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The Impact of Youth Characteristics and Experiences on Transitions Out of Poverty

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ABSTRACT: Although the causes of intergenerational transitions from poverty have attracted the attention of economists and sociologists in recent years, there have been few attempts to integrate ideas from both disciplines. Using a sample of young adults who were impoverished as youth, this study explores the effects of a number of background characteristics such as early welfare dependency, substance abuse, teen parenthood and parent's educational attainment on the family income levels of young adults. It finds that many of these background variables have significant indirect influences on family income through intervening variables, especially the respondent's own educational attainment, welfare dependency, and work experiences.

INTRODUCTION

Since the publication of William Julius Wilson's *The Truly Disadvantaged* in 1987, poverty research has reemerged as a major focus of economics and sociology. An important portion of this literature has focused on the intergenerational transmission of poverty. Of particular concern is that poor children have a higher probability of becoming poor adults than do children from non-poor families. This

intergenerational transmission of poverty, however, is not deterministic; studies have found a wide variance in the adult economic status of poor children (Altonji & Dunn, 1991; Corcoran, Gordon, Laren, & Solon, 1990; 1992). To explain this variation, much recent research focuses on the identification of the mechanisms which permit poor children to break intergenerational cycles of poverty (see, for example, Borjas, 1992; Cohen & Tyree, 1986).

The development of large panel data sets, especially the Panel Study of Income Dynamics (PSID) and the National Longitudinal Study of Youth (NLSY), has enabled many studies of the determinants of intergenerational economic mobility. The ability to follow individuals over time, as they leave their parents' households, enter the work force, and start families, has greatly expanded our understanding of poverty transitions.

However, much of the research, particularly that conducted by economists, has provided little analysis of the actual mechanisms for transitions out of poverty. While most of these studies identify important background characteristics affecting poverty, they fail to capitalize on the ability of longitudinal data sets to provide information on the paths through which background variables have influence. Youth background characteristics may directly affect an individual's income potential or they may do so indirectly through intervening decisions and events such as years of education received, marriage, and work experience. Early studies of poverty transitions (Blau & Duncan, 1967) developed these "intervening variables models" in great detail, and they provide a good general framework for analysis of these new data sources.

In this paper, we develop an intervening variable model which builds on the general model developed by Blau and Duncan. Using the National Longitudinal Survey of Youth (NLSY) data base, the total effect of background variables on future well-being is analyzed and the paths through which this impact occurs are considered. We include more intervening variables than Blau and Duncan to incorporate recent theories of poverty including the theory of welfare dependency (e.g., Murray, 1984) and theories of underclass development (e.g., Wilson, 1987). An important finding is that each of the six indirect paths through which background is expected to influence future income is a significant path for at least one background variable.

The remainder of the paper develops a model of intergenerational income mobility and conducts an empirical analysis using the NLSY data base. We first review related literature, and then present the set-up of the intervening variable model. OLS regression is used to produce estimates of the total effect that each background variable has on standard of living. Then, the total effects are decomposed into direct and indirect effects, and the paths through which each background variable acts on standard of living are presented. Finally, policy implications and suggestions for future research are presented in the concluding section.

RELATED LITERATURE

Empirical work on poverty and income mobility suggest a number of factors which influence the likelihood that impoverished youth will escape poverty. For the purpose of organization, we group these factors into several categories: 1) family background characteristics, 2) individual characteristics, 3) ethnicity and gender, and 4) location.

Family Background Characteristics

Much recent research addresses the relationship between family background and income mobility. There is now general agreement that the effect of the socioeconomic status of parents on the income mobility of their children is significant. Economists have generally found a relatively small, but significant correlation between parents' income and their children's earnings (Behrman & Taubman, 1985; Corcoran, et al., 1990, 1992; Krein & Beller, 1988; Peters, 1992; Solon, 1992; Solon, Corcoran, & Laren, 1991). For example, using a sample of parent/child pairs from the National Longitudinal Surveys, Peters (1992) estimated that parents' log income explains between 9% and 11% of the variation in children's log incomes, and Solon (1992) found substantial father-son correlations in hourly wages and family income. Findings of high correlation in income between siblings (e.g., Corcoran, et al., 1991) are also consistent with the argument that family background has significant influence on economic status.

The effects of growing up in a welfare dependent family on children's ability to later escape poverty has received considerable attention in the literature. The arguments are often expressed in terms of intervening variables. Critics of welfare, such as Charles Murray (1984), argue that public assistance acts through a set of intervening variables to perpetuate poverty. In particular, a history of welfare dependency discourages work, education and marriage, and these intervening variables have an adverse effect on income. Others maintain that the indirect disincentive effects are much smaller than the critics of welfare suggest (Ellwood & Summers, 1996; Sawhill, 1988). The link between public assistance and transitions from poverty has recently been explored using panel data sets like the NLSY (e.g., Antel, 1992; Kimenyi, 1991). Our empirical estimation attempts to include early welfare dependency as a background variable and allows it to work through a set of intervening variables in the determination of the respondents income position as an adult.

A number of other family background characteristics have been shown to be important predictors of intergenerational income mobility. For example, Cohen and Tyree (1986) use PSID data to show that the educational and occupational characteristics of parents of upwardly mobile individuals are more favorable. Krein and Beller (1988) use Becker's theory of household production and NLSY data to show that growing up in a single parent family has a negative impact on

childrens' educational attainment. Although the literature clearly shows the importance of family background, it has not focused on how background can operate indirectly through a set of intervening variables to affect the economic performance of the son's and daughters of the poor.

Individual Characteristics: Human Capital, Aptitudes, Marriage, and Lifestyle

Investments in human capital play a role as both background and intervening variables. For example, a parent's educational attainment is a background influence that can affect their children's educational attainment, which, in turn, influences future income mobility. Therefore, the parent's educational attainment can be considered a background variable and their children's educational attainment an intervening variable.

