LONG-TERM NEIGHBORHOOD EFFECTS ON LOW-INCOME FAMILIES: EVIDENCE FROM MOVING TO OPPORTUNITY

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We examine long-term neighborhood effects on low-income families using data from the Moving to Opportunity (MTO) randomized housing-mobility experiment, which offered some public-housing families but not others the chance to move to less-disadvantaged neighborhoods. We show that 10-15 years after baseline, MTO improves adult physical and mental health, has no detectable effect on economic outcomes or youth schooling or physical health, and mixed results by gender on other youth outcomes, with girls doing better on some measures and boys doing worse. Despite the somewhat mixed pattern of impacts on traditional behavioral outcomes, MTO moves substantially improve adult subjective well-being.

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I. Introduction

Research dating back to at least the 17th century has shown that people living in relatively more disadvantaged neighborhoods tend to fare worse with respect to earnings, schooling outcomes, health, crime involvement and a range of other life outcomes (Sampson, Raudenbush, and Earls 1997; Macintyre and Ellaway 2003; Sampson, Morenoff, and Gannon-Rowley 2002; Kawachi and Berkman 2003). These patterns have led to concern that neighborhood environments may have independent causal effects on people's long-term life chances. Living in a disadvantaged social environment may depress people's life chances by shaping their exposure to peer norms, information, or access to resources, such as job referrals (Wilson 1987; Manski 2000; Becker and Murphy 2000). However some theories yield the opposite prediction about the behavioral consequences of moving from a disadvantaged to more affluent area, since discrimination and competition from advantaged peers may be more pronounced in more affluent areas (Jencks and Mayer 1990).

Empirically isolating the causal effects of neighborhood environments on people's behavior and well-being is complicated by the fact that most people have at least some degree of choice over where they live. Observational studies may confound the causal effects of neighborhood environments with those of hard-to-measure individual- or family-level attributes that affect both residential sorting and the key behavioral outcomes of interest.

Understanding the importance of "neighborhood effects" on people's behavior and well-being is important in part because neighborhood residential segregation by income has been increasing in the United States since 1970, a trend that does not seem to be due simply to increases in overall income inequality (Reardon and Bischoff 2011). Nearly 9 million people in the U.S. currently live in "extreme-poverty" neighborhoods in which at least 40 percent of

residents are poor (Kneebone, Nadeau, and Berube 2011). Evidence about neighborhood effects (and the mechanisms behind such effects) is relevant for policy decisions that affect how people are sorted across neighborhoods, and for understanding whether spillover effects that people might not account for in making residential choices might lead to inefficient equilibria in the housing market (Benabou 1993; Becker and Murphy 2000).

This paper examines the long-term effects of moving from very disadvantaged to much less disadvantaged neighborhoods on the well-being of low-income parents and children, using data from a unique, large-scale randomized social experiment – the U.S. Department of Housing and Urban Development's (HUD) Moving to Opportunity (MTO) demonstration. Via random lottery, MTO offered some families with children living in high-poverty public housing projects the chance to move into less-distressed areas. MTO randomization generates large, persistent differences in neighborhood conditions across otherwise comparable groups of families and enables us to attribute differences in post-baseline outcomes across groups to the MTO moves.

We find that 10-15 years after randomization, MTO moves to less disadvantaged neighborhoods generate improvements in several key adult mental and physical health outcomes, but have no consistent detectable impacts on adult economic outcomes or children's schooling outcomes, even for those who were pre-school age at baseline and so experienced very large changes in neighborhood environments during what is increasingly thought to be the most developmentally plastic life stage. We also find signs of the same gender difference in the effects of MTO moves on youth risky behaviors and health found in the interim (4-7 year) follow-up, with girls doing better in some ways while boys do worse. Despite the mixed MTO impacts on the standard outcomes that have dominated the neighborhood-effects literature, the net effect of MTO moves is a substantial gain in subjective well-being by MTO adults (Ludwig et al. 2012).

II. The Moving to Opportunity Experiment

From 1994 to 1998 MTO enrolled 4,604 low-income public housing families living in high-poverty neighborhoods within five U.S. cities: Baltimore, Boston, Chicago, Los Angeles, and New York. Families were randomized into three groups: i) the *Experimental voucher group*, which received housing vouchers that subsidize private-market rents, but could only be used in census tracts with 1990 poverty rates below 10 percent, and some additional housing-mobility counseling; ii) the *Section-8 only voucher group*, which received regular housing vouchers without any MTO relocation constraint; and iii) a *control* group, which received no assistance through MTO. Some 48% of households assigned to the Experimental group and 63% of those assigned to the Section 8-only group moved through MTO (the MTO "compliance rate").

Data from baseline surveys show that these families were quite economically disadvantaged when they applied for MTO (see Appendix Table 1). Most household heads were African-American or Hispanic females; fewer than 40% had completed high school. Around three-quarters of applicants report getting away from gangs and drugs as the most important reason for enrolling in MTO, far more than any other reason. As one would expect from a properly-conducted random assignment, the distribution of baseline characteristics is balanced between the treatment and control groups (Ludwig et al. 2011; Ludwig et al. 2012).

III. Measures and Methods

To measure long-term outcomes, our research team subcontracted with the Institute for Social Research at the University of Michigan to collect in-person data with 3,273 MTO adults and 5,105 youth who were ages 10-20 at the end of 2007. Data were collected between 2008 and 2010, or 10-15 years after baseline. The effective response rates equaled 90% for MTO adults and 89% for youth, and were generally similar across randomized MTO groups. Adults in the

Section 8 group were interviewed slightly later than other adults because funding for this activity was secured later during the project; we discuss implications of this delay below.

To measure neighborhood environments we tracked MTO households during the follow-up period using self-reported address information together with passive tracking data. We linked addresses to census tract-level data on population characteristics from the 1990 and 2000 decennial censuses and the 2005-09 American Community Surveys. We focus on duration-weighted average tract characteristics over the entire 10-15 year study period, since people's life outcomes may depend on cumulative exposure to neighborhood environments. Our surveys also included questions that ask adults and youth to self-report about neighborhood conditions.

