The Company You Keep:
The Effects of Family and Neighborhood on Disadvantaged Youths

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ABSTRACT

We examine the effects of family background variables and neighborhood peers on the behaviors of inner-city youths in a tight labor market using data from the 1989 NBER survey of youths living in low-income Boston neighborhoods. We find that family adult behaviors are strongly related to analogous youth behaviors. The links between the behavior of older family members and youths are important for criminal activity, drug and alcohol use, childbearing out of wedlock, schooling, and church attendance. We also find that the behaviors of neighborhood peers appear to substantially affect youth behaviors in a manner suggestive of contagion models of neighborhood effects. Residence in a neighborhood in which a large proportion of other youths are involved in crime is associated with a substantial increase in an individual's probability of the being involved in crime. Significant neighborhood peer effects are also apparent for drug and alcohol use, church attendance, and the propensity of youths to be out of school and out of work. Our results indicate that family and peer influences both operate in manner such that "like begets like."

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I. Introduction

The last two decades have witnessed a substantial deterioration along many dimensions in the economic and social conditions of disadvantaged young Americans. The changes appear to have been especially adverse for black youths living in the ghetto neighborhoods of large American cities. In particular, the rate of joblessness has increased substantially for less-educated youths (Freeman, 1991a; Juhn, 1991). The real and relative wages of both black and white young, less-educated workers have plummeted since the early 1970s. The poverty rate among families headed by young persons has increased. Many observers believe that the problems of crime, violence, and drug abuse reached "catastrophic" proportions in American inner cities in the late 1970s and have probably continued to worsen (Wilson, 1987). In fact, the proportion of black men 20 to 29 years old directly in trouble with the law (in jail or prison or on probation or parole) reached 23 percent in 1989 (Mauer, 1990). While some disadvantaged youths continue to advance in the mainstream economy, the trends of the 1970s and 1980s suggest that a substantial proportion are likely to become unable or unwilling to work regularly in the normal market economy.

What factors differentiate among those inner-city youths that make progress in the mainstream economy through schooling and working and those who do not follow such a path? Recent proposed explanations for the problems of the disadvantaged have emphasized a decline in the availability of jobs for less-educated workers in America's central cities (Kasarda, 1989) and the role of family and neighborhood factors operating through peer influences and the behavior and characteristics of adult role models (Wilson, 1987; Crane, 1991). While Freeman (1989, 1991a) has provided evidence that strong local labor market conditions improve the labor market performance of inner-city youth, the question of how important are disadvantageous family and neighborhood factors in hindering the progress of youths even in vibrant labor markets remains relatively unexplored.

In this paper, we address these issues through an examination of the effects of family background and neighborhood characteristics on the socioeconomic outcomes of inner-city youths in

a tight labor market (Boston in early 1989). We perform this analysis using the 1989 NBER survey of youths living in low-income, inner-city Boston neighborhoods. The survey provides detailed information on family background variables, neighborhood characteristics, standard measures of socioeconomic outcomes, indicators of drug use and criminal activity, and on youths' social contacts and views of their neighborhoods.

While the existing literature empirically examining the extent to which an individual's socioeconomic success is influenced by various family and community background factors is immense, the 1989 NBER Boston Youth Survey has two features for studying family and neighborhood effects not available in most of the data sets used in previous research.[1] The survey provides some nonstandard family background variables such as information on the church attendance, drug use, and criminal records of respondents' older family members. Second, the survey allows us to look at the influences of peers within geographic entities resembling actual neighborhoods, since we have information on exact street addresses for a substantial majority of the respondents.

We draw two main conclusions from our empirical analysis. The first is that measured family background variables are strongly related to the socioeconomic outcomes of disadvantaged youths in a manner suggestive of potentially causal behavioral links. We find that different family background variables have quite distinct relations with the different measures of socioeconomic outcomes for the youths in the sample. In particular, family background variables appear to be most strongly related to similar variables for youths and usually not significantly related to other outcome variables when directly-related family background variables are included in the specification. In other words, youths who had family members in jail when they were being raised are much more likely be involved in

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[1]A small sampling of the literature examining the impacts of family background variables on economic success includes Blau and Duncan (1967), Corcoran et al. (1989), and Altonji and Dunn (1991). The empirical literature on neighborhood effects is critically reviewed in Jencks and Mayer (1990).

criminal activity; those with family members with drug problems are more likely to use drugs; those with teenage mothers and parents who were not married are substantially more likely to have children out of wedlock; and those with more-educated parents get more schooling.

Our second main finding is that the spatial pattern of outcomes in our sample from the Boston Youth Survey appears consistent with the view that neighborhood effects operating through peer influences are important for socioeconomic outcomes, even within a sample in which all the youths are living in high-poverty communities. Residence in a neighborhood in which many other youths are involved in crime, use illegal drugs, or are out of work and out of school is associated with an increase in an individual's probability of the analogous outcome even after controlling for a variety of family background and personal characteristics.

The paper is organized as follows. Section II describes the 1989 NBER Boston Youth Survey and provides descriptive information on Boston inner-city youth. Section III examines the relations between family background variables and youth outcomes. Section IV empirically examines the importance of neighborhood effects on youth outcomes. Section V concludes.

II. A Profile of Disadvantaged Youths in a Tight Labor Market

The NBER surveyed some 1200 youths aged 17 to 24 from high-poverty neighborhoods in inner-city Boston in early 1989. The survey was implemented in a period with an extremely strong labor market in Boston at the tail end of a sustained economic boom and was completed before the emergence of the recent economic downturn in the New England region. The survey was designed with the intention of developing a portrait of how disadvantaged youths fare in a tight labor market and to assess hypotheses concerning the economic factors and family and neighborhood influences that affect their labor market success and other socioeconomic outcomes. The survey questionnaire contains ten modules covering labor market experiences, current living arrangements, family

background, social contacts and neighborhood characteristics, childbearing and marital history, schooling experiences, personal history, illegal activities, drug use, and respondent opinions and outlook.

In contrast to the 1979-80 NBER Survey of Inner-City Black Youths (Freeman and Holzer, 1986), the 1989 NBER Boston Youth Survey covered white (and other nonblack) youths as well as blacks, and included young women as well as young men. The survey covers youths in three high-poverty areas of Boston's central city: Roxbury (a primarily black area), South Boston (an almost exclusively white area), and South Dorchester (a racially mixed area). The survey had a response rate of 71 percent and was implemented using a residence-based sampling design analogous to the one used in the 1979-80 NBER survey.

A. Respondent Characteristics and Family Backgrounds

Table 1 provides information on the family backgrounds of the black males, white males, black females, and white females in the sample. (The sample does not contain a sufficient number of Hispanics or Asians to analyze separately). The table indicates that relatively more blacks than whites come from single-parent homes in which the father was not present when the respondent was age 14. The fraction of both blacks and whites from homes without a father present at age 14 is substantially greater than the national averages for blacks and whites from the National Longitudinal Survey Youth sample (a somewhat older sample containing young persons aged 14-21 in 1979).[2] The fraction of black males from homes with fathers is 43 percent in our Boston sample in comparison to 52 percent for the NLSY. The contrast for white males is even more striking: 59 percent for the

[2]Tabulations from the NLSY were performed by the authors using the random and supplemental samples. All averages are weighted averages using sampling weights to convert the numbers into representative national averages. The averages are quite similar when only the random sample is used.

Table 1: Percentage of Boston Inner-City Youths with Various Family Background Characteristics and Living Arrangements

Characteristic	Black Males	White Males	Black Females	White Females
Family Background				
Father Present at Age 14	43	59	39	49
Mother Present at Age 14	86	93	89	89
Parents Were Not Married	33	8	36	8
Ever Supported by Welfare	31	29	37	29
Teenage Mother (less than 20 at respondent's birth)	35	15	30	19
Parent HS Graduate[a]	86	79	79	69
Family Member Ever in Jail	40	33	35	34
Family Member(s) with Drug/Alcohol Problems	42	57	36	62
Adults in Family Attended Church Often	52	39	53	34
Current Living Arrangements				
Living with Older Adults	75	74	68	67
In Public Housing by self-report	25	39	33	37
In Public Housing Project based on address	11	39	12	36
Family Income of others less than $12,000	44	22	47	43
Family Income of others greater than $30,000	14	20	13	14
Sample Size	299	288	286	167

[a]Based on education of person most important in raising youth.