That differences in educational attainment between the rich and the poor is a major contributor to the intergenerational transmission of poverty is a popular theme in the economics literature (Bowles, 1972; Cohen & Andrea, 1986; Danziger, 1991; Glazer, 1986; Sawhill, 1988) and there is mounting evidence that the effect of education on poverty is becoming more important over time (Danziger, 1991). Other investments in human capital effecting income mobility are on-the-job training acquired through work experience (Mincer, 1974), formal vocational training (Bassi & Ashenfelter, 1986) and training gained through military service (Seeborg, 1994).

More controversial is the link between intelligence and economic outcomes. In *The Bell Curve*, Herrnstein and Murray (1994) argue that intelligence is a highly heritable trait that is closely linked to socio-economic achievement. Their proxy for intelligence is the score from the Armed Forces Qualification Test (AFQT) which was administered in 1980 to all respondents to the National Longitudinal Survey of Youth. They conclude that intelligence, as measured by AFQT, is more important than parental socio-economic background in the determination of the probability of respondents being in poverty in 1990.

The Bell Curve has come under considerable criticism on methodological grounds. For example, in a review article which is very critical of much of Herrnstein's and Murray's methodology, Goldberger and Manski (1995) question whether AFQT is an adequate measure of intelligence. Since it was administered to the respondents when they were 15-23 years old, the scores could measure educational attainment rather than cognitive ability (p. 768). We agree with the Goldberger and Manski critique and feel that it is best to view AFQT scores as a measure of the aptitudes of respondents rather than as a pure measure of innate ability. It may, in part, reflect heritable intelligence, but no doubt also reflects the cumulative effects of all types of investments in human capital, from nutrition to learning within the home to job training to formal education.

Marital choices are also strongly associated with poverty status. Cohen and Tyree (1986), for example, show that being married is a powerful predictor of the escape from poverty of the sons and daughters of the poor. But there is little agreement among social scientists on the economic determinants of marital status. For example, some argue that family structure has been most adversely affected by disincentive effects of government programs, especially public assistance programs (Murray, 1994) while others place the blame on the lack of local employment opportunities, especially the lack of employment for young men (Wilson, 1997).

Teenage childbearing is another lifestyle choice which is receiving attention in the literature. Byrne, Myers, and King (1991) show that teenage motherhood has large and significant negative impacts on educational attainment, labor supply and wages, even after controlling for a number of background characteristics such as ability, family structure, parents' education and race. Research using sister pairs to compare a teen mother and a non-teen mother from the same family found smaller effects, presumably because of better controls for background (e.g., Geronimus & Korenman, 1992). Through the intervening variable framework applied in this paper, it is possible to explore how teen motherhood can affect income indirectly through its effect on such intervening variables as work experience, education and marriage.

The economic effects of other lifestyle choices are receiving increasing attention in the literature. As expected, criminal activity appears to have adverse effects on employment (e.g., Grogger, 1992). But the evidence on the effects of drug and alcohol abuse are mixed with some recent studies using NLSY data indicating that drug users actually receive higher wages than non-drug users (Gill & Michaels, 1992; Register & Williams, 1992; Kaestner, 1991).

Ethnicity and Gender

The literature on intergenerational poverty transitions pays particularly close attention to the effects of race. Cohen and Tyree (1986) find that being black is one of the strongest predictors of the income mobility of the poor. Both economists (e.g., Borjas, 1992; 1995) and sociologists (e.g., Wilson, 1987) have explored mechanisms making upward mobility difficult for blacks, especially lack of employment opportunities, neighborhood effects, and the effects of government programs. These analyses are most often couched in terms of intervening variables. For example, Wilson (1987) argues that being black increases the probability of exposure to adverse social and economic conditions (i.e., underclass environment) which in turn reduces the probability of intergenerational movements out of poverty.

Gender is also important. The "feminization" of poverty is a topic of much discussion (e.g., Bane, 1986; Wilson & Neckerman, 1986). One primary explanation of the feminization of poverty is that women are much more likely than men to

assume responsibility for children when marriages dissolve and in the event of out of wedlock births.

Location

Location of residence and the resultant "neighborhood effects" also play an important role in determining intergenerational transitions from poverty (e.g., Borjas 1995; Cohen & Tyree 1986; Wilson, 1987). Cohen and Tyree (1986), for example, use PSID data to show that parents of upwardly mobile youth are more likely to have resided outside of the South and to have lived in more affluent communities.

In sum, the literature suggests a number of channels through which early background and demographic variables might effect the income mobility of impoverished youth. We believe that an intervening variables framework is general enough to permit incorporation of many causal chains suggested in the literature.

EMPIRICAL MODEL

Intervening Variables Framework

In an intervening variables framework, background variables can have direct and indirect effects on a youth's later standard of living. Each background variable can exert indirect effects on standard of living through a set of intervening variables, such as educational attainment, military service, welfare dependency, work experience, marriage and family size. This is shown schematically in Figure 1.

To illustrate, consider the possible effects a 15 year old girl's decision to deliver and raise a baby might have on her subsequent relative income position. Figure 2 indicates likely direct and indirect effects. The responsibility of single parenthood could directly decrease potential income by reducing the range of job search. Teen motherhood may also indirectly affect future income levels through such channels as decreasing the mother's level of formal educational attainment, decreasing her subsequent work experience, making her more welfare dependent, and reducing her odds in marriage markets. These indirect effects not only influence potential

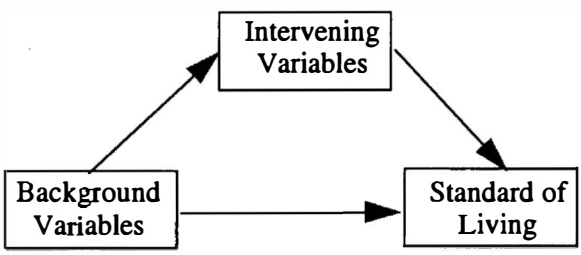

Figure 1.

