy that crudely conflates elements of both level and change. Yet a more finely-grained measurement strategy reveals that the standardized effects of poverty's duration ranges from .18 to .24, while the simple additive effect of past transitions on the slope of anxiety-depression was .10. In the context of the behavioral sciences, particularly the study of poverty and its effects on young people, the effects of past and current duration are not small and indeed duration and transitions represent the most powerful predictors of these outcomes in our models.

Finally, the results provide evidence for differences by race and gender: the results suggest that Hispanic boys may be especially vulnerable to the deleterious effects of poverty. Transitions into

poverty prior to 1986 have stronger negative implications for the 1986 level of antisocial behavior among Hispanic boys than White boys. Furthermore, the rate of change in anxiety-depression between 1986 and 1992 is greater with increases in poverty's duration prior to 1986 among Hispanic boys as compared with White boys.

These findings suggest that very early experiences of poverty, reflecting duration or transitions before ages 4 to 6, may be particularly detrimental to the psychosocial development of Hispanic boys. While the present data do not allow for an examination of the mechanisms that explain this relationship, ethnographic and epidemiological evidence is suggestive. Matute-Bianchi (1986) reports that while different minorities encounter negative stereotypes in the schoolplace regardless of their academic achievement, these stereotypes may be especially pronounced for Chicano students, who are frequently viewed as migrants or immigrants. Teachers often believe that Chicano students must cross cultural and language boundaries to succeed in the Anglo school context, a labelling process which can be associated with a "disorganized personality" (McCarthy and Yancey 1971) characterized by lowered self-conceptions. Indeed, drawing on nationally representative sample, McDermott and Spencer (1997) report that the Hispanic children of less educated parents are markedly more likely to exhibit aggressive behaviors and diffident disorders (Tables 5 and 6), which, the authors speculate, reflects a recent history of immigration (see also, Ramirez 1988; Spencer, Swanson, & Cunningham 1991). These processes may be especially invidious during the first years of daycare and formal schooling, when the language barrier is apt to be most troublesome.

Nevertheless, these findings must be viewed with caution. First, processes in the school may not account for the effects of poverty between birth and ages four to six, suggesting that how poverty is experienced within Hispanic families may be unique. Second, additional control variables might eliminate these race-specific findings (McLoyd 1991), although the models include standard controls in this research context. Finally, given the substantial diversity of experiences among Hispanics by national background and region of residence, further research is needed to replicate and interpret these findings.

The results clearly demonstrate the importance of correcting for biases due to missingness when using longitudinal data from the NLSY. To date, no published studies of children and poverty have corrected for missingness with multiple imputation, although the present findings show that results are notably different based on listwise and imputed data sets. Results based on listwise deletion revealed several anomolous findings (e.g., the rate of increase in antisocial behavior is lesser for Hispanic children as their duration of current poverty increases), none of which were observed in the imputed results. Additionally, several expected effects were significant only in the imputed findings (e.g., the effect of current duration on the antisocial slope). Analyses revealed that the listwise results were biased because of an underrepresentation of Black and Hispanic children of less educated, divorced mothers. Future research could profitably benefit from refinements in the more precise identification of mechanisms of missingness in the NLSY and in statistical strategies to assess overall model fit and to compare nested models.

Several limitations to the present study should be acknowledged. Although the joint focus on duration and transitions proves useful, such a conceptualization fails to capture the full complexities of children's longitudinal poverty experiences. Cycles of movement into and out of poverty may not indicate substantial changes in a family's circumstances (Ashworth et al. 1994; Citro & Michael 1995).

Thus, future research should address the difficult issue of temporal patterns of the severity of deprivation. Also, biases due to endogeneity may be difficult to cover fully in the context of poverty's effects on family members (Mayer 1997). To the extent that poverty experiences and children's psychosocial development reflect mechanisms not represented among the controls, the estimated effects of poverty on children's psychosocial development may be significantly biased. On the other hand, some research suggests that parental characteristics may reasonably be treated as exogenous variables (Manski, Sandefur, McLanahan, & Powers 1992).

Nevertheless, the present study demonstrates the utility of a dynamic approach to children's poverty and well-being that emphasizes developmentally-sensitive concepts and methods. The children of contemporary America are children marked by change and their life-histories, as brief as they may seem, add much to the study of their lives beyond cross-sectional descriptions. This merging of life course themes with the study of poverty and children's well-being offers promise for a better understanding of human biographies as they reflect the imprint of changing societies and families.

## Endnotes

/1/ A common criticism of the BPI is that any observed relationships between social factors and children's mental health reflect the effects of those social factors on mothers' experiences and the mothers' subsequent perceptions of their children. However, evidence suggests that mothers can accurately assess their children's antisocial behavior and depression (Bird, Gould, & Staghezza 1992) and that earlier claims of bias may have been overstated (Richters 1992).

/2/ Specifically, the multiple imputation strategy partitions observed variance into within-imputation and between-imputation components. Total variance is calculated as

$$T = \bar{U} + \left(1 + \frac{1}{m}\right)B$$

where  $m$  is the number of imputed data sets,  $\bar{U}$  is the simple average of complete-data variance estimates, and the between imputation variance is calculated as

$$B = \frac{1}{(m-1)} \sum_{t=1}^m (\hat{Q}^{(t)} - \bar{Q})^2$$

where  $\hat{Q}^{(t)}$  is the complete-data point estimate and  $\bar{Q}$  is the simple average of complete-data point estimates. Based on these values, a confidence interval can then be constructed as  $\bar{Q} \pm t_v \sqrt{T}$ . Degrees of freedom for this interval are estimated as

$$v = (m-1) \left[ 1 + \frac{\bar{U}}{\left(1 + \frac{1}{m}\right)B} \right]^2 .$$

/3/ Although multiple imputation provides superior point estimates and confidence intervals for model parameters, indices of model fit are currently not estimable. Meng and Rubin (1992) present one method for comparing likelihood-ratio tests, but these techniques have not yet been implemented in the context of structural equation modeling. Because of the difficulties in comparing fit across nested models within the multiple imputation framework, we tested measurement invariance and baseline growth functions using listwise deletion. This was done to ensure that, if measures were not invariant across gender--or if boys and girls had different growth functions--then the appropriate interaction terms could be used in the process of multiple imputation.

/4/ The analytic strategy based on the multiple imputations differs from procedures used with listwise matrices in two respects. First, because the model trimming procedure was based on imputed results, the final set of predictors differs somewhat from the final model based on listwise results. Second, because multiple imputation does not allow for formal tests that compare nested models, we present imputed findings separately for boys and girls.

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