Our primary outcomes are indices of adult outcomes in the domains of economic outcomes, physical health, and mental health, and for youth in the domains of educational outcomes, physical health, mental health, and risky / delinquent behavior. The outcome indices are constructed from a set of individual outcomes from our follow-up surveys, and are re-scaled so that higher values represent "better" outcomes and then converted to Z-scores using the control group distribution. Aggregating outcomes improves statistical power to detect impacts and also reduces the risk of "false positives" by reducing the number of statistical tests carried out (Kling, Liebman, and Katz 2007). To further reduce the risk of false positives due to data mining, we examine outcome indices that were pre-specified for the interim MTO follow-up undertaken in 2002 (Kling, Liebman, and Katz 2007).

We present intention-to-treat (ITT) estimates that capture the effect of being offered the chance to use an MTO voucher to move into a different neighborhood. These estimates are calculated as the difference in average outcomes for families assigned to treatment versus those assigned to the control condition, by regressing some outcome index Y against a set of indicators

for treatment-group assignment, **Z**, and a set of baseline characteristics, **X**, that include indicators for MTO demonstration site and various participation socio-demographic measures to improve precision (see Appendix Table 1). The estimates are weighted to account for changes over time in the probability of treatment assignment due to higher-than-expected compliance rates.

(1) $Y = \pi_0 + \mathbf{Z}\,\pi_1 + \mathbf{X}\,\pi_2 + \varepsilon$

So long as the effect of treatment assignment only affects families who move with a MTO voucher, the effects of treatment on the treated (TOT) will equal the ITT effect for either the Experimental or Section 8 group divided by that group's MTO compliance rate (Bloom 1984). Given compliance rates of 48% and 63% for the Experimental and Section 8 groups, respectively, the TOT effects will be about 2.1 and 1.6 times the ITT effects.

IV. Results

One year after baseline, the average control group adult is living in a neighborhood with an average tract poverty rate of 50 percent. Moving with an Experimental voucher reduces average tract poverty rates one year after baseline by 35 percentage points, or about 2.8 standard deviations in the 2000 census tract poverty distribution, while moving with a regular Section 8 voucher reduces tract poverty rates by 22 percentage points, or 1.8 standard deviations. These differences across randomized MTO groups in neighborhood conditions narrow over time, but mostly because the neighborhood poverty rate for control group families decline over time.

Despite the narrowing over time of neighborhood conditions across randomized MTO groups, MTO-induced differences in duration-weighted average tract poverty rates over the course of the 10-15 year follow-up period are still quite sizable. The first panel of Figure 1 shows that a very large share of adults who moved through MTO with an Experimental voucher has an average tract poverty rate below 20%. Very few control group families wind up with average

tract poverty rates in this range. The effects of moving with a regular Section 8 voucher on average tract poverty rates are somewhat less pronounced, as seen in the second panel of Figure 1. (Appendix Table 2 presents MTO impacts on a broader set of neighborhood characteristics.)

Contrary to the longstanding view that living in a disadvantaged inner-city neighborhood depresses labor market outcomes, Table 1 suggests that being offered a voucher through MTO does not improve economic outcomes, at least for this study sample. Although the ITT estimate for the Section 8 group is negative and marginally significant ($p<.10$), we believe this is most likely an artifact of our interviewing the Section 8 group adults a bit later in time than control adults, when labor market conditions were less favorable (see Sanbonmatsu et al. 2011).

The results in Table 1 also hint at some potentially positive impacts of MTO on adult mental and physical health outcomes, with ITT effects on these broad health outcome indices that are positive (in the direction of better health) but not quite statistically significant. However some individual outcome measures within in the health domain showed large and statistically significant improvements in response to MTO-assisted moves, as seen in Table 2. For example, moving with an Experimental-group voucher (the TOT effect) reduced the prevalence of having a body mass index of 40 or more (BMI, defined as weight in kilograms divided by the square of height in meters) by 7 percentage points. This is a decline of nearly 40% of the control group mean of 18 percent (Ludwig et al. 2011, Supplemental Table 3). For a five-foot-four woman a BMI of 40 would correspond to a weight of about 235 pounds. We also found that the TOT effect of the Experimental voucher reduced prevalence of diabetes, measured from blood samples as having a level of glycosylated hemoglobin (HbA1c) of 6.5% or higher, by 10 percentage points, or fully one-half of the control mean.

Among youth, we find no evidence that MTO has beneficial impacts on schooling outcomes, and that for other outcomes MTO has more beneficial effects on female youth than male youth. Assignment to the Experimental and Section 8 groups improves physical health for girls, while the Experimental group effect on mental health outcomes is also positive and statistically significant. The estimated effects on health outcomes for boys range from zero to negative (worse health). We can reject the null hypothesis that the physical and mental health impacts of Experimental group assignment are the same for girls and boys. (Results for the statistically significant individual outcomes within these indices are shown in Table 2).

V. Extensions

The MTO findings about the effects of changing neighborhood environments on key outcomes like economic self-sufficiency and children's schooling outcomes runs counter to much of what previous theories and observational research has suggested. One common explanation for this discrepancy is that MTO generates too small of a "treatment dose" on neighborhood environments to provide a meaningful test of "neighborhood effects" theories. In this section we provide more details on the nature and magnitude of MTO's effects on the neighborhood conditions in which families were living during our study period. In this section we provide additional details about MTO impacts on neighborhood conditions, followed by a discussion of some additional results for MTO effects on various behavioral outcomes.

A. Impacts on neighborhood environments

A1. MTO effects on neighborhood poverty

Appendix Table 2 shows that one year after random assignment, the average control group family is living in a neighborhood that is 50 percent poor, or 2.9 standard deviations (SD) above the national average in the 2000 census nationwide tract-poverty distribution. Moving

with an Experimental voucher reduces average tract poverty rates by 35 percentage points, or 2.8 SD – essentially moving families down to the national average. The effect of moving with a regular Section 8 voucher that does not have the mobility restriction is smaller but still sizable – equal to 22 percentage points, or 1.8 SD in the national distribution.

Over time the MTO effect on neighborhood conditions declines, due partly to secondary moves by MTO families after their initial MTO-assisted voucher moves but also in large part to declines over time in the average tract poverty rate of families in the control group. For example the Experimental group TOT effect on tract poverty rates goes from 35 percentage points measured 1 year after baseline to about 9 percentage points measured 10 years out, a decline of 26 percentage points. Much of this attenuation of the MTO effect on neighborhood poverty rates comes from the fact that the average tract poverty rate for control families declined from 50 percent one year after baseline down to 33 percent 10 year out, a drop of 17 percentage points. In other analyses (not reported here) we find that most of the decline in neighborhood poverty rates among control families is due to mobility rather than to gentrification of the neighborhoods in which control group families are living, as suggested by re-estimating MTO impacts on neighborhood conditions at different points in time since randomization but holding the poverty rates of all tracts constant at their levels in the 2000 census.