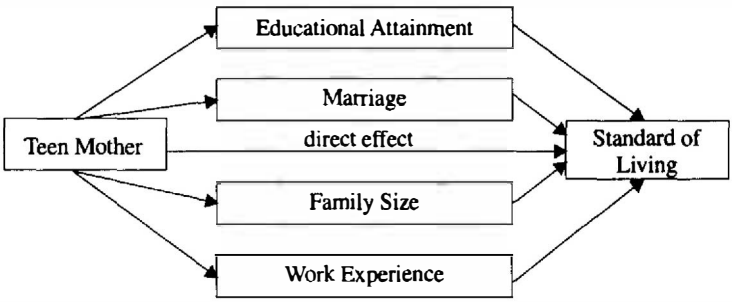

Figure 2.

wages, but also the availability of non-work income and the respondent's attitudes toward marketwork.

Empirical Model and Data Source

Table 1 provides variable definitions and indicates whether the relationship between each independent variable and dependent variable is expected to be positive (+) negative (-) or uncertain (?). The variables used in our empirical model are all derived from the National Longitudinal Survey of Youth (NLSY).[1] Our sample consists of youth who were aged 14 through 17 and in poor families in 1979. The NLSY panel was interviewed annually from 1979 through 1990[2] (Center for Human Resource Research, 1993).

The dependent variable, POVRATIO, is designed to measure the respondent's relative family income position. It is the ratio of actual total net family income to the official poverty level of income for that family. We feel that POVRATIO is superior to a poverty status dummy variable because it provides more information of the position of the respondent's income relative to the poverty line. POVRATIO is also superior to total family income because it automatically takes into account the effect of family size on living standards. The denominator of POVRATIO is the poverty level of income and larger families have larger official poverty levels of income.

The independent variables are organized into five categories: family characteristics, individual characteristics, demographics, region, and intervening variables. With the exception of the intervening variables, most of these variables where measured during the early survey years (e.g. 1979; 1980). They represent various youth characteristics and early formative experiences.

The path framework discussed in the previous section posits that a youth's characteristics and early experiences can have both direct and indirect effects on income mobility. Family background characteristics include parents' educational attainment (EDMOM and EDDAD) and the family structure under which the youth lived in 1979 (FEMHEAD). We also consider the influences that early eco-

Table 1. Variable Definitions

	Definitions	*Expected Sign*
Dependent		
POVRATIO	Ratio of actual total family income to the poverty level income	N/A
Family Characteristics		
Parental Characteristics:		
EDMOM	One if respondent's mother had at least 12 years of education	(+)
EDDAD	One if respondent's father had at least 12 years of education	(+)
FEMHEAD	One if respondent lived in a female headed household in 1979	(–)
Early Economic Conditions:		
WELFARE79	One if the respondent's family received at least some income from public assistance in 1979 and 1980	(–)
PERSISTPOV	Proportion of survey years through age 18 where respondent's family income was below poverty level	(–)
Individual Characteristics		
Human Capital:		
EDEXPECT	Number of years of education expected by respondent in 1979	(+)
AFQT	Deviation from mean for age group of Armed Forces Qualification Test: Percentile score	(+)
Lifestyle:		
SUBSTANCE	One if respondent was a heavy user of cocaine, marijuana or alcohol as a youth	(–)
TEENPARENT	One if respondent became a parent before 18 years of age	(–)
Demographics		
BLACK	One if respondent is black	(–)
FEMALE	One if respondent is female	(–)
Region		
SOUTH	One if respondent lived in South region (1979 interview)	(?)
N.CENTRAL	One if respondent lived in N. Central region (1979 interview)	(?)
WEST	One if respondent lived in West region (1979 interview)	(?)
Intervening		
Human Capital:		
EDUCATION	Actual number of years of formal education (1990 Interview)	(+)
MILITARY	One if in military for at least one full year	(+)
HRSWORK	Average hours worked per year from 1979 through 1989	(+)
Family Structure:		
MARRIED	One if respondent was married (1990 interview)	(+)
FAMSIZE	Actual number in respondent's family (1990 interview)	(–)
Welfare Dependency:		
%WELFARE	Percent of years from 1979 through 1989 during which respondent received food stamps of AFDC	(–)

Note: *Symbols: (+) indicates a hypothesized positive relationship to POVRATIO
(–) indicates a hypothesized negative relationship to POVRATIO
(?) indicates an uncertain relationship to POVRATIO

nomic conditions such as welfare dependency in 1979 (WELFARE79) and the persistence of poverty of the respondent's family during his/her teenage years (PERSISTPOV) have on subsequent standard of living.

The "individual characteristics" defined in Table 1 are early characteristics and influences that are unique to the respondent. Some of these relate directly to human capital, such as educational expectations (EDEXPECT) and educational aptitudes (AFQT). Others involve early lifestyle choices, such as involvement with alcohol and drugs (SUBSTANCE) and becoming a parent before the age of eighteen (TEENPARENT).

Finally, a number of demographic influences may also be important. Both race (BLACK) and gender (FEMALE) have been shown to be linked to the probability of being poor and to intergenerational transitions from poverty.

One limitation of the NLSY is that it does not have detailed information on the neighborhoods in which the respondents grew up. Consequently it is hard to control for the effects of neighborhood on intergenerational transfers from poverty as suggested in the work of Wilson (1987) and others. We have however, included dummy variables for regional effects (SOUTH, N. CENTRAL, and WEST). These variables are included strictly as controls and no attempt is made to isolate their direct and indirect effects on POVRATIO.