Source: Tabulated from the 1989 NBER Boston Youth Survey. Sample sizes vary by question, but the response rates were over 95 percent for all questions except those concerning parent's education and mother's age.

Boston youth sample versus 84 percent for the national sample from the NLSY. Table 1 further shows that the blacks in the Boston youth survey are much more likely to have had a teenage mother and to have had parents who were not married to each other than are the white youths. Approximately 30 percent of both the black and white youths report having been supported by welfare at some time when they were being raised.

In sharp contrast to typical national samples, the blacks appear to have been raised by individuals with more years of schooling than the whites in our Boston sample.[3] Over 80 percent of the blacks in our sample claim to have had a "parent" with a high school degree in contrast to only 58 percent for the blacks in the NLSY. On the other hand, the whites in our sample appear to have much less-educated parents than random national samples of whites.

The 1989 NBER Boston Youth Survey has three further interesting variables on the family backgrounds of the respondents. These variables are based on the responses to the question "how often, if at all, did any of the following things happen to the family you were brought up in?: (1) someone in your family was in jail; (2) someone in your family had drug/alcohol problems; and (3) the adults in your family went to church." Responses to these questions could be coded as often, sometimes, rarely, and never. The questions were asked immediately after a series of questions on the respondent's family when he or she was 14 and on the type of upbringing the respondent received. The responses to the questions indicate that a substantial minority of the respondents had family members that had been in jail. The majority of whites in the sample indicated having family members with drug or alcohol problems. Finally, blacks were more likely to come from families in which the adults went to church often. As we shall see below, the responses to these three questions

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[3]The sample does not contain standard parents' education variables. Instead, we have information on the education of the person the respondent denotes as having been most important in raising him or her when he or she was 14. When this variable was not available, we used education of person contributing most money in raising youth. When both variables were unavailable, we used the education of the older adult with whom they were living at the survey date.

seem to be strongly related to respondent behaviors similar to the information being probed about their family members.

The bottom part of Table 1 provides information on the living arrangements of the respondents at the time of the survey. Most of the youths are living with a parent or with older adults. A large fraction of the youths live in low-income households with disproportionately many more blacks than whites coming from quite poor families.

We have two measures of public housing residence for the sample. The first comes directly from the self-reports of the respondents. The second measure we derived using the addresses of the respondents and information on the exact location of Boston's public housing projects provided by the Boston Housing Authority (BHA).[4] Many more whites than blacks in our sample reside in public housing projects. This is indicative of Boston's quite distinct pattern of public housing. The largest, high-density public housing projects in Boston (the Mary Ellen McCormack and Broadway-D Street projects) are located in South Boston and largely inhabited by whites. This contrasts with other large cities such as Chicago in which high-density, high-rise public housing is largely located in black areas. Overall, almost 40 percent of the whites in the NBER sample live in public housing, as compared to 1 percent for whites at similar ages in the national NLSY sample in 1980. Using self-reports of public housing residence, as is also found in the NLSY, we find that the blacks in the NBER survey are also much more likely to live in public housing (approximately 30 percent as compared to 13 percent in the NLSY).

In summary, the 1989 NBER Boston Youth Survey contains a sample of young people who are disproportionately disadvantaged along many dimensions. We next examine whether these

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[4]The two measures correspond quite well for the whites in our sample. The vast majority indicating residence in public housing do appear to actually reside in BHA projects. In contrast, the majority of blacks indicating residence in public housing do not appear to live in BHA projects and are likely to receive government rental assistance.

disadvantages translate into particularly poor socioeconomic performance even in a robust economy.

B. Respondent Socioeconomic Outcomes

Table 2 provides measures of socioeconomic outcomes for blacks and whites in our Boston youth sample. A moderate proportion of both the blacks and whites are still in school with the proportion higher for blacks. A larger fraction of the blacks are still in school and a much greater fraction of the whites are high school drop outs. This finding is consistent with evidence that blacks get more schooling than whites with similar family background characteristics (e.g. Altonji, 1988) and is not surprising given that the blacks in the sample seem to have more-educated parents than the whites.

In contrast to the greater educational attainment of blacks in the sample, the whites appear to be more successful in the labor market. Whites are much more likely to work and have a much lower unemployment rate. Overall, since the proportion of youths out of school in the sample who are employed is quite low, a quite significant proportion of the sample respondents are "idle" -- out of school and not employed.

Did the tight labor market in Boston raise the labor market performance of these disadvantaged youths to levels close to the national average? Table 2A contrasts standard measures of labor market participation and idleness for the 18-24 year old black and white males in our sample to national averages from the Current Population Survey for 1988. The tight labor market appears to have put the 18-19 year old, disadvantaged black males in the sample up to even footing with the national average for black males of similar age. In contrast, the 20-24 year old black males are much more likely to be unemployed and idle than the national sample. The difference may arise at least partly from the much greater likelihood that the 20-24 year olds who had gained from the strong Boston economy may have moved out of these neighborhoods than the successful 18-19 year olds. The

Table 2: Percentage of Boston Inner-City Youths with Specified Socioeconomic Outcomes and Characteristics

Characteristic	Black Males	White Males	Black Females	White Females
Labor Force/ School Status				
In School	41	33	45	38
In Labor Force[a]	55	60	31	41
Unemployed (as percent of labor force)	36	22	37	20
Employed	35	47	19	33
Idle (out of school and not working)	29	26	44	40
High School Drop Out Not in School	14	24	19	34
Criminal Activity and Drug Use				
Crime (did any crimes in last 12 months)	17	30	6	13
Sold illegal drugs in last 12 months	12	18	3	5
Use illegal drugs	33	36	20	33
Use alcohol at least weekly	35	48	14	20
Other Characteristics				
Attend Church at least 2 or 3 times a month	28	30	37	25
Parented Child out of Wedlock	20	11	43	23
Currently Married	3	3	3	7
Sample Size	299	288	286	167

[a]Major activity week before survey was working or looking for work.

Source: Tabulated from the 1989 NBER Boston Youth Survey. Sample sizes vary slightly by item depending on the number of respondents who answered the relevant questions.

Table 2A: Labor Market Status of Black and White Males, 18-24 Years Old

NBER Boston Inner-City Youths in early 1989 versus
U.S. Averages for 1988 from the Current Population Survey

Activity	NBER Black Males	NBER White Males	CPS Black Males	CPS White Males
18-19 Years of Age				
Percentage in labor force	54.8	51.4	56.0	71.0
Percentage of labor force unemployed	35.0	27.8	31.7	12.4
Percentage idle (major activity is not working and not going to school)	27.4	25.7	30.7	15.1
20-24 Years of Age				
Percentage in labor force	70.3	73.7	79.3	86.6
Percentage of labor force unemployed	37.8	20.9	19.4	7.4
Percentage idle (major activity is not working and not going to school)	44.3	32.7	25.5	10.8

Sources: The numbers for NBER Black Males and NBER White Males were tabulated from the 1989 NBER Boston Youth Survey. The sample sizes are 73 for black males aged 18-19; 70 for white males aged 18-19; 166 for black males aged 20-24; and 156 for white males age 20-24. The CPS numbers are 1988 annual averages from Employment and Earnings, January 1989, pp. 163-4.

disadvantaged white males in the sample have much lower labor force participation, higher unemployment, and greater idleness than average white males in their age groups.

Returning to Table 2, we find that the statistics concerning drug use and crime present some surprises. Whites are much more likely than blacks in the sample to admit to having committed crimes, to selling drugs, and to using illegal drugs. While the proportion of young white males who admit that they committed crimes in the past year is quite high relative to national samples like the NLSY (as indicated in tabulations presented by Freeman (1986)), the proportion of blacks who admit to committing crimes does not appear to be particularly high relative to national samples. The higher rate of crime reported by whites than blacks in the sample may reflect the tendency for black youths to substantially underreport criminal acts relative to whites (Hindelang, Hirschi, and Weis, 1981), or it may arise because the survey failed to adequately sample the segment of the black population in these areas involved in crime. These self-reports of crime contrast sharply with the findings presented below that blacks are more likely to have friends in gangs and are more likely to think crime and violence are major problems in their neighborhoods.[5] Finally, there is some indication that the financial rewards to criminal activity increased for disadvantaged youths in Boston during the 1980s. Freeman (1989) reports that many more black males in Boston in the 1989 NBER survey than in the 1980 NBER survey reported that they could earn "more on the street doing something illegal than on a straight job" (66 percent in 1989 versus 44 percent in 1980) and that average illegal earnings for this group increased substantially from 1980 to 1989.