Whatever the cause, it is clearly true that the neighborhood conditions of the MTO treatment and control groups converge over time. Rather than look at MTO's impacts on neighborhood conditions at a point in time, we can also average over the entire follow-up study period. Looking at MTO's effects on average neighborhood conditions families experience over the entire study period also fits with the common view that behavioral change may require accumulated exposure to neighborhood environments. Appendix Table 2 shows that over the

course of the study period the average control group family lived in a census tract that was 40 percent poor. Moving with an Experimental voucher reduces average tract poverty rates for families by fully 18 percentage points, for a decline of nearly one-half the control mean.

Another way to consider the size of the MTO "treatment dose" on neighborhood conditions is to ask how much better we could ever hope to do with an at-scale mobility program, where the answer in the MTO application is: not much. A common measure of residential segregation is the "dissimilarity index," defined as the share of people who would need to be moved across census tracts within a given area in order to have the share of poor people in each tract equal the share of the larger area that is poor. The five MTO demonstration cities have poverty rates right now in the ballpark of 20 percent.[1] The average tract poverty rate of MTO Experimental group movers (about 21 percent) corresponds basically to the benchmark of perfect poverty integration in these MTO cities. Even if we implemented a residential mobility program that would move inner-city families all over the country, the poverty rate in the U.S. as a whole right now is 15 percent. There is just not that much room to achieve more economic integration at large scale when the overall poverty rate is 15 or 20 percent.

A2. MTO effects on other neighborhood conditions

Although MTO focused explicitly on reducing economic rather than racial segregation for participating families, one might have expected there to be important changes in neighborhood racial segregation as a byproduct of the MTO moves, given that residents of high-poverty neighborhoods are very disproportionately likely to be Hispanic or African-American (Jargowsky 1997; Jargowsky 2003). Appendix Table 2 makes clear, however, that MTO's impacts on racial segregation for participants were fairly modest. The average control group

[1] Data from the Census Bureau's American Community Survey for 2006 through 2010 show the poverty rates for the five MTO cities are: Baltimore (21.3 percent); Boston (21.2); Chicago (20.9); Los Angeles (19.5); and New York (19.1). See www.census.gov.

family spent the study period in a census tract that was 88 percent minority. The tract share minority for those who moved with an experimental voucher was lower by a statistically significant amount, but the TOT effect of about 13 percentage points means that, over the study period, even the Experimental group movers were living in census tracts in which fully three-quarters of all residents were members of racial and ethnic minority groups.

Despite the lack of MTO impact on neighborhood racial composition, MTO moves led to sizable changes in neighborhood social processes that a growing body of sociological research suggests might be particularly important in affecting people's life outcomes (see for example Sampson, Morenoff, and Gannon-Rowley 2002; Sampson 2012). For example Appendix Table 2 shows that in survey self-reports 10 years after baseline – after the convergence in neighborhood poverty rates between treatment and control groups has occurred – the Experimental group TOT effect on the chance of having at least one college-educated friend was nearly 15 percentage points, or about a third of the control mean of 53 percent. The Experimental TOT effect on the likelihood that neighbors would do something if local youth were spraying graffiti (intended to measure what Sampson, Raudenbush, and Earls (1997), call "collective efficacy" – the willingness of neighbors to work together to enforce shared social norms) was over 15 percentage points, about a quarter of the control mean of 59 percent.

MTO also delivered in terms of changing the neighborhood condition that was the main reason most MTO families signed up for the program originally – safety. Moving with an experimental group voucher reduces the local violent-crime rate (as measured by police data) by 876 violent crimes per 100,000 residents, over one-third of the control mean of 2,420. Self-reported data about neighborhood safety shows similarly large effects. The Experimental TOT effect on the likelihood that adults report feeling unsafe in their neighborhood during the day

equals 7 percentage points, over one-third of the control group's rate of 20 percent, and reduces the likelihood of having seen drugs used or sold in the neighborhood over the past month by 13 percentage points, over two-fifths of the control group value of 31 percent.

Because moving itself is part of the MTO treatment and could have independent effects on people's life outcomes, it is important to keep in mind that the control group averaged about 2.2 moves over the course of the 10-15 year follow-up study period. Treatment assignment increased the number of moves over 10 to 15 years by about half a move on average.

B. Additional Impacts on Behavioral Outcomes

The results presented in Table 1 above provide a broad summary of the effects of MTO-assisted moves on the behavioral outcomes of adults and youth. In this section we provide more details about impacts on the individual outcomes that underlie these broad outcome indices.

B1. MTO impacts on adult outcomes

Given the widely held view that living in a disadvantaged neighborhood depresses earnings and employment, due to peer norms or lack of access to informal job referrals or some other reason, one of the most surprising findings shown in Table 1 is that moving to a less-distressed area with a Section 8-only voucher seems to *reduce* labor market outcomes. As noted above, we believe that this is most likely a spurious result – a result of the fact that we secured funding to survey the Section 8 adults later in the research project and so interviewed them later in calendar time than we did controls, when labor market conditions were more depressed as a result of the Great Recession. Appendix Table 3 presents the details.

The top of Appendix Table 3 shows that MTO impacts on survey reports of adult economic outcomes are never statistically significant for the Experimental group, but for the Section 8-only group tend to be in the direction of worse economic outcomes. However the

bottom panel of Appendix Table 3 shows MTO impacts on adult employment rates and earnings as measured by quarterly administrative records obtained from state unemployment insurance (UI) systems, which we can use to measure outcomes at a common point in time across groups. We find no signs of a negative Section 8 effect on economic outcomes with administrative data. We can also see this in Appendix Figure 1, which shows that quarter-by-quarter employment rates for all three randomized MTO groups track each other very closely over the study period.

Appendix Table 4 indicates the overall MTO impacts on our broad physical and mental health outcome indices are not quite statistically significant, but MTO does improve several important individual indicators of health. For example, the top panel shows that moving with an MTO Experimental voucher reduces an indicator of short-term psychological distress (the K6 index) by one-fifth of a standard deviation, with impacts of moving with a Section 8 voucher roughly half as large.