The indirect effects of background variables on POVRATIO work through a set of intervening variables. These variables measure developments in the life of the respondent which generally occurred during the decade of the 1980s. Some are related to investments in human capital, such as educational attainment (EDUCATION), military service (MILITARY), and work experience (HRSWORK). The remaining three intervening variables measure the degree of welfare dependency (%WELFARE) and decisions relating to family structure (MARRIED and FAMSIZE).

The National Longitudinal Survey of Youth (NLSY) is well suited for the study of transitions of young persons from poverty for several reasons. First, since minority youth and economically disadvantaged white youth are over sampled, we have a relatively large sample of poor youth for our analysis. Second, it is possible to explore the influence of family background and other early experiences on subsequent income mobility because many youth in the NLSY were still living as dependents in 1979, the first year of the panel survey.[3] Finally, since the NLSY interviewed youth annually through the entire decade of the 1980s, we can trace respondents' decisions after they left their parents' homes, especially decisions relating to formal education, vocational training, military service, marriage and family size.

Table 2 provides summary statistics. Since the sample includes only youth who were poor in 1979, and since the NLSY over samples minorities, these statistics are not representative of the entire youth population. The mean value of POVRATIO is 2.13, implying that, on average, members of the sample had a 1989 family

Table 2. Means

Dependent	
POVRATIO	2.13
Family Characteristics	
Parental Characteristics	
EDMOM	0.29
EDDAD	0.26
FEMHEAD	0.40
Early Economic Conditions	
WELFARE79	0.31
PERSISTPOV	0.76
Human Capital	
EDEXPECT	13.00
AFQT	1.82
Lifestyle	
SUBSTANCE	0.18
TEENPARENT	0.12
Demographics	
BLACK	0.41
FEMALE	0.50
Intervening	
Human Capital	
EDUCATION	11.92
MILITARY	0.33
HRSWORK	1005
Family Structure	
MARRIED	0.41
FAMSIZE	3.09
Welfare Dependency	
%WELFARE	0.17
Sample Size	940

income which was about twice the poverty level. Since all members of the sample were below the poverty level in 1979, the group as a whole experienced significant upward intergenerational income mobility over the 1980s.[4] Table 2 also indicates that only about one-fourth of the respondents' parents had completed high school and only 40% of the respondents were married in 1989.

In the following two sections, we explore the effects that family characteristics, individual characteristics, race and gender have on the respondent's standard of living as measured by POVRATIO.

TOTAL EFFECTS OF BACKGROUND VARIABLES ON "POVRATIO"

The first stage of the empirical analysis is to estimate the total effects of the background variables on LOG(POVRATIO), which is a simple log transformation of POVRATIO.[5] Table 3 presents the background model estimates (except for the regional dummies) for the entire sample.

Since intervening variables are not included in this model, the coefficients will pick up the total effect that the background variables have on LOG(POVRATIO). In Section IV, we decompose the total effect of each of the background variables into direct and indirect effects.

Focusing on the total effects of background characteristics is an important part of the analysis, though, since our best prediction of the effect of early policy intervention, designed to change one of the background variables, is given by the coefficient on the background variable in that model. Later, when we add the intervening variables to the equation with the background variables, the coefficients for each background variable reflects only the direct effect, rather than total effect, of that variable on LOG(POVRATIO).

Column 1 of Table 3 presents the results of estimation of the background model for the entire sample. In the "parental characteristics" category of variables, mother's educational attainment (EDMOM) and living in a female headed household (FEMHEAD) were significant predictors of LOG(POVRATIO). Interestingly, the magnitude of the two significant coefficients is similar. This may indicate that the negative effect of growing up in a female headed household can be offset by having a highly educated mother.

In earlier runs, other background variables were tried but later discarded because of insignificance. For example, we found that several standard measures of the parents' early employment situation did not prove to be significant predictors of their childrens' subsequent standard of living.

"Early economic conditions," as measured by PERSISTPOV, are important. Although all respondents were poor in 1979, those who experienced the most persistent poverty had significantly lower standards of living in 1989. The insignificance of WELFARE79 is not consistent with the arguments of some of the harshest critics of the welfare system, such as Charles Murray (1984).

As expected, both of the "human capital" related variables (EDEXPECT and AFQT) are significant and positive predictors of LOG(POVRATIO). Aptitudes are proxied by standardized percentile scores on the Armed Forces Qualifications Exam (AFQT), an examination which was administered to the entire NLSY sample in 1981. The coefficient is highly significant, indicating the importance of ability in improving respondent's subsequent standard of living, a result completely consistent with human capital theory. As argued earlier, we believe that AFQT is a measure of the effects of prior investments in human capital as well as inherent ability.

Table 3. Regression: LOG(POVRATIO) on Youth and Intervening Variables (Standard Errors in Parentheses)

	Background Model	*Overall Model*
Youth Variables:		
EDMOM	0.214***	0.115**
	(0.074)	(0.064)
EDDAD	0.061	0.105*
	(0.076)	(0.066)
FEMHEAD	–0.121**	–0.097**
	(0.065)	(0.057)
WELFARE79	0.049	0.033
	(0.071)	(0.062)
PERSISTPOV	–0.351***	–0.146*
	(0.126)	(0.110)
EDEXPECT	0.079***	0.027**
	(0.0015)	(0.0014)
AFQT	0.009***	0.0027**
	(0.0016)	(0.0015)
SUBSTANCE	–0.211***	–0.118**
	(0.81)	(0.071)
TEENPARENT	–0.162**	0.107
	(0.095)	(0.087)
BLACK	–0.179***	–0.044
	(0.075)	(0.065)
FEMALE	–0.219***	0.100
	(0.063)	(0.061)
Intervening Variables:		
EDUCATION	N/A	0.085***
		(0.016)
MILITARY	N/A	0.104***
		(0.023)
HRSWORK	N/A	0.0007***
		(0.00006)
MARRIED	N/A	0.370***
		(0.057)
FAMSIZE	N/A	—0.057***
		(0.017)
%WELFARE	N/A	–0.336***
		(0.133)
R Squared	.20	0.40
N	940	940