Finally, blacks (especially black women) in the sample are much more likely have parented children without being married than are whites. In fact, extremely few of the individuals in the sample are married.

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[5]See Freeman (1991b) for a detailed discussion of the likely degree of underreporting of crime by blacks in the 1989 NBER Boston Youth Survey.

C. Social Contacts and Neighborhood Characteristics

Many recent discussions of the problems of disadvantaged youth have emphasized the characteristics of the neighborhoods in which they reside and the nature of their social contacts. In particular, Wilson (1987) has highlighted the potential importance of the increasing social isolation of the poor and Jargowsky and Bane (1990) that poor blacks become increasingly geographically concentrated since 1970. A series of questions were included in the NBER Boston Youth Survey to attempt to determine the nature of extent of contact these youth have with persons engaged in various activities in their neighborhoods.

The top part of Table 3 summarizes the responses to questions concerning neighborhood contacts. A significant fraction (at least 37-42 percent) of both the black and white youths report that they "know very well persons" involved in crime in their neighborhoods. A large proportion of black youths (30 percent of males and 16 percent) of females report having friends in gangs (although very few admit to being in gangs themselves) and most have friends who sell drugs. Furthermore, less than 30 percent of the respondents indicate that they know well persons in "business, accounting, engineering, science, or law" and approximately 50 percent of the youths in the sample indicate that they do not know any professionals in these fields in their neighborhoods. The youths are much more likely to know people in trouble with the law and welfare mothers than they are to know professionals. This suggests some possibility that they are socially isolated without middle class role models in their communities. On the other hand, the respondents are clearly not geographically isolated and the majority leave their neighborhoods to go elsewhere essentially every day.

The NBER survey also provides information on the youths views of life in their neighborhoods. These perceptions are summarized in Table 4. The youths report that their neighborhoods have many jobless men, many welfare mothers, and many drug dealers. In contrast to their lower self-

Table 3: Neighborhood Contacts and Neighborhood Characteristics
Boston Inner City Youths, 1989

	Black Males	White Males	Black Females	White Females
A) Percentage of Youths Who Know Very Well Persons in Their Neighborhood Who:				
Sell drugs	40	38	31	33
Do other illegal acts	32	32	18	21
Are in business, accounting, engineering, science, or law	33	29	26	20
Are in jail or trouble with the police	42	42	37	39
Are women on welfare	45	32	60	50
B) Percentage of Youths Who Have Friends Who:				
Are in gangs	30	11	16	12
Sell drugs	63	54	44	50
C) Percentage of Youths Who Are Victims of Crimes In Their Neighborhoods				
Robbed in Neighborhood	22	15	20	20
Attacked in Neighborhood	21	13	10	8
D) Time Spent in Neighborhood				
Mean Years Living in Neighborhood	10.7	14.9	9.6	14.4
% Born in Boston	63	87	66	88
% Leaving Neighborhood Every Day	80	67	66	58

Source: Tabulated from the 1989 NBER Boston Youth Survey.

Table 4: The Perceptions of Their Neighborhoods of Boston Inner City Youths, 1989

	Blacks	Whites
Percentage of Youths Who Regard Statement About Their Neighborhood As True:		
1. Many men in late teens and early twenties who don't go to school are unemployed.	68	60
2. Many women with children are on welfare.	73	71
3. Many young men find that dealing in drugs is a good way to make money.	84	67
4. Most adults in the neighborhood sell drugs.	23	11
5. Crime and violence are serious problems.	74	37
6. There is strong support for people who try to get ahead through schooling and getting jobs.	40	54
7. There are many job opportunities for you, your family and friends in Boston.	78	86
8. You prefer to live in your neighborhood to another neighborhood in Boston, the suburbs, or somewhere else.	39	57

Source: Tabulated from the 1989 NBER Boston Youth Survey. The responses are for both males and females. The sample sizes vary depending on the response rate from 579 to 587 for blacks and from 447 to 455 for whites except for line 4 in which the sample size is 422 for blacks and 428 for whites.

reports of criminal activity, the blacks in our survey are twice as likely as the whites to respond that crime and violence are serious problems in their neighborhoods. While the blacks in the sample are more likely to know professionals in their neighborhoods, they are much less likely than the whites to indicate that their community provides support for people who try to get ahead through schooling and getting jobs. Similarly, a majority of the whites (57 percent) indicate they prefer living in their neighborhoods to other locations, while a substantial majority (61 percent) of the blacks express a desire to move out of their neighborhoods.

III. Family Backgrounds and Socioeconomic Outcomes

How do the differences in family background factors among the disadvantaged youth in inner-city Boston relate to differences in socioeconomic outcomes? Table 5 provides a first look at this question by comparing six socioeconomic outcome variables (measuring criminal activity, illegal drug use, childbearing out of wedlock, labor market and school activity, and church attendance) for youths with and without eight different family background characteristics.

While one must be careful in drawing inferences from the comparisons in Table 5 since they do not control for many other relevant factors, the table presents a striking message: each family background factor seems to be a reasonably strong predictor of youth behaviors similar to the behavior of adults in the family being captured by the family background variable.[6] Youths who had family members in jail when they were being raised are more than twice as likely (25 percent to 12 percent) to admit to being involved in criminal activity in the last year than are those who report no family members in jail. Similarly, those with family members with drug and alcohol problems are much more likely to use drugs; the best predictor of whether a youth has parented a child out of

[6]The message is quite similar when one separately examines cross-tabulations of the type presented in Table 5 for blacks and whites and for black males and white males.

Table 5: Family Background and Socioeconomic Outcomes
Boston Inner City Youths, 1989

Family Background Characteristic	Percentage of Youths with the Specified Background Variable with the Following Outcomes: (1) Crime in last year	(2) Use illegal Drugs	(3) Single Parent	(4) Idle	(5) High School Drop Out	(6) Attend Church Often
1. No Family Members in Jail	12	26	23	27	19	33
2. Family Members in Jail	25	34	28	39	27	29
3. No Family Members with Drug/Alcohol Problems	10	21	23	29	19	34
4. Family Member with Drug/Alcohol Problems	24	38	26	34	24	29
5. Adults in Family Did Not Attend Church Often	18	31	24	31	24	22
6. Adults in Family Attended Church Often	14	26	26	32	19	42
7. At least one parent not present at 14	18	30	28	35	25	30
8. Both parents present at 14	14	28	20	27	18	33
9. Mother at least 20 years old at birth	16	28	20	27	20	32
10. Teenage Mother	21	34	32	38	26	32
11. Parents Were Married	16	29	21	30	21	32
12. Parents Were Not Married	17	29	37	35	23	30
13. Family Never on Welfare	15	28	21	28	19	31
14. Family Ever on Welfare	18	31	32	38	27	33
15. Parent HS Drop Out	17	25	29	36	26	31
16. Parent HS Graduate	17	30	21	29	18	33

Source: Tabulated from 1989 NBER Boston Youth Sample. The sample includes all 1048 observations with complete information on all the outcome variables and all the family background variables with the exceptions of mother's age (n=853) and parent's education (n=913).

wedlock are whether his or her parents were married; parent's education differentiates among educational attainment of youths but is not much related to criminal behavior; and, unsurprisingly, youth regular church attendance is most strongly differentiated by the church attendance behavior of family adults. Many of the family background variables appear strongly related to idleness (being out of work and out of school).

To determine whether or not the family background variables continue to be highly related to similar youth behavior once other background variables are allowed to have an impact, we estimated ordinary least squares equations linking socioeconomic outcomes (linear probability models for discrete outcomes) to the background factors, race, sex, and age.[7] While these regressions do not tell us whether background factors cause outcomes or whether certain background factors and outcomes go together for other reasons (omitted variables correlated with both), strong patterns in the results may provide information helpful for the further exploration of potentially causal models.