While MTO has no detectable effects on overall self-reported health status, we see sizable impacts on a variety of specific health conditions. Moving with an Experimental voucher reduces the chances that MTO adults will have difficulty lifting groceries by about 10 percentage points or one-fifth the control mean. Appendix Table 4 also shows impacts on obesity and diabetes, taken from Ludwig et al. (2011). Although the interim MTO study found that MTO reduced obesity prevalence, defined as BMI≥30, we see no impact on this outcome in the long-term data – perhaps because now nearly three in five MTO adults is obese. We do find sizable impacts at higher BMI cut points. Moving with either a MTO Experimental or Section 8 voucher reduces the likelihood of having BMI≥35 by about 9 or 10 percentage points, roughly a quarter of the control mean of 35 percent. The Experimental TOT effect on extreme obesity (BMI≥40) is 7 percentage points, 40 percent of the control mean of 18 percent. We used blood samples to

measure diabetes, since nearly a third of all diabetes cases are undiagnosed (Cowie et al. 2006) and the likelihood of diagnosis could vary across areas. The Experimental TOT effect on diabetes is -10 percentage points, about half the control mean of 20 percent.

Because economic outcomes and particularly health outcomes are expected to vary by age, it is possible that MTO's effects on adult outcomes could also vary by age. Appendix Table 5 presents results for economic outcomes and individual health outcomes separately for adults who were under 33 years of age versus 33 and older at the time of random assignment. We find little consistent evidence that there are detectable differences in MTO impacts on adults by age.

B2. MTO impacts on youth outcomes

Appendix Table 6 shows that the long-term data are qualitatively consistent with the interim MTO study in showing a gender difference in MTO impacts on youth – with female youth doing better on some outcomes, while males doing worse – although the youth impacts are generally more muted in the long-term than interim data. For female youth MTO moves with either an Experimental or Section 8 voucher reduce obesity (which for youth is defined as BMI$\geq 95^{th}$ percentile), with an ITT effect equal to about five percentage points or a fifth of the control mean. The Experimental group moves also improve mental health, as indicated by declines in the K6 measure of short-term psychological distress. For male youth most of the impacts are either not statistically significant or tend to indicate worse outcomes as a result of M TO moves, for example with respect to injury prevalence, smoking, or likelihood of being educationally on track. We see no signs of the large declines in youth violence rates that we saw among both male and female youth in the interim MTO data (Kling, Ludwig, and Katz 2005).

It is worth noting that the set of youth we surveyed for the long-term MTO study, who were ages 10-20 at the end of 2007, is mostly non-overlapping with youth in the interim MTO

study, who were 10-20 at the end of 2001. Our long-term results thus help confirm that the previous (surprising) results for the gender difference in MTO impacts seems to be real.

We find few statistically significant MTO impacts on educational outcomes in the long-term data, either with respect to measures of school persistence or achievement test scores (third panel, Appendix Table 6). The standard errors around our estimates let us rule out impacts on achievement test scores that are larger than about 0.10 or 0.15 SD.

One of the main motivations for following up youth in the long-term study was the possibility that youth who were very young at baseline may have experienced particularly pronounced gains from MTO moves. After all children who were pre-school age at baseline did not yet really have social networks or a sense of social identity before they moved. Moreover they experienced massive changes in neighborhood poverty (up to 3SD in the national distribution one year after randomization) during the life stage when children are thought to be most developmentally malleable. Yet Appendix Table 7 shows that even for children who were under age 6 at baseline we see no signs of any detectable changes in achievement test scores.

The overall pattern of impacts we see in the MTO long-term data provide suggestive evidence that what matters most for youth outcomes may be the conditions of the neighborhood in which the youth is living at the time outcomes are measured – what Sampson (2012) calls "situational" neighborhood effects – rather than the accumulated history of neighborhood environments to which youth were exposed growing up, or "developmental" neighborhood effects. Theories about developmental neighborhood effects predict larger impacts on those youth studied in the long-term follow-up compared to those in the interim follow-up, since the former experienced both a larger share of their lives in lower-poverty areas and, as noted above, experienced particularly large changes in neighborhood environments during the earliest years of

life. Yet the data actually show larger changes in youth behavior in the interim data; those youth spent fewer years in low-poverty areas relative to youth in the long-term study sample, but the MTO effects on neighborhood poverty at the time the surveys were collected were larger for youth in the interim than long-term follow-ups.

Although MTO has overall a mixed pattern of impacts on the sort of traditional measure of objective outcomes that dominate the neighborhood-effects literature, Appendix Table 8 (reproduced from the supplemental appendix to Ludwig et al. 2012) shows that MTO moves nonetheless generate very sizable gains in adult self-reports of subjective well-being (SWB). The long-term MTO data included the standard SWB measure that has been used as part of the General Social Survey ("Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy?") The proper interpretation of SWB measures remains the topic of some debate. Previous studies have shown different measures of self-reported SWB to be correlated in expected ways with objective indicators of well-being such as life events, biological indicators, and reports by other people about the person's happiness (see for example Kahneman and Krueger (2006) and Oswald and Wu (2010)). The TOT effects on SWB equal 0.16SD for the Experimental group and 0.19SD for the Section 8 group.

Appendix Figure 2 (taken from Ludwig et al. 2012) suggests that adult SWB is more strongly affected by neighborhood economic segregation than by racial segregation. The analysis estimates the relationship between SWB and some duration-weighted neighborhood measure by using interactions of MTO treatment assignment and city indicators as instrumental variables to deal with the endogeneity of neighborhood location. Panel A shows that there is a negative relationship between SWB and average tract poverty rates when that is the only neighborhood

measure included as an explanatory variable in the model. Panel B shows the same is true for the relationship between SWB and tract minority share. When tract poverty and tract minority share are included in the model at the same time, SWB has an even more pronounced negative relationship with tract poverty (Panel C) but SWB now has a *positive* relationship with tract minority share (Panel D). A qualitatively similar pattern holds for our broad indices for outcomes in the physical and mental health domains as well (see Appendix Tables 9-12 for details).

This pattern is important because while racial segregation has been declining in the U.S. since 1970, to levels not seen since 1970 (Glaeser and Vigdor 2012), income segregation has been increasing since 1970 (Watson 2009; Reardon and Bischoff 2011). Our results suggest the adverse effect of disadvantaged neighborhood environments on the well-being of poor families is getting worse over time, and that trends over time in growing inequality in family income may understate the growth over time in the inequality of overall well-being.