Notes: * indicates significance at the .10 level (one tail test).
** indicates significance at the .05 level (one tail test).
*** indicates significance at the .01 level (one tail test).
Regression also includes 3 unreported dummies for region of residence

Measures of early "Lifestyle" were significant predictors of LOG(POVRATIO). Although consistent with our expectations, the significance of early substance abuse (SUBSTANCE) is not consistent with much recent literature which finds little relationship between drug and alcohol use and wages (Duncan, 1984; Gill & Michaels 1992; Kaestner, 1991; Register & Williams, 1992). Teenage parenthood (TEENMOM) is also a significant predictor of LOG(POVRATIO), but only at the .10 level.

Finally, demographics are important. Both gender (FEMALE) and race (BLACK) are powerful predictors of LOG(POVRATIO). The coefficients of these two variables are of similar magnitude, indicating that being female and being black have nearly the same negative effects on respondents' 1989 standard of living, after controlling for other background influences. These results are consistent with the idea that black women suffer a double burden due to demographics.[6]

In sum, the background model, when run for the entire sample, showed the importance of early human capital influences on subsequent standards of living, as measured by LOG(POVRATIO). Especially important are educational attainment of the youth's mother (EDMOM), educational expectations (EDEXPECT) and aptitudes (AFQT). These results suggest that social policies which improve the educational performance of poor youth (and their mothers) could have significant effects upon their future income position.

All of the statistically significant variables in the total sample regression had the signs which we expected on the basis of our literature review as presented in Table 1. Of the insignificant coefficients, only WELFARE had the incorrect sign.

DIRECT AND INDIRECT EFFECTS

Analytical Framework

The "background model" results presented in Table 3 and discussed in the previous section should be quite useful to policy makers interested in increasing the probability that poor youths will break the intergenerational cycle of poverty. In essence, the coefficients presented there provide our best estimate of the effect we can have on the poverty ratio by influencing background characteristics and experiences, given that we only have knowledge of background and no later developments. These characteristics and experiences may operate through any channels in reaching this end; these results simply indicate the "bottom line" effect on well-being, the result which may be most interesting to policy makers.

Yet, it is certainly worth exploring the ways in which these variables impact poverty using the intervening variable framework introduced above. Background characteristics may either directly influence an individual's standard of living, or they may indirectly influence it through "intervening variables."

We refer to direct impact of background variables on the well-being of the respondent as the "direct effects," the effects through intervening variables as

"indirect effects," and the combination of these effects as "total effects." Recall the six intervening variables which we consider: years of education, average hours worked, percent of years on welfare between 1979 and 1990, years in the military, marriage, and family size.

Note that, in the presence of correlation among background variables, the total effect given here is actually the effect holding other background constant. Additionally, we assume that our six intervening variables represent the only indirect paths; if there are actually others, their effects will show up in the direct effect computed.

This combination of direct and indirect effects can easily be seen by totally differentiating the log of the poverty ratio (LOGPOV) with respect to one background variable; we'll use TEENPARENT to continue the earlier example. Note that we use the expression "Logpov" as a shortened notation for the dependent variable LOG(POVRATIO).

(dLogpov/dTeenparent) = (δLogpov/δTeenparent) + (δLogpov/δEducation) * (δEducation/δTeenparent) + (δLogpov/δ%Welfare) * (δ%Welfare/δTeenparent) + (δLogpov/δHrswork) * (δHrswork/δTeenparent) + (δLogpov/δMilitary) * (δMilitary/δTeenparent) + (δLogpov/δMarried) * (δMarried/δTeenparent) + (δLogpov/δFamsize) * (δFamsize/δTeenparent)

The total derivative on the left hand side represents the total effect estimated in the previous section of the paper. The first partial derivative (**δLogpov / δTeenparent**) represents the direct effect. It is estimated by the coefficient on the relevant background variable in an overall model which includes all background and intervening variables. The results of this overall model are presented the last column in Table 3.

Each of the six products following this direct effect represent an indirect effect through the corresponding intervening variable and their sum represents the total indirect effect. These can be estimated in two steps. The first term, **δLogpov / δEducation**, is the coefficient of the relevant intervening variable in the overall model. The second term, **δEducation / δTeenparent**, is the coefficient of the relevant background variable in an auxiliary regression which predicts the corresponding intervening variable. The product of these two coefficients serves as an estimate of the indirect effect of TEENPARENT on LOG(POVRATIO) through the intervening variable EDUCATION. Auxiliary regressions on all six intervening variables are presented in the Appendix.[7]

Results

We present the results by category of background variable. Given the large number of direct and indirect effects, we highlight only some especially interesting results. For all background variables, Table 4 decomposes the total effect into direct and indirect effects. The indirect effect of each background variable

Table 4. Total, Direct and Indirect Effects of Youth Variables on LOG(POVRATIO)
(Standard Errors and Confidence Intervals in Parentheses)