Table 6 presents the estimates of models relating our six socioeconomic outcome variables to "exogenous" personal and family variables.[8] The strong impacts of family background variables on directly related youth behaviors and weaker effects on other behaviors (except idleness) continues to hold in the multivariate analysis presented in Table 6. For example, the estimates in the first column show that the two family variables potentially related to illegal activities by parents and older siblings (whether the respondent had family members in jail or with drug problems) have the largest and most significant estimated impact on self-reported criminal activity. In the second column, the estimates show that the variable indicating whether an individual has family members with drug problems has a large effect on illegal drug use. Furthermore, the two background variables with

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[7]The results are extremely similar for the models with dichotomous dependent variables when logits and probits are used rather than linear probability models.

[8]The welfare variable was dropped from the specification since it provided quite similar information to the variable for whether the respondent's parents were married.

Table 6: Multivariate Models Relating Family Background Factors to Socioeconomic Outcomes
Boston Inner City Youths, NBER Boston Youth Survey, 1989

		Dependent Variable:					
Explanatory Variable	Mean	(1) Crime in last year	(2) Use illegal Drugs	(3) Single Parent	(4) Idle	(5) Highest Grade Completed	(6) Attend Church Often
Female	.44	−.142 (.022)	−.093 (.028)	.189 (.025)	.102 (.028)	.079 (.089)	.039 (.029)
Black	.48	−.071 (.025)	−.021 (.031)	.067 (.028)	−.013 (.031)	.229 (.099)	.038 (.032)
Family Member in Jail	.35	.084 (.025)	.028 (.032)	.032 (.028)	.112 (.031)	−.192 (.101)	−.016 (.032)
Family Member with Drug/Alc. Problems	.46	.083 (.024)	.153 (.030)	.036 (.027)	−.000 (.030)	−.033 (.097)	−.016 (.031)
Adults in Family Went to Church Often	.47	−.020 (.022)	−.044 (.028)	.012 (.025)	.012 (.027)	−.042 (.089)	.194 (.029)
Both parents present at age 14	.46	−.025 (.024)	−.016 (.030)	−.031 (.027)	−.077 (.029)	.326 (.095)	.018 (.031)
Mother less than 20 years old at birth	.19	.035 (.030)	.059 (.037)	.094 (.034)	.095 (.037)	−.139 (.120)	.009 (.038)
Mother's age missing	.19	−.023 (.031)	.012 (.039)	.067 (.035)	.110 (.038)	−.236 (.123)	−.026 (.040)
Parents not married	.21	.024 (.030)	.018 (.038)	.108 (.034)	.017 (.037)	−.006 (.121)	−.026 (.039)
Parent's years of schooling	11.85	.001 (.005)	.015 (.007)	−.009 (.006)	−.014 (.006)	.095 (.021)	.009 (.007)
Parent's schooling missing	.13	.004 (.034)	−.012 (.043)	.008 (.039)	−.034 (.043)	−.620 (.138)	−.046 (.044)
7 age dummies and an intercept		yes	yes	yes	yes	yes	yes
Mean of dependent var.		.162	.289	.246	.314	11.21	.315
R^2		.10	.07	.17	.14	.28	.06

Note: All models were estimated by OLS and contain 1048 observations. The numbers in parentheses are standard errors. Observations with missing values for mother's age and parent's schooling were given the mean age for mothers and mean years of schooling for parents by race and sex.

large impacts on single parenting are whether the respondent had a teenage mother and whether the respondent's parents were married. While the effects of standard family background variables (whether both parents were present at age 14 and parent's education) are substantial and significant for the standard outcome measures of idleness and schooling, the indicator variables for having had a family member in jail and for having a teenage mother seem to be (at least to some extent) general indicators of potential future socioeconomic distress for youths.

We have explored the robustness of our findings concerning family background variables to a large number of changes in specifications and samples. The basic qualitative findings concerning the impacts of family background variables presented in Table 6 remain quite similar when we restrict the sample to males only and when the specifications are expanded to include further (potentially endogenous variables) such as an indicator variable for residence in public housing and a measure of the family income (the income of those with whom the respondent resides). In addition, the results are robust to estimating these equations on the younger half of the sample separately from the older half. The relevant results are also not much altered when dummy variables for broad neighborhoods or zip codes are included in the specifications.

We conclude that different family background variables appear to have quite distinct relations with the different measures of socioeconomic outcomes for disadvantaged youths. In particular, family background variables typically appear to be most strongly related to variables capturing analogous behavior for youths. The impact of family background variables appears more complex than simply as picking that "good" families have "good" kids and "bad" families have "bad" kids.

IV. Do Neighborhoods Matter for Disadvantaged Youths?

Many observers believe that when children from disadvantaged families have predominantly disadvantaged neighbors that their chances of escaping from poverty and advancing in the mainstream

economy are greatly diminished.[9] Neighborhoods may, prima facie, be thought to influence youths in two complementary ways. First, if adult neighbors are involved in an activity -- crime, for example, or drug abuse -- observation of this activity may directly influence youths in the neighborhood. "Collective socialization" models of neighborhood effects (Wilson, 1987) focus on the way adults in a neighborhood affect youths who are not their children. Affluent adult neighbors may act as positive role models indicating that success follows from hard work and may help maintain neighborhood order. Second, neighborhoods provide youths with close proximity to others in their age group. Interaction with peers who exhibit certain behaviors may influence youths directly. "Epidemic" or contagion models (Crane, 1991; Montgomery, 1990) emphasize the way in which peers influence one another's behavior and are based on the assumption that an individual's likelihood of getting involved in an activity depends positively on the fraction of his or her neighborhood peers involved in such an activity.

In addition to its use in quantifying family influences, the NBER Boston Youth Survey can be used to study the effects of neighborhoods on youth outcomes. We are able to use the data available in the Boston Youth Survey to examine the potential importance of neighborhood effects operating through peer influences.[10]

To perform our analysis of neighborhood influences, we exploit the fact that we know the precise street addresses of a substantial majority of the youths in the NBER Boston Youth survey.[11]

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[9]See Jencks and Mayer (1990) for a review of alternative models of neighborhood effects.

[10]While we would like to explore the importance of non-familial adult influences, we do not have appropriate data to do so at present. The only non-familial adult behavior measured in our sample is that of the parents of other youths in the survey. However, the parents of peers may not provide a representative sample of non-familial adult behavior in a youth's neighborhood.

[11]We recovered the address sheets for 997 of the 1200 survey respondents. The other 203 address sheets were (inexplicably) not kept. We were able to determine the exact locations of the residences of the respondents in 988 of the 997 cases using the addresses reported on the address sheets and detailed Boston street maps. The sample for which we have addresses appears to be quite similar

On the basis of geographic location, we assign youths to neighborhoods roughly one or two square blocks in size, with four or five youths per neighborhood. The 988 youths for which we know physical location are assigned to 206 neighborhoods. We use these neighborhoods in the empirical work that follows.

Descriptive Evidence of Neighborhood Effects

There is significant heterogeneity in neighborhood characteristics and outcomes, even among high-poverty communities in Boston's inner city. To bring some of these differences into focus, we present in Table 7 the percentage of youths reporting particular activities in the three broad areas of the city covered by the survey: South Boston (310 observations), Dorchester (446 observations) and Roxbury (232 observations). The percentage of Roxbury youths reporting family members in jail while they were being raised is higher than that in Dorchester or South Boston. However, a higher percentage of South Boston youths report family drug or alcohol abuse problems (56 percent) than do those in Roxbury (39 percent) or Dorchester (42 percent). There is also a striking difference between these areas in the percentage reporting that their parents were never married, with the rate in South Boston (8 percent) significantly lower than that in Dorchester (27 percent) and Roxbury (35 percent).

Although the differences in youth outcomes and family background characteristics between these three areas of the city at least partially reflect the racial differences summarized in Table 2, there are also large differences among neighborhoods of similar racial compositions within each of these areas of the city. For example, large differences exist between neighborhoods in the percentage

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to the full sample on virtually all characteristics except race. Disproportionately many of the addresses are missing for the nonwhites and nonblacks from the original sample. We have repeated the analyses in sections II and III using the smaller sample that we can place into exact neighborhoods and found qualitatively and quantitatively quite similar results.