We can interpret the magnitude of these findings by noting that a 1 SD reduction in tract poverty rates (or about 13 percentage points) is associated with an increase in SWB that equals about two-thirds of the gap in SWB between blacks and whites in nationally representative studies (Stevenson and Wolfers 2010). The association between a 1 SD reduction in tract poverty and SWB is also about the same size as the remaining gap in SWB between families with annual incomes that differ by $13,000 after controlling for a set of family characteristics that differ by income and affect happiness – a large amount given that the average control family's income in the long-term survey is just $20,000.

VI. Discussion

The MTO long-term results do not provide much support for theories suggesting that high rates of school failure and non-employment in central city neighborhoods are primarily due

to the direct adverse effects of living in a neighborhood in which a large share of other residents are economically disadvantaged. This pattern of findings is consistent with the findings of data from the 4-7 year interim follow-up of MTO adults (Kling, Liebman, and Katz 2007). We find no detectable impact on schooling outcomes even for children who were pre-school age at baseline, and so experienced massive changes in neighborhood environments during the life stage – early childhood – that a growing body of evidence suggests people may be most developmentally malleable (Shonkoff and Phillips 2000; Knudsen et al. 2006).

One natural question is with regard to the generalizability of these findings: Do neighborhood changes have no impact on earnings or schooling outcomes in MTO because the MTO study sample is somehow unusual? It is true that MTO families were drawn from extremely distressed communities. The baseline census tracts for MTO families were fully 3 standard deviations above the national average in the 2000 census national tract-poverty distribution. On the other hand much of the scientific and policy concern about adverse "neighborhood effects" is with families living in the most distressed areas. While around one-quarter of eligible families applied for MTO, the characteristics of MTO families are not so different from those of other residents of extreme-poverty neighborhoods nationwide – more than 80% of whom are minorities, with nearly 40% of adults lacking a high school diploma (Kneebone, Nadeau, and Berube 2011). Previous observational studies like the Project on Human Development in Chicago Neighborhoods report finding neighborhood effects on schooling outcomes for samples about as disadvantaged as MTO (Ludwig et al. (2012), fn 10).

Looking at broad indices of outcomes that were pre-specified for the interim MTO data, we see suggestive (but not quite statistically significant) signs that physical and mental health outcomes may have improved. We see very large MTO impacts on specific health measures,

particularly those related to extreme obesity and diabetes. While we acknowledge that measuring candidate mechanisms like diet, exercise and access to health care is intrinsically challenging, and that our available data on these factors is not nearly as detailed as we would wish, it is nonetheless noteworthy that MTO moves reduced extreme obesity and diabetes by fully 40-50% without generating detectable changes in our measures of these candidate mediators. One hypothesis for these physical health impacts comes from the improvements in neighborhood safety that MTO families experienced, and the subsequent improvements in mental health – including specific measures of psychological distress. This safety-stress-health hypothesis is also consistent with the fact that the majority of MTO households signed up for the program because of concerns about crime.

The long-term MTO data do not show any signs of the large drop in violent-crime arrests that were found in the 4-7 year MTO follow-up among both male and female youth (Kling, Ludwig, and Katz 2005). However the long-term data do echo the interim data to some extent in showing that with respect to other outcomes like mental health or risky behaviors, female youth may benefit from MTO moves in some ways but male youth are if anything do worse as a result of such moves, although the sizes of these MTO impacts are smaller in the long-term than interim data. It is also the case that the difference across randomized MTO groups in neighborhood conditions is smaller at the time our long-term survey data were collected compared to the interim MTO study. These patterns suggest youth outcomes might be more strongly affected by contemporaneous neighborhood conditions than accumulated exposure to neighborhood environments, or what Sampson (2012) calls “situational” neighborhood effects as contrasted to “developmental neighborhood effects.”

The MTO data also suggest that neighborhood environments have important impacts on the overall quality of life and well-being of low-income families despite the mixed pattern of impacts on traditional "objective" outcome measures, including null results on key outcomes like earnings and schooling. Ludwig et al. (2012) show that a 1 standard deviation decline in census tract poverty rates (about 13 percentage points) is associated with an increase in SWB that is about the same size as the difference in SWB between households whose annual incomes differ by $13,000 – a very large amount given that the average control group family's annual income in the long-term survey is just $20,000. If the goal of anti-poverty policy is to improve the well-being of poor families, rather than more narrowly to just reduce income poverty, than efforts to protect poor families from the adverse effects of living in distressed, dangerous neighborhoods are very much worth keeping on the table.

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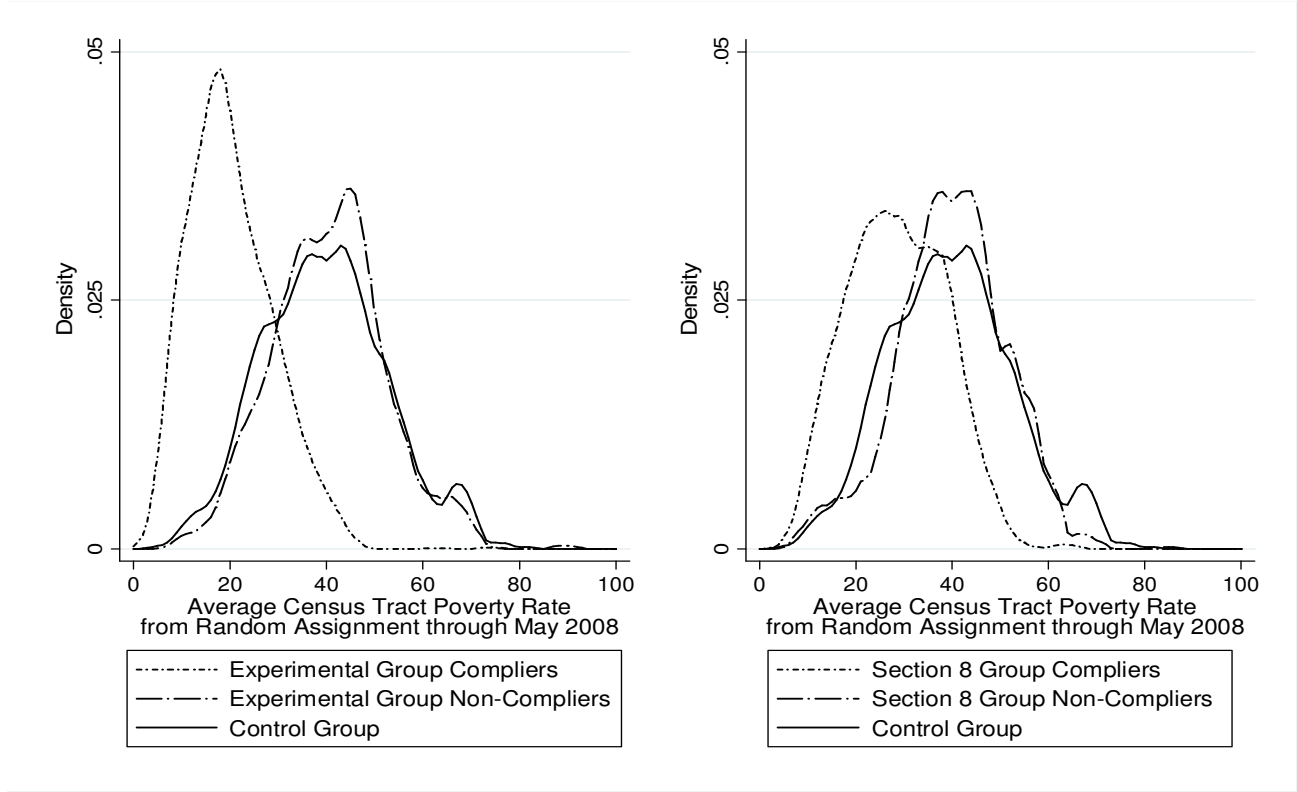