	Total Effects	*Direct Effects*	*Indirect Effects*
Parental characteristics			
EDMOM	0.215***	0.115**	0.100~
	(0.074)	(0.064)	(0.042, 0.155)
EDDAD	0.061	0.105*	–0.044
	(0.076)	(0.066)	(–0.103, 0.023)
FEMHEAD	–0.121**	–0.097**	–0.024
	(0.065)	(0.057)	(–0.076, 0.027)
Early Economic Conditions			
WELFARE79	0.049	0.033	0.016
	(0.071)	(0.062)	(–0.046, 0.081)
PERSISTPOV	–0.351***	–0.146*	–0.205~
	(0.126)	(0.110)	(–0.314, –0.102)
Human Capital			
EDEXPECT	0.080***	0.027**	0.053~
	(0.015)	(0.015)	(0.037, 0.070)
AFQT	0.009***	0.003**	0.007~
	(0.002)	(0.0015)	(0.005, 0.008)
Lifestyle			
SUBSTANCE	–0.212***	–0.118**	–0.094~
	(0.081)	(0.071)	(–0.163, –0.026)
TEENPARENT	–0.162**	0.107	–0.269~
	(0.095)	(0.087)	(–0.372, –0.173)
Demographics			
BLACK	–0.179***	–0.044	–0.135~
	(0.073)	(0.065)	(–0.200, –0.071)
FEMALE	–0.219***	0.100	–0.320~
	(0.063)	(0.061)	(–0.397, –0.258)

Notes: * indicates significance at the .10 level (One tail test).
** indicates significance at the .05 level (One tail test).
*** indicates significance at the .01 level (One tail test).
~ indicates that the 90% confidence interval does not contain zero.

on LOG(POVRATIO) is the sum of the six indirect effects of that background variable. Table 5 presents all six of the indirect effects for each background variable.

For the total and direct effects reported in Table 4, traditional standard errors of coefficients are reported. Indirect effects, however, are calculated as the product of two coefficients and thus can not be assumed to be distributed normally. A bootstrap sampling technique is used to generate 90% confidence intervals for these effects (Effron, 1982).[8] If this confidence interval does not contain zero, we can

Table 5. Indirect Effects of Youth Variables on LOG(POVRATIO) Through Intervening Variables (95% Confidence Interval in Parentheses)

	Years of Education (EDUCATION)	*% Yrs. on Welfare (%WELFARE)*	*Ave. Hrs. Worked (HRSWORK)*	*Years in Military (MILITARY)*	*Family Size (FAMSIZE)*	*Whether I (MARR*
Parental Characteristics:						
EDMOM	0.021~	0.013~	0.043	–0.007	0.025~	0.005
	(0.006, 0.042)	(0.002, 0.027)	(–0.001, 0.089)	(–0.025, 0.011)	(0.008, 0.043)	(–0.019, 0.02
EDDAD	0.016	–0.002	–0.036	0.013	–0.012	–0.022
	(–0.005, 0.034)	(–0.013, 0.006)	(–0.086, 0.011)	(–0.008, 0.038)	(–0.030, 0.0009)	(–0.046, 0.00
FEMHEAD	0.002	–0.003	–0.037	0.004	0.023–	–0.012
	(–0.016, 0.019)	(–0.014, 0.006)	(–0.075, 0.005)	(–0.007, 0.020)	(0.008, 0.039)	(–0.034, 0.01
Early Economic Cond.:						
WELFARE79	0.016~	–0.019~	0.031	–0.0004	–0.012	0.001
	(0.001, 0.039)	(–0.036, –0.003)	(–0.017, 0.078)	(–0.018, 0.017)	(–0.029, 0.0004)	(–0.020, 0.01
PERSISTPOV	0.016	–0.019~	–0.201~	0.0003	–0.007	0.005
	(–0.017, 0.046)	(–0.041, –0.002)	(–0.288, –0.123)	(–0.027, 0.029)	(–0.028, 0.015)	(–0.039, 0.04
Human Capital:						
EDEXPECT	0.034~	0.005~	0.008	0.001	0.003~	0.001
	(0.023, 0.047)	(0.001, 0.010)	(–0.001, 0.018)	(–0.002, 0.004)	(0.001, 0.007)	(–0.005, 0.00
AFQT	0.003~	0.0004~	0.002~	0.0007~	0.0003~	0.0003
	(0.002, 0.004)	(0.0001, 0.001)	(0.001, 0.003)	(0.0003, 0.001)	(0.00006, 0.0007)	(–0.0002, 0.0

Lifestyle						
SUBSTANCE	–0.031~	–0.002	–0.027	–0.002	–0.001	–0.035~
	(–0.056, –0.010)	(–0.013, 0.008)	(–0.087, 0.026)	(–0.021, 0.027)	(–0.017, 0.015)	(–0.061, –0.010)
TEENPARENT	–0.049~	–0.067~	–0.100~	0.011	–0.052~	–0.011
	(–0.81, –0.025)	(–0.119, –0.014)	(–0.175, –0.032)	(–0.006, 0.030)	(–0.090, –0.020)	–0.038, 0.022)
Demographics						
BLACK	0.052~	–0.006	–0.108~	0.015	–0.004	–0.084~
	(0.031, 0.075)	(–0.119, –0.005)	(–0.159, –0.059)	(–0.001, 0.033)	(–0.018, 0.009)	(–0.115, –0.056)
FEMALE	0.013	–0.053~	–0.216~	–0.063~	–0.019~	0.005
	(–0.003, 0.033)	(–0.094, –0.009)	(–0.273, –0.167)	(–0.091, –0.039)	(–0.036, –0.006)	(–0.004, 0.039)

* indicates significance at the .10 level (Two tail test).

reject the hypothesis of zero indirect effect in favor of a two-sided alternative at the 10% level.