Table 7: Family Background Characteristics and Youth Outcomes by Area of Residence

Characteristic	All	South Boston	Dorchester	Roxbury
Family Background				
Family member ever in jail	0.35 (0.02)	0.34 (0.03)	0.33 (0.02)	0.41 (0.03)
Family member(s) with drug/alcohol problems	0.45 (0.02)	0.56 (0.03)	0.42 (0.02)	0.39 (0.03)
Adults in family attended church often	0.47 (0.02)	0.39 (0.03)	0.53 (0.02)	0.45 (0.03)
Parents were not married	0.23 (0.01)	0.08 (0.02)	0.27 (0.02)	0.35 (0.03)
Youth Outcomes				
Crime (last 12 months)	0.17 (0.01)	0.25 (0.02)	0.13 (0.02)	0.12 (0.02)
Uses illegal drugs	0.28 (0.01)	0.32 (0.03)	0.25 (0.02)	0.28 (0.03)
Parented child out of wedlock	0.26 (0.01)	0.17 (0.02)	0.29 (0.02)	0.30 (0.03)
Idle	0.33 (0.02)	0.31 (0.03)	0.34 (0.02)	0.33 (0.03)
Friends are gang members	0.19 (0.01)	0.14 (0.02)	0.19 (0.02)	0.25 (0.03)
Attends church	0.54 (0.02)	0.56 (0.03)	0.56 (0.02)	0.45 (0.03)
Uses alcohol at least weekly	0.28 (0.01)	0.36 (0.03)	0.23 (0.02)	0.27 (0.03)

Source: Tabulated from the 1989 Boston Inner City Youth Survey. Sample sizes vary by question. Standard errors of the means are provided in parentheses.

of youths reporting that family members have been in jail. Family jail terms are much more prevalent in the western neighborhoods of South Boston (home of the Broadway-D Street public housing project) than in South Boston's eastern neighborhoods. The data also suggest that individual family background variables have quite distinct spatial patterns. The southern neighborhoods of South Boston have a relatively high incidence of family members in jail, but a relatively low incidence of parents not married. For the central neighborhoods of Dorchester, the opposite is true: relatively low rates of family members jailed, but relatively high incidence of unwed parents. In the northern neighborhoods of Roxbury, both rates are high. This suggests that models in which some neighborhoods are "bad," and act generally as "bad" influences on youths, will not be adequate to explain our data.

There exists, as well, a substantial amount of spatial correlation across neighborhoods in youth's socioeconomic outcomes: neighborhoods with a high degree of idleness tend to be adjacent to or near other neighborhoods with high idleness rates. Neighborhoods with lower gang membership rates tend to be near neighborhoods with similarly low rates.[12] Spatial correlation remains even after conditioning on family background and personal characteristic variables.[13] Spatial correlation in the

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[12]This can be seen also by calculating Moran I statistics (MI) of spatial correlation for the 206 neighborhoods in our sample. The measure of spatial covariance relative to variance for outcome Y can be calculated:

$$MI = \frac{Y'WY/2J}{Y'Y/n}$$

where W is a matrix that assigns each observation its' neighbors. $W = \{w_{ij}\}$ such that $w_{ij} = 1$ if i and j share a boundary, else $w_{ij} = 0$. J is the number of boundaries in the system, and n is the number of neighborhoods in the system. The MI statistic is asymptotically normally distributed. For the outcomes we will analyze below, the MI statistics are: CRIME = 0.18 (t-stat = 3.83); DRUG USE = 0.10 (2.05); SINGLE PARENT = 0.10 (2.07); IDLE = 0.15 (3.15); FRIENDS ARE GANG MEMBERS = 0.07 (1.47); CHURCH ATTENDANCE = 0.12 (2.48); REGULAR ALCOHOL USE = 0.10 (2.16).

[13] Regressions were performed on those observations for which addresses are available. The regression results are almost identical to those reported in Table 6 for the sample as a whole.

mean residuals by neighborhood suggests that there may be large neighborhood effects, with the rates of outcomes in some neighborhoods much higher [lower] than one would expect given personal and family background characteristics. In addition, neighborhoods with particularly high [low] mean residuals tend to be adjacent to or near similar neighborhoods.

Estimates of Neighborhood Effects

To more formally explore the extent to which neighbors influence one another, we explicitly allow for the possibility that other young people in the neighborhood directly influence youths' actions. Table 8 presents probit estimates that allow for the influence of neighbors in a given youths' behavior for seven socioeconomic outcome indicators: criminal activity, illegal drug use, parenthood outside of wedlock, idleness, friendship with gang members, church attendance, and regular alcohol use. In each of the estimated equations, neighbors' observed behavior is included as an independent variable, along with the family background and personal characteristic variables used in Section III. The models estimated in Table 8 are of the form:

$$Y^{*} = \phi W Y + X\beta + u$$

$$Y_i = 1 \text{ if } Y_i^{*} > 0, \; Y_i = 0 \text{ otherwise}$$

where Y is an (Nx1) vector of youth outcomes, u is an (Nx1) vector of disturbance terms, and W is an (NxN) matrix that assigns to each observation the mean of its neighbors' outcomes. That is, the ith row of W assigns to observation i the average behavior of i's neighbors. In this estimation, "neighbors" include both those observations with which a given youth shares a neighborhood and observations in immediately adjacent neighborhoods. Because each neighborhood contains only 4 or 5 observations and represents a quite compact geographic area, we allow youths in adjacent

Table 8: Probit Estimates of (Non-instrumented) Neighborhood Effects Using Individual-level Data
Boston Inner City Youths, NBER Boston Youth Survey, 1989
Changes in the Probability of Each Outcome

	Dependent Variable:						
Explanatory Variable	(1) Crime in last year	(2) Use illegal Drugs	(3) Single Parent	(4) Idle	(5) Friends with Gang Members	(6) Attend Church	(7) Alc. Use Weekly
Neighbors' outcome (ϕ)	.231 (2.50)	.320 (2.78)	.160 (1.01)	.245 (1.74)	.273 (2.05)	.266 (2.06)	.339 (3.53)
Female	-.107 (5.42)	-.111 (3.66)	.247 (6.72)	.104 (2.87)	-.066 (2.28)	.017 (0.46)	-.209 (7.57)
Black	-.049 (1.99)	-.010 (0.30)	.049 (1.15)	-.040 (0.96)	.071 (1.93)	-.030 (0.76)	-.026 (0.77)
Family Member in jail	.056 (2.73)	.039 (1.16)	.047 (1.20)	.111 (2.83)	.059 (1.86)	-.030 (0.74)	.016 (0.54)
Family Member with Drug/Alcohol problems	.066 (3.26)	.133 (4.12)	.053 (1.37)	-.014 (0.36)	.081 (2.63)	.027 (0.70)	.042 (1.48)
Adults in family went to church often	-.022 (1.13)	-.031 (1.02)	-.003 (0.07)	.009 (0.26)	-.014 (0.48)	.152 (4.25)	-.028 (1.04)
Both parents present at age 14	-.024 (1.22)	-.025 (0.77)	-.063 (1.63)	-.118 (3.19)	.033 (1.13)	.056 (1.53)	-.011 (0.39)
Mother less than 20 at respondent's birth	.023 (0.99)	.061 (1.57)	.140 (3.09)	.119 (2.54)	.033 (0.96)	-.040 (0.86)	.002 (0.07)
Mother's age missing	.004 (0.12)	.032 (0.72)	.093 (1.99)	.145 (2.90)	-.038 (0.83)	-.106 (2.17)	-.034 (0.86)
Parents not married	.033 (1.29)	.015 (0.36)	.109 (2.35)	.004 (0.09)	.065 (1.80)	-.043 (0.90)	.031 (0.84)
Parent's years of schooling	-.000 (0.05)	.014 (1.93)	-.007 (0.93)	-.016 (1.82)	.002 (0.33)	.003 (0.31)	.012 (2.03)
Parent's schooling missing	.001 (0.03)	.005 (0.11)	.030 (0.58)	-.023 (0.43)	-.004 (0.08)	-.030 (0.56)	-.000 (0.00)
7 age dummies and an intercept	yes	yes	yes	yes	yes	yes	yes
# observations	880	880	880	880	880	880	880

Note: The numbers in parentheses are t-statistics of the β parameters.