FIGURE 1. DENSITIES OF AVERAGE POVERTY RATE BY TREATMENT GROUP

Notes : Duration-weighted average of census tract poverty at all addresses from random assignment through May 2008 (just prior to the long-term survey fielding period), based on linear interpolation of 1990 and 2000 decennial census and the 2005-09 American Community Survey data. Density estimates used an Epanechnikov kernel with a half-width of 2. *Source and Sample* : Adult long-term survey. Sample is all adults who were interviewed as part of the long-term survey. Sample sizes in the Experimental, Section 8, and control groups are 1,456, 678, and 1,139.

TABLE 1
MEAN EFFECT SIZES FOR SUMMARY MEASURES OF OUTCOMES

	All Adults		All Youth		Female Youth		Male Youth		M – F Youth	
	E – C	S – C	E – C	S – C	E – C	S – C	E – C	S – C	E – C	S – C
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
Economic	-0.029	-0.112 ~								
self-sufficiency	(0.040)	(0.059)								
Absence of physical	0.055	0.062	0.025	0.025	0.109 ~	0.124 ~	-0.075	-0.058	-0.184 *	-0.182 ~
health problems	(0.042)	(0.058)	(0.047)	(0.052)	(0.061)	(0.065)	(0.068)	(0.078)	(0.088)	(0.100)
Absence of mental	0.069	0.063	0.089 *	-0.006	0.160 *	0.039	0.008	-0.062	-0.151 ~	-0.101
health problems	(0.042)	(0.062)	(0.044)	(0.049)	(0.058)	(0.065)	(0.064)	(0.071)	(0.085)	(0.095)
Absence of risky			0.009	-0.035	-0.001	0.007	0.027	-0.069	0.028	-0.076
behavior			(0.047)	(0.049)	(0.065)	(0.066)	(0.061)	(0.067)	(0.085)	(0.090)
Education			-0.024	-0.021	-0.043	0.027	-0.006	-0.082	0.037	-0.109
			(0.045)	(0.053)	(0.061)	(0.072)	(0.061)	(0.069)	(0.082)	(0.094)
Overall	0.037	-0.010	0.034	-0.019	0.079	0.077	-0.016	-0.116 ~	-0.096	-0.193 *
	(0.040)	(0.059)	(0.046)	(0.050)	(0.062)	(0.065)	(0.062)	(0.069)	(0.084)	(0.089)

Notes : E − C denotes Experimental − control; S − C denotes Section 8 − control. Estimates are the intent-to-treat mean effect sizes, from Equation (1), fully interacted with gender in columns (v)–(x) as described in the text. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1 (the youth analyses also control for a series of youth-specific covariates not listed in Appendix Table 1). M − F Youth is male − female difference. Robust standard errors adjust for household clustering are in parentheses. * = p-value < 0.05, ~ = p-value < 0.10. Index components are as follows (positive outcomes (+) were included as is, while negative outcomes (−) were flipped so that higher index values indicate "better" outcomes): Adult economic self-sufficiency: + adult employed and not on TANF + employed + 2009 earnings − on TANF − 2009 government income. Adult mental health: − distress index − depression − Generalized Anxiety Disorder + calmness + sleep. Adult physical health: − self-reported health fair/poor − asthma attack past year – obesity − hypertension − trouble carrying/climbing. Adult overall includes 15 measures in self-sufficiency, physical health, mental health. Youth physical health: − self-reported health fair/poor − asthma attack past year − overweight − nonsports injury past year. Youth mental health: − distress index − depression − Generalized Anxiety Disorder. Youth risky behavior: − marijuana past 30 days − smoking past 30 days − alcohol past 30 days − ever pregnant or gotten someone pregnant. Youth education: + graduated high school or still in school + in school or working + ECLS-K reading score + ECLS-K math score. Youth overall includes 15 measures in physical health, mental health, risky behavior, and education.

Source and Sample : Adult and youth long-term survey. Sample is all adults and youth aged 15-20 (as of December 2007) who were interviewed as part of the long-term survey. Sample sizes in the E, S, and C groups are 1,456, 678, and 1,139 for adults and 1,437, 1,031, 1,153 for youth.