In the parental characteristics category, the decomposition reported in Table 4 produces several interesting results. Most of the effect of FEMHEAD occurs directly; the overall indirect effect is not even significant. EDDAD did not have a significant total effect, but it actually does have a direct effect which is significantly greater than zero. This is offset by slightly negative, though insignificant, indirect effects, primarily through a reduction in the probability of marriage. EDMOM, however, has the vast majority of its positive effects through the indirect channels of reducing welfare dependence and family size and increasing the respondent's own education (see Table 5). More educated mothers apparently transmit human capital, in part, by positively influencing their childrens' educational attainment. In the "early economic conditions" category of background variables, only PERSISTPOV has a significant indirect effects (Table 4) and the main channel is through its effect on hours worked (Table 5). It appears that persistent poverty of the parents restricts the hours of work experience of their children and that this, in turn, has an adverse effect on their standard of living. This finding suggests a possible explanation for the strong intergenerational correlations between the income of parents and their children found in the literature (Behrman & Taubman, 1985; Corcoran, et al, 1990, 1992; Krein & Beller, 1988; Peters, 1992; Solon, 1992; Solon, et al, 1991). Despite the significance of PERSISTPOV, welfare dependency (WELFARE79) does not have significant direct or indirect effects (Table 4).

Our two human capital variables each have very strong indirect effects. Not surprisingly, the largest portion of the effect of EDEXPECT is through an increase in actual schooling, accounting for about 3/8 of the original coefficient. However the indirect paths of reducing welfare dependency and reducing family size are also significantly greater than zero, as is the direct effect of this variable, indicating the multiple channels through which educational expectations affect living standards. Most of the effect of AFQT is also through indirect channels. In fact, it acts positively through all intervening variables except marriage. AFQT also has a direct effect which is significantly greater than zero. We prefer the Goldberger and Manski (1995) argument that AFQT is largely a measure of human capital accumulation through investments in education, etc., rather than the Herrnstein and Murray (1994) argument that it is a measure of pure intelligence (Herrnstein & Murray, 1994). This implies that early human capital investments which increase an individual's aptitudes, as reflected in the AFQT score, will have significant effects on subsequent living standards through a variety of channels.

The lifestyle variables (SUBSTANCE and TEENPARENT) have interesting decompositions. Substance abuse (SUBSTANCE) has significant direct and indirect effects on LOG(POVRATIO). The most important indirect paths for SUBSTANCE are through its negative effects on educational attainment and the

probability of marriage. The strong effects of substance abuse is not consistent with a number of other studies which used a more general NLSY sample and found that drug users actually received higher wages than non drug users (Gill & Michaels, 1992; Register & Williams, 1992; Kaestner, 1991). Two possible reasons for the conflicting results are that substance abuse could have a more adverse effect on the sons and daughters of the poor than on the more general population and the adverse effects of substance abuse could intensify with the passage of time.

Being a teenage parent (TEENPARENT) has significant indirect effects on LOG(POVRATIO). Table 5 shows that TEENPARENT operates through four of the six intervening variables to exert significant influence on LOG(POVRATIO). It does this by reducing educational attainment, increasing welfare dependency, decreasing work experience and increasing family size. It is interesting to note that the negative effect of teen parenthood on LOG(POVRATIO) is entirely due to the indirect effects. The direct effect is not significant and has the wrong sign.

The two "demographic" variables (BLACK and FEMALE) also have significant indirect effects and insignificant direct effects. Being black decreases work experience and the probability of marriage enough to offset higher levels of education and military experience (Table 5). This is consistent with both labor market discrimination and Wilson's (1987) theories concerning the lack of marriageable black males. Being female tends to increase welfare use and family size while decreasing military training and work experience (Table 5). All of these indirect effects lower LOG(POVRATIO).

CONCLUSIONS

Although this research on the effects of background on the subsequent income performance of impoverished youth is largely exploratory, some conclusions can be drawn.

Early Background influences are very important determinants of relative income mobility (i.e., family income relative to the poverty line) as indicated by the fact that 10 out of 11 background variables have significant total effects (Table 4).

The decomposition of total effects showed that both direct and indirect effects of background on respondents' standard of living are important. For example, 7 out of 11 background variables had a significant direct effect and 8 out of 11 had significant indirect effects (Table 4). In fact, many of the background variables (6 of 11) had stronger indirect than direct effects.

The results also suggest the danger of trying to infer the effects of background on income from a single equation model which includes both background and intervening variables. The background coefficients in such a model are net of the indirect effects and, in our model, usually underestimate the total effect of background.

Some specific conclusions regarding the background variables included in our study of youth who were living in poverty in 1979 are outlined briefly.

Parental Characteristics.

Youth from traditional married couple families and youth who have mothers with at least 12 years of schooling fare significantly better than youth from female-headed households and youth with mothers who dropped out of school. But, the father's educational attainment does not have significant effects.

Early Economic Conditions.

Growing up in a family which experienced persistent poverty has a strong adverse effect on respondents' living standards and the mechanism of transmission of poverty are both direct and indirect. Curiously, early dependence on welfare by the respondents parents was not a significant predictor. This set of findings suggest that it is the condition of poverty rather than reliance on welfare that inhibits intergenerational movements out of poverty. If so, simply moving families off of the welfare roles without dealing with the underlying conditions of poverty probably won't help much. This finding also calls into question the intergenerational welfare dependency argument of Charles Murray (1984), at least for our rather unique sample, and tends to support the contention that the disincentive effects of welfare are rather small (e.g. Ellwood & Summers, 1996; Sawhill, 1988).

Respondent's Early Human Capital Influences.

Favorable aptitudes and high educational expectations are extremely important predictors of economic success. Policies directed toward improving the educational experiences of the poor, if successful, could have significant effects on their income mobility.

Lifestyle.

Early substance abuse and teenage parenthood have adverse effects on subsequent living standards. Policies which reduce heavy use of alcohol and drugs and discourage teenagers from becoming parents should have a significant influence on living standards.