All models are of the form: $Y^* = \phi W Y + X\beta + u$.

Changes in probability are evaluated at the sample means.

neighborhoods to be included in measures of neighbor activity in order to provide a more precisely estimated measure of that activity in the area immediately surrounding a youth. Thus, a youth's neighbors includes other youths in the geographic area stretching approximately two blocks in each direction from the youth's residence.

The estimates presented in Table 8 are the derivatives of the predicted probabilities for each outcome with respect to each covariate evaluated at the sample mean characteristics.[14] Similar to the results presented in Table 6, family factors continue to have significant effects on related youth behavior. Youth drug use, for example, is more highly correlated with reported family drug problems than with any other family background variable; parenting a child out of wedlock continues to be highly correlated with having parents who never married, and with having a teenage mother. In addition to the related family background variables, it appears that related peer behaviors have substantial and significant effects on youth involvement in crime, drug use, church attendance, alcohol use, and idleness. For example, the point estimates in column (1) imply that the direct effect of moving a youth with given family and personal characteristics to a neighborhood where 10 percent more of the youths are involved in crime than in his or her initial neighborhood is to raise the probability the youth will become involved in crime by 2.3 percent. Peer influences appear to be less significant in affecting the propensity of youths to have children out of wedlock than they do for the other activities examined.

While the results in Table 8 suggest strong family and peer influences, there are several potential sources of bias in estimating peer effects by directly entering neighbor's outcomes as explanatory variables in models to estimate individuals' socioeconomic outcomes. The discussion

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[14]The models estimated in Table 8 are of the form $Y^* = Z\delta + u$, where u is a vector of i.i.d. normal error terms with mean zero and unit variance. The derivative of the probability that $Y=1$ with respect to the covariate Z_j evaluated at Z° is given by $\phi(Z^\circ\delta)\delta_j$, where $\phi(\ )$ is the probability density function for a univariate standard normal random variable. The reported derivatives in Table 8 are evaluated at the sample means of the Z's.

above implied that neighboring observation j influences observation i's actions while at the same time being influenced by observation i. This structure means that an individual observation's error term is correlated with its neighbors' outcomes and its neighbors' outcomes enter its equation as an explanatory variable. In this case, probit estimates with neighbors' outcomes on the right-hand side of the equation do not yield consistent estimates of peer effects. In addition, significant correlation between neighbors' behavior and a given youth's behavior may be due solely to correlation in the shocks to their systems. In other words, one would not want to attribute influence to peers that which was instead correlation in u_i's among youths in a neighborhood arising from unmeasured factors affecting all youths in the neighborhood. For example, crime and drug involvement may be higher in some neighborhoods than others because of laxer law enforcement activity rather than because of peer influences. Although unmeasured variables common to neighbors are likely to lead to upward biased estimates of peer effects using the direct probit approach in Table 8, measurement error in neighbor's outcomes from respondent misreporting of activities is likely to lead to downward biased estimates using this approach.

The problem of estimating peer or neighborhood effects has an analogue in analysis of discrete panel data, where researchers have been interested in distinguishing between serial correlation and potential habit persistence.[15] In our analysis of peer effects, we wish to distinguish between spatial correlation in the errors and true interdependence in youth behavior. We will do so using two procedures similar to those recommended for assessing the importance of habit persistence in the

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[15]When the value taken by the latent variable Y^* for i in period t is a function of the value of the latent variable for i in earlier periods,

$$Y^*(i,t) = f[Y^*(i,t-1)],$$

the model is said to exhibit "habit persistence." Heckman (1981a,b) carefully discusses empirical strategies to attempt to distinguish true habit persistence from serial correlation in the errors in discrete panel data models.

discrete panel data/time series analogue.

In the time series case, Chamberlain (1985) recommends adding lagged exogenous variables to the model and testing their significance. If current behavior does not respond to lagged exogenous variables, this can be taken as evidence that there is no interdependence. In the spatial case, this becomes a test of whether neighbors' family and personal background characteristics (WX) are significant explanatory variables of a youth's predisposition to a behavior (Y^*) in models that also include an individual's own family and personal background characteristics (X) as explanatory variables.

To carry out these tests, probit models for youth socioeconomic outcomes were estimated taking as explanatory variables the same individual-specific personal and family background variables used in Table 8. The log likelihoods of these models are recorded as the log likelihoods for Model 1 in Table 9. We then compare these log likelihoods to those from probit models (Model 2 in Table 9) which take as explanatory variables, in addition to all of the personal and family background variables used in Model 1, the average values of the same set of personal and family background variables of the youths's neighbors. Neighbors are defined, as above, to be youths in the same one to two block area and in immediately adjacent areas.

These tests, presented in Table 9, suggest that youths' behaviors are interdependent for most of the behaviors discussed above. Comparison of log likelihoods of probit estimating equations that allow for the presence of neighbors' variables (WX) with those that do not suggest that neighbors' variables are highly significant in predicting criminal activity (Likelihood Ratio (LR) test = 36.6, Probability of correctly rejecting the null hypothesis of equality between likelihoods = 0.99), drug use, gang activity, church attendance, and alcohol use. These tests suggest less neighborhood influence in idleness, and almost no evidence of neighbor influence in parenting out of wedlock (LR=17.0, Prob=0.48). These tests encourage closer attention to behavioral interdependence.

Table 9: Tests of the Joint Significance of Neighbors' Explanatory Variables in Probit Models for Youth Socioeconomic Outcomes
NBER Boston Youth Survey, 1989

Model 1: $Y_i^* = X_i\beta + u_i$; $Y_i = 1$ if $Y_i^* > 0$ and $Y_i = 0$ otherwise

Model 2: $Y_i^* = X_i\beta + X_j\delta + u_i$; $Y_i = 1$ if $Y_i^* > 0$ and $Y_i = 0$ otherwise[a]

Outcome Variable	Model 1 Log likelihood	Model 2 Log likelihood	LR Test	Probability[b]
Crime	-341.327	-359.652	36.64	0.99
Drugs	-492.461	-507.086	29.25	0.95
Single Parent	-420.902	-429.410	17.02	0.48
Idle	-484.569	-494.840	20.54	0.70
Friends with Gang Members	-358.174	-377.684	39.02	0.99
Attends Church	-584.138	-596.976	25.67	0.90
Regular Alcohol Use	-460.862	-487.382	53.04	0.99

[a]X_i is a vector of the personal and family characteristics of i, and X_j is a vector containing the mean values of the same characteristics of i's neighbors. The variables included in X are parent's years of schooling, 7 age dummies, and dummy variables for sex, race, family member in jail, family member with drug/alcohol problems, adults in family went to church often, both parents present at age 14, mother was less than 20 years old at birth, mother's age missing, parents not married, parent's years of schooling, parent's schooling missing.

[b]Probability of correctly rejecting null hypothesis of equality between the likelihoods.

The second approach we take is to put more structure on the problem by directly modeling a youth's predisposition toward a behavior as a function of other youths' predispositions, allowing for the simultaneity induced by such a structure. The estimating equation is chosen to allow youth i's predisposition to an outcome (Y_i^*) to depend upon neighboring youths' predispositions to that outcome (Y_j^*), in addition to the same set of conditioning variables (X_i) used in Tables 6 and 8. This approach yields a model which can be written as:

$$(1) \quad Y^* = \phi W Y^* + X\beta + u$$

$$(1a) \quad Y_i = 1 \text{ if } Y_i^* > 0, \; Y_i = 0 \text{ otherwise}$$

where u is assumed to be normally distributed with mean zero and ϕ is the parameter measuring the extent of neighborhood peer influences.