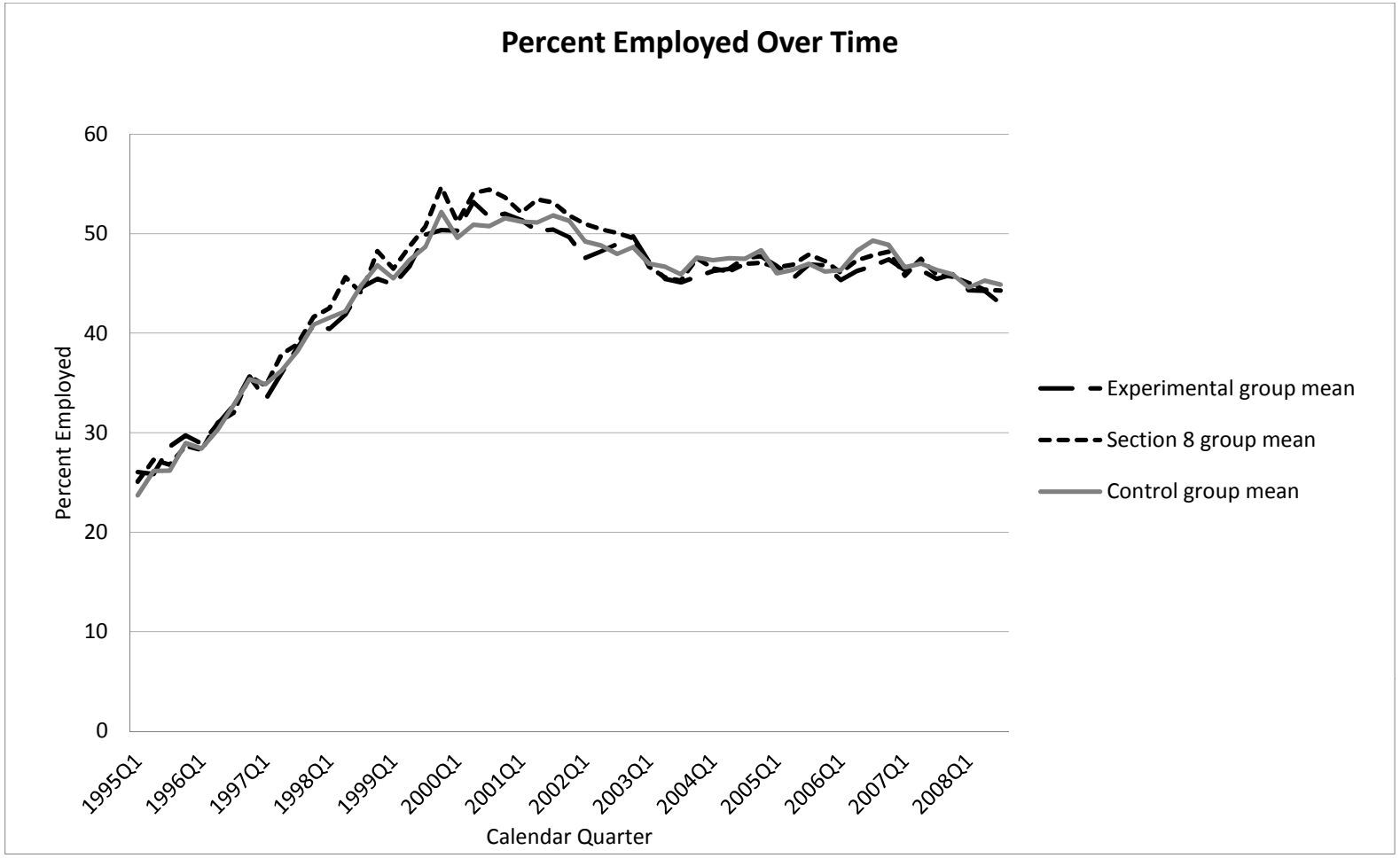
TABLE 2
SPECIFIC OUTCOMES WITH EFFECTS SIGNIFICANT AT 5 PERCENT LEVEL

	E/S (i)	CM (ii)	ITT (iii)	TOT (iv)	CCM (v)
A. Adult index outcomes					
Employed and not receiving TANF	S – C	0.499	-0.066	-0.106	0.577
			(0.021)	(0.043)	
Employed	S – C	0.525	-0.068	-0.108	0.606
			(0.021)	(0.043)	
Psychological distress, K6 z-score	E – C	0.000	-0.106	-0.219	0.058
			(0.042)	(0.087)	
Has trouble climbing stairs or carrying groceries	E – C	0.510	-0.050	-0.104	0.514
			(0.021)	(0.043)	
B. Youth (female and male) outcomes					
Smoked in past 30 days	E – C	0.208	0.046	0.095	0.154
			(0.019)	(0.039)	
	S – C	0.208	0.050	0.076	0.196
			(0.019)	(0.039)	
C. Female youth outcomes					
Psychological distress, K6 z-score	E – C	0.000	-0.143	-0.289	0.133
			(0.062)	(0.125)	
Overweight, BMI > 95th percentile	E – C	0.269	-0.059	-0.119	0.333
			(0.028)	(0.056)	
D. Male youth outcomes					
Educationally on track	S – C	0.801	-0.061	-0.089	0.824
			(0.025)	(0.054)	
Smoked in past 30 days	S – C	0.250	0.089	0.130	0.228
			(0.027)	(0.058)	
Serious non-sports injury or accident in past year	S – C	0.107	0.050	0.073	0.100
			(0.020)	(0.043)	
E. Additional adult outcomes (not in indices)					
Obese, BMI >= 35	E – C	0.351	-0.044	-0.092	0.404
			(0.020)	(0.042)	
	S – C	0.351	-0.061	-0.098	0.389
			(0.020)	(0.042)	
Obese, BMI >= 40	E – C	0.175	-0.036	-0.074	0.213
			(0.016)	(0.032)	
HbA1c test detected diabetes	E – C	0.204	-0.050	-0.103	0.255
			(0.018)	(0.038)	
Subjective well-being: very happy or pretty happy (vs. not too happy)	E – C	0.725	0.045	0.094	0.712
			(0.018)	(0.038)	

TABLE 2 (continued)