Demographics.

Female and black youth experience less favorable income mobility. Race and gender exert powerful indirect effects on income and the pattern of indirect effects for blacks is quite different than the pattern for women.

Finally, the decomposition showed that indirect effects of background variables were often more important than the direct effects. Future research should examine these indirect effects in more detail to determine, for example, if there are gender or race differences. Future research should also attempt to simulate how policy interventions would influence income mobility by altering one or more of the intervening variables.

APPENDIX.

Table 1. Regressions of Intervening Variables on Youth Variables (Standard Errors in Parentheses)

	Years of Education (EDUCATION)	*%Yrs. on Welfare (%WELFARE)*	*Ave. Hrs Worked (HRSWORK)*	*Years in Military (MILITARY)*	*Family Size (FAMSIZE)*	*Whether Married (MARRIED)*
Parental Characteristics						
EDMOM	0.248*	–0.039**	64.8	–0.067	–0.430***	0.012
	(0.131)	(0.017)	(43.4)	(0.096)	(0.133)	(0.039)
EDDAD	0.184	–0.007	–54.3	0.121	0.217	–0.058
	(0.134)	(0.018)	(44.3)	(0.099)	(0.136)	(0.040)
FEMHEAD	0.019	0.010	–55.1	0.037	–0.401***	–0.033
	(0.115)	(0.015)	(38.1)	(0.085)	(0.117)	(0.034)
Early Economic Conditions:						
WELFARE79	0.192	0.055***	47.2	–0.004	0.201	–0.003
	(0.125)	(0.016)	(41.6)	(0.093)	(0.127)	(0.037)
PERSISTPOV	0.193	0.057	–302.5	0.003	0.122	0.014
	(0.222)	(0.030)	(73.7)	(0.164)	(0.225)	(0.066)
Human Capital:						
EDEXPECT	0.404***	–0.016***	11.8	0.012	–0.059**	0.002
	(0.027)	(0.004)	(8.9)	(0.020)	(0.027)	(0.008)
AFQT	0.0324***	–0.0013***	3.23***	0.0068***	–0.0060**	0.00086
	(0.0029)	(0.00038)	(0.95)	(0.0021)	(0.0029)	(0.0009)
Lifestyle						
SUBSTANCE	–0.361***	–0.005	–41.0	0.016	0.022	–0.093**
	(0.144)	(0.019)	(47.6)	(0.106)	(0.146)	(0.043)
TEENPARENT	–0.577***	0.199***	–150.7***	0.104	0.901***	–0.030
	(0.169)	(0.023)	(55.9)	(0.124)	(0.171)	(0.050)
Demographics						
BLACK	0.617***	0.017	–162.6***	0.141	0.075	–0.228***
	(0.128)	(0.017)	(42.5)	(0.094)	(0.130)	(0.038)
FEMALE	0.153	0.158***	–324.3***	–0.599***	0.323***	0.046
	(0.112)	(0.015)	(37.1)	(0.083)	(0.113)	(0.033)
R Squared	.45	.32	.19	.08	.10	.07
N	940	940	940	940	940	940

Notes: * indicates significance at the .10 level (Two tail test).
** indicates significance at the .05 level (Two tail test).
*** indicates significance at the .01 level (Two tail test).
Regressions also include 3 unreported dummies for region of residence in 1979.

NOTES

1. Because our analysis is conditional on being in a poor family in 1979, we are able to utilize the economically disadvantaged oversampling present in NLSY without introducing bias.

2. We use the 1990 rather than a more recent survey because the NLSY discontinued the economically disadvantaged white component of the supplemental subsample after 1990 for budget reasons. A significant proportion of our original sample would have been lost if we used post 1990 data.
3. Note that we include only youths between 14 and 17 in 1979 in our sample. We assume that all such youths live at home as dependents.
4. The ratio ranged in value from zero to 23.4. Unfortunately, the four families in our sample which had the highest incomes were all coded as having an income of $146,942. Although some information is lost by truncating the highest income levels to this value we felt that it was still best to not remove these families from the sample. Fortunately the truncated values only constituted 0.3% of our total sample.
5. It was necessary to take the log of POVRATIO because when regressions were run against non-transformed POVRATIO, tests revealed violations of the normality and linearity assumptions.
6. To be certain that there was not a significant interaction between race and gender, an interaction term was added to the background model. The interaction term was insignificant, reassuring us of our conclusion regarding the impact of being a black female on LOG(POVRATIO). We also tested for possible interaction between FEMHEAD and EDMOM and found none.
7. We estimate the overall model using OLS. For this to yield consistent parameter estimates, we must assume that the error term in the overall model is uncorrelated with the error terms in the auxiliary regressions. We maintain this assumption to focus on identification of relationships between background variables, intervening paths, and outcomes. Relaxing this assumption would require an instrumental variables technique which would necessitate the arbitrary exclusion of at least 6 background variables from the overall model. To the extent that these variables truly belong in the overall model or are weakly correlated with the intervening variables, instrumental variable estimates will be inconsistent, and likely worse than OLS. We leave exploration of this approach for future research.
8. We chose bootstrapping techniques to estimate confidence intervals for the indirect effects because indirect effects are the product of two coefficients from two separate regression equations. Even if the individual coefficients are normal, their product does not have a distribution which is convenient to work with. Consequently, we loose our usual testing and confidence interval apparatus. Also, the standard error of the product of these two coefficients is very complicated to compute. The bootstrapping method involves repeated sampling (we used 400 samples) from our actual sample. The results of the procedure produce a reliable confidence interval without the need to make the standard assumptions regarding the shape of the distribution function. The rigorous details of the bootstrap method are in Effron (1982).

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