Underlying continuous variables indicating youth predispositions towards an outcome or the extent of youth involvement in an activity such as drug use are not available in the Boston Youth Survey. The only data available are discrete indicators of youth behaviors.[16] Since Y^* is not observed, we note that equation (1) can be rewritten:

$$(2) \quad Y^* = [I - \phi W]^{-1} X\beta + [I - \phi W]^{-1} u .$$

Furthermore, we observe that the matrix associated with $X\beta$ in (2) can be expanded:

$$[I - \phi W]^{-1} = I + \phi W + \phi^2 W^2 + \phi^3 W^3 \ldots$$

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[16]See Jones (1990) for an alternative instrumental variables approach to estimating peer influences when continuous outcome measures are available.

as long as ϕ is less than one in absolute value. With ϕ less than one in absolute value, the higher order terms become less and less influential and can be ignored for all practical purposes. We approximate the matrix $[I - \phi W]^{-1}$ and estimate the model implied by (1a) combined with the following equation[17]:

$$(3) \qquad Y^* = [I + \phi W + \phi^2 W^2] X\beta + [I - \phi W]^{-1} u .$$

Under this approach a youth's own personal characteristics and family background variables identify β, and neighbors' family background and personal characteristics are used to identify peer influences. More specifically, variation in neighbors' personal characteristics and family background variables (WX) and those of neighbors' neighbors (W^2X) identify ϕ. As in Heckman (1978), it is more convenient to work with a variance normalized version of estimating equation (3). Details of the estimation procedure are presented in Appendix 1.

Estimates using this approach are presented in Table 10. The reported estimates are the derivatives of the predicted probabilities for each outcome with respect to each covariate evaluated at the sample mean characteristics. As was true in the estimates in Table 8 where simultaneity was not explicitly modelled, the addition of neighboring youth behavior does not break the strong relations between family background variables and directly related youth behaviors found in Section III. It continues to be the case that family drug and crime history are the most influential family

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[17]We have also estimated equation (3) with expansion to a third term in ϕ--that is, approximating

$$[I - \phi W]^{-1} \quad I + \phi W + \phi^2 W^2 + \phi^3 W^3.$$

The estimates were virtually identical in all case to the estimates using an expansion to ϕ^2 suggesting the influence of the higher order terms beyond ϕ^2 quickly die away and are of little practical significance.

Table 10: Probit Estimates of Neighborhood Effects Using Individual-level Data
Boston Inner City Youths, NBER Boston Youth Survey, 1989
Changes in the Probability of Each Outcome

	Dependent Variable:						
Explanatory Variable	(1) Crime in last year	(2) Use illegal Drugs	(3) Single Parent	(4) Idle	(5) Friends with Gang Members	(6) Attend Church	(7) Alc. Use Weekly
Neighbors' predicted outcome (ϕ)	.118 (2.49)	.383 (4.00)	.008 (0.11)	.255 (3.19)	.201 (2.99)	.482 (3.93)	.204 (3.53)
Female	−.097 (4.85)	−.090 (3.07)	.262 (6.76)	.124 (3.26)	−.074 (2.49)	.046 (1.47)	−.193 (7.23)
Black	−.043 (2.00)	−.018 (0.83)	.068 (1.36)	−.059 (1.87)	.076 (2.67)	−.012 (0.52)	−.018 (0.83)
Family Member in jail	.075 (3.45)	.061 (1.75)	.050 (1.21)	.132 (3.16)	.094 (2.70)	−.018 (0.46)	.022 (0.79)
Family Member with Drug/Alcohol problems	.063 (2.99)	.141 (4.17)	.056 (1.38)	−.013 (0.32)	.077 (2.37)	.013 (0.35)	.067 (2.48)
Adults in family went to church often	−.020 (1.01)	−.035 (1.21)	.000 (0.01)	.016 (0.43)	−.016 (0.54)	.146 (4.38)	−.010 (0.40)
Both parents present at age 14	−.014 (0.69)	.017 (0.51)	−.066 (1.61)	−.125 (3.14)	.027 (0.85)	.066 (1.90)	.011 (0.42)
Mother less than 20 at respondent's birth	.027 (1.10)	.083 (2.02)	.146 (3.08)	.115 (2.31)	.021 (0.56)	−.037 (0.82)	.022 (0.64)
Mother's age missing	.001 (0.03)	.021 (0.49)	.100 (2.02)	.154 (2.95)	−.063 (1.35)	−.092 (1.94)	−.028 (0.77)
Parents not married	.041 (1.60)	.025 (0.62)	.119 (2.42)	−.004 (0.08)	.078 (2.00)	−.037 (0.82)	.051 (1.45)
Parent's years of schooling	−.000 (0.02)	.019 (2.66)	−.009 (1.00)	−.016 (1.70)	.002 (0.25)	.003 (0.41)	.013 (2.15)
Parent's schooling missing	.013 (0.40)	.020 (0.42)	.033 (0.62)	−.018 (0.33)	.003 (0.05)	−.006 (0.12)	−.023 (0.55)
7 age dummies and an intercept	yes	yes	yes	yes	yes	yes	yes
# observations	880	880	880	880	880	880	880

Note: The numbers in parentheses are t-statistics of the β parameters.

All models are of the form: $Y = [I - \phi W]^{-1} X\beta + [I - \phi W]^{-1} u$.

Changes in probability are evaluated at the sample means.

See Appendix 1 for details of estimation.

variables in a model of youth crime activity. Among family variables, illegal drug use and regular alcohol use are still most closely tied to family drug/alcohol abuse, and single parenthood is still most responsive to mother's age at youth's birth and to parents' being unwed.

Estimates of neighborhood peer influences (estimates of ϕ) are given in the top row of Table 10. Controlling for simultaneity in neighbors' behavior also does not break the strong neighborhood interdependence in youth behavior observed in Table 8. Increases in neighbors' involvment in crime, drug and alcohol use, gang activity, idleness and church attendance have large and significant effects on a given youth's involvement in these activities. The results suggest that youths within a neighborhood have large and significant effects on each others' behavior, even after including substantial controls for personal characteristics and family background variables. In other words, youths residing in a neighborhood in which a substantial fraction of young people are involved in crime or use illegal drugs have significantly higher probabilities of exhibiting analogous behavior than youths with similar family background and personal characteristics living in neighborhoods in which a small fraction of other young people are engaged in such activities. The magnitude of neighborhood peer influences are particularly large for illegal drug use and church attendance. On the other hand, peer influences appear unimportant for childbearing out of wedlock.

One possible caveat to our interpretation of the results in Tables 8, 9 and 10 is that they may be partially being driven by errors in the measurement of individual family background variables that are correlated with the measured average characteristics of one's neighbors. For example, if our observed family background measures consist of true family backgrounds plus measurement error that is uncorrelated with the truth and if families are sorted among neighborhoods on the basis of "true" family background characteristics, then neighbors' X's will be correlated with an individual's error term. On the other hand, our finding that the estimated effects of family background variables are not much reduced by the inclusion of neighbors' variables suggests that our estimates of neighborhood

effects do not largely reflect the possibility that neighbors' variables may proxy for mismeasured family background variables.[18]

Our findings complement the results of recent studies using tightly defined neighborhoods. For example, Crane (1991) finds strong neighborhood influences on dropping out behavior and teenage pregnancy in a national sample using geographic neighborhoods of similar size to the one's used in our analysis. Brooks-Gunn et al (1991) also find evidence that a geographic neighborhood's socioeconomic mix is significantly related to adolescent behaviors (out-of-wedlock childbearing and dropping out of school) using census tracts and zip code areas as neighborhoods. Similarly using schools rather than residential neighborhoods, Mayer (1991a,b) finds substantial effects of a school's socioeconomic mix on teenage fertility and high school graduation rates. The one discrepancy between our findings and these other studies is that we find quite weak neighborhood effects on out-of-wedlock childbearing.

V. Conclusions

Our main findings are that the behaviors of family members and neighborhood peers appear to substantially affect the behavior and outcomes of disadvantaged youths. The pattern of influences suggests that two inner-city youths with the same personal characteristics may have quite different socioeconomic outcomes depending on family role models and peer influences in their neighborhoods. Our results indicate that family and peer influences both operate in manner such that "like begets like." These family and neighborhood influences are important even under the tight labor market conditions prevailing in Boston in the mid- to late-1980s.

Our results are consistent with Wilson's (1987) emphasis on the importance of role models.

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[18]See Borjas (1991) for a formalization of this argument in the analogous case of examining the extent to which the effects of ethnic group average characteristics on youth outcomes may pick up mismeasured individual family background variables.

Wilson (1987, p.7) argues that the presence of working class and middle class black families "reinforced and perpetuated mainstream patterns of norms and behaviors." Our findings suggest that such families may influence inner city youths directly through the actions of their children, or perhaps indirectly, with influence working from adult neighbor to parent, and from parent to child.

The possibility of substantial family and neighborhood influences presents a mixed message with respect to the future prospects for those growing up in disadvantaged neighborhoods. On the pessimistic side, strong family and neighborhood effects imply that those from disadvantaged backgrounds may have difficulties even under the most optimistic scenarios involving labor shortages and tight labor markets in the future. On the optimistic side, such effects also suggest that shocks or policy interventions that positively affect individuals will have positive multiplier effects within neighborhoods through peer influences and across generations through family influences.

References

Altonji, Joseph G. "The Effects of Family Background and School Characteristics on Education and Labor Market Outcomes." Unpublished paper, Northwestern University, December 1988.

Altonji, Joseph G. and Thomas A. Dunn. "Relationships Among Family Incomes and Labor Market Outcomes of Relatives." Research In Labor Economics, forthcoming 1991.

Blau, Peter and Otis D. Duncan. The American Occupational Structure. New York: Wiley, 1967.

Brooks-Gunn, Jeanne; Greg J. Duncan; Pam Kato; and Naomi Sealand. "Do Neighborhoods Influence Child and Adolescent Behavior?" Unpublished Paper, University of Michigan, April 1991.

Borjas, George J. "Ethnic Capital and Intergenerational Mobility." Unpublished paper, UCSD, March 1991.

Chamberlain, Gary, "Heterogeneity, Omitted Variable Bias, and Duration Dependence." In J.J. Heckman and B. Singer (eds.), Longitudinal Analysis of Labor Market Data. Cambridge: Cambridge University Press, 1985, 3-39.

Corcoran, Mary, Roger Gordon, Deborah Laren, and Gary Solon. "Effects of Family and Community Background on Men's Economic Status." NBER Working Paper No. 2896, March 1989.

Crane, Jonathan. "The Epidemic Theory of Ghettos and Neighborhood Effects on Dropping Out and Teenage Childbearing." American Journal of Sociology, 1991.

Freeman, Richard B. "Who Escapes? The Relation of Churchgoing and Other Background Factors to the Socioeconomic Performance of Black Male Youths from Inner-City Tracts." In Freeman and Holzer (1986), 353-376.

Freeman, Richard B. "Help Wanted: Disadvantaged Youths in a Labor Shortage Economy." Unpublished paper, Harvard University, October 1989.

Freeman, Richard B. "Labor Market Tightness and the Mismatch Between Demand and Supply of Less-Educated Young Men in the United States in the 1980s." In F. Padoa Schioppa (ed.), Mismatch and Labor Mobility. Cambridge: Cambridge University Press, 1991a, 360-381.

Freeman, Richard B. "Crime and the Economic Status of Disadvantaged Young Men." Unpublished paper, Russell Sage Foundation, March 1991b.

Freeman, Richard B. and Harry J. Holzer, eds. The Black Youth Employment Crisis. Chicago: University of Chicago and NBER, 1986.

Heckman, James J., "Dummy Endogenous Variables in a Simultaneous Equation System," Econometrica 46(6), 931-959, 1978.

Heckman, James J. "The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process." In Charles F. Manski and Daniel McFadden (eds.), Structural Analysis of Discrete Data with Econometric Applications. Cambridge, Ma: MIT Press, 1981a, 179-197.

Heckman, James J. "Statistical Models for Discrete Panel Data." In Charles F. Manski and Daniel McFadden (eds.), Structural Analysis of Discrete Data with Econometric Applications. Cambridge, Ma.: MIT Press, 1981b, 114-178.

Hindelang, M.J., T. Hirschi, and J. Weis. Measuring Delinquency, vol. 123, Sage Library of Social Research. Beverly Hills, Ca.: Sage, 1981.

Jargowsky, Paul A. and Mary Jo Bane. "Neighborhood Poverty: Basic Questions." In L. Lynn and M. McGeary (eds.), Inner-City Poverty in the United States. Washington, D.C.: National Academy Press, 1990, 16-67.

Jencks, Christopher and Susan E. Mayer. "The Social Consequences of Growing Up in a Poor Neighborhood: A Review." In L. Lynn and M. McGeary (eds.), Inner-City Poverty in the United States. Washington, D.C.: National Academy Press, 1990, 111-187.

Jones, Stephen R. G. "Worker Interdependence and Output: The Hawthorne Studies Reevaluated." American Sociological Review 55 (April 1990): 176-190.

Juhn, Chinhui. "The Decline of Male Labor Force Participation: The Role of Declining Market Opportunities." Unpublished paper, University of Chicago, April 1991.

Kasarda, John. "Urban Industrial Transition and The Underclass." The Annals of the American Academy of Political and Social Science 501 (January 1989): 26-47.

Mauer, Marc. "Young Black Men and the Criminal Justice System: A Growing National Problem." Working Paper, The Sentencing Project, Washington, D.C., February 1990.

Mayer, Susan E. "How Much Does a High School's Racial and Socioeconomic Mix Affect Graduation and Teenage Fertility Rates?." In C. Jencks and P. Peterson (eds.), The Urban Underclass. Washington, D.C.: The Brookings Institution, 1991a, 321-341.

Mayer, Susan E. "The Effect of Schools' Racial and Socioeconomic Mix on High School Students' Chances of Dropping Out." Unpublished paper, University of Chicago, February 1991b.

Montgomery, James D. "Is Underclass Behavior Contagious? A Rational-Choice Analysis." Unpublished paper, Northwestern University, March 1990.

Wilson, William J. The Truly Disadvantaged. Chicago: The University of Chicago Press, 1987.

Appendix 1 Estimation of equations with spatial habit persistence[1]

If a youth's predisposition toward a behavior is a function of neighboring youths' predispositions toward that behavior, the structural equations appear (as in the text):

$$Y_i^* = (I - \phi W)^{-1} X\beta + (I-\phi W)^{-1} u \qquad (2)$$

where u is assumed to be normally distributed, $u \sim N(0, I\,\sigma_u^2)$.

$Y_i = 1$ iff $Y_i^* \geq 0$.

$Y_i = 0$ otherwise.

The variance-covariance matrix for (2) is

$$\Omega = E(VV') = (I - \phi W)^{-1} (I - \phi W)^{-1\prime}\, \sigma_u^2$$

where V_i = the ith element of $(I - \phi W)^{-1}u$.

The variance-normalized version of equation (2) appears

$$Y_i^{**} = D^{*-1} (I - \phi W)^{-1} X\beta + D^{*-1} (I-\phi W)^{-1} u \qquad (2A)$$

where the inverse of D^*, the square root of the DIAG(Ω), is used to give the model unit variance disturbances.

Clearly the probability that Y_i^* is greater than zero,

$$Pr(Y_i^*) \geq 0 = Pr[\, (I-\phi W)^{-1} u \geq (I - \phi W)^{-1} X\beta \,]$$

is equal to the $Pr(Y_i^{**} \geq 0) = Pr[D^{*-1} (I-\phi W)^{-1} u \geq D^{*-1} (I - \phi W)^{-1} X\beta) \,]$.

[1] See Heckman (1978) Appendix B for a general treatment, and Heckman (1981), pp. 145-46 for details on the time series analogue.

An approximation of D^{*-1} is used in practice. Note that

$$[I - \phi W]^{-1} = I + \phi W + \phi^2 W^2 + \phi^3 W^3 + \ldots$$

with the influence of the later terms dying out. Using this matrix expansion, the variance (Ω) can then be written:

$$\Omega = (I - \phi W)^{-1} (I - \phi W)^{-1}, \sigma_u^2$$

$$= (I + \phi(W + W') + \phi^2(W^2 + W^2' + WW')) \sigma_u^2$$

$$+ \text{terms involving } \phi^3 \text{ and higher orders of } \phi.$$

The variance covariance matrix Ω was approximated using terms of ϕ through ϕ^2. That is:

$$\Omega^* \simeq (I + \phi(W + W') + \phi^2(W^2 + W^2' + WW')) \sigma_u^2$$

Estimations in the text are based on variance normalized versions of equation (3) in the text, using the inverse of the square root of the diagonal of Ω^* above to normalize the variance.