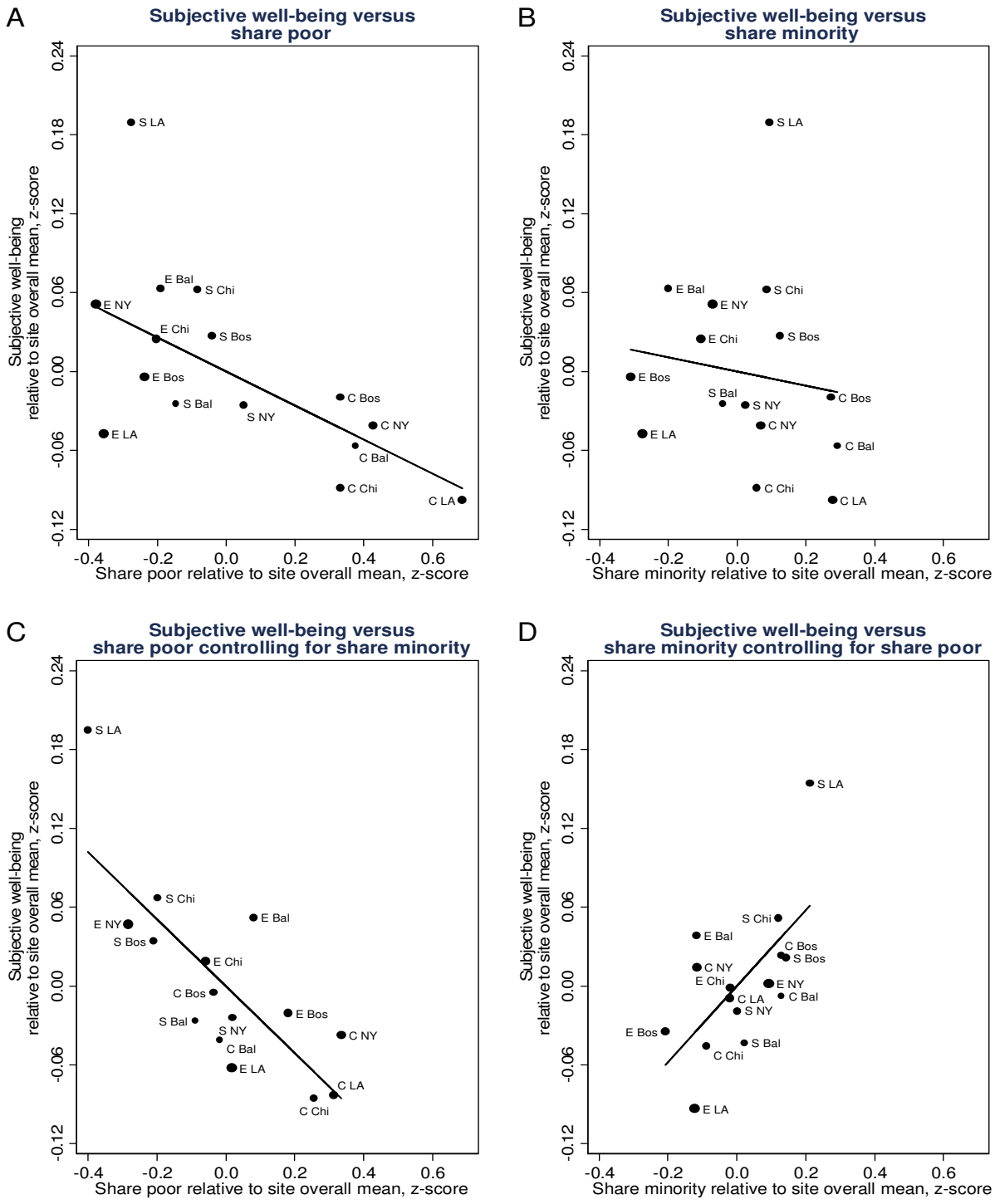
Notes : E/S indicates whether the comparison is Experimental − control or Section 8 − control. CM, control mean; ITT, intent-to-treat, from Equation (1); TOT, treatment-on-treated, from Equation (2); CCM, control complier mean. Robust standard errors adjusted for household clustering are in parentheses. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1 (the youth analyses also control for a series of youth-specific covariates not listed in Appendix Table 1). Outcomes in panels A through D to illustrate magnitudes were selected based on ITT p-values <0.05 and are 14 of 120 from the set of specific contrasts (E − C, S − C), based on the outcomes (15 for adults and 15 for youth) and subgroups—adults, youth (female and male), female youth, and male youth—described in the notes to Table 1. The effects on obesity, diabetes, and subjective well-being represent key findings from earlier work. TANF denotes Temporary Assistance for Needy Families. Psychological distress consists of 6 items (sadness, nervousness, restlesss, hopelessness, feeling that everything is an effort, worthlessness) scaled on a score from 0 (no distress) to 24 (highest distress) and then converted to a z-score using the mean and standard deviation for the control group (adults and female and male youth (ages 15-20) all standardized separately). Body mass index (BMI) is weight in kilograms divided by height in meters squared. For adults, BMI >= 35 indicates severe obesity, and BMI >= 40 indicates extreme obesity. For youth, BMI values greater than the 95th percentile indicate overweight. Glycosolated hemoglobin (HbA1c) level is from a blood sample, and a level >= 6.5% indicates diabetes. Subjective well-being is from a 3-point happiness scale (1=not too happy, 2=pretty happy, 3=very happy).

Source and Sample : Adult and youth long-term survey. Sample is all adults and youth aged 15-20 (as of December 2007) who were interviewed as part of the long-term survey. Sample sizes in the E, S, and C groups are 1,456, 678, and 1,139 for adults and 1,437, 1,031, 1,153 for youth.



APPENDIX FIGURE 1. EMPLOYMENT RATES OVER TIME BY TREATMENT GROUP

Employment is the fraction with positive earnings per quarter from Unemployment Insurance (UI) records. The analysis uses individual data from UI records from Maryland, Illinois, California, and Florida for individuals whose random assignment site was Baltimore, Chicago, or Los Angeles. It also incorporates aggregated UI data from Massachusetts and New York, representing individuals whose random assignment site was Boston or New York City. The sample is adults with baseline consent (N=4,194).



APPENDIX FIGURE 2. INSTRUMENTAL VARIABLE ESTIMATION OF THE RELATIONSHIP BETWEEN SUBJECTIVE WELL-BEING AND TRACT POVERTY RATE AND TRACT SHARE MINORITY

APPENDIX FIGURE 2. (continued)

Notes: The figure shows the instrumental variable estimation of the relationship between subjective well-being and average (duration-weighted) tract poverty rate (panel A), tract share minority (panel B), tract poverty controlling for share minority (panel C), and tract share minority share controlling for tract poverty (panel D). The y-axis is a 3-point happiness scale (1=not too happy, 2=pretty happy, 3=very happy) expressed in standard deviation units relative to the control group. Share poor is the fraction of census tract residents living below the poverty threshold. Share minority is the fraction of census tract residents who are members of racial or ethnic minority groups. Tract shares are linearly interpolated from the 1990 and 2000 decennial census and 2005-09 American Community Survey and are weighted by the time respondents lived at each of their addresses from random assignment through May 2008. Share poor and minority are z-scores, standardized by the control group mean and standard deviation. The points represent the site (Bal = Baltimore, Bos = Boston, Chi = Chicago, LA = Los Angeles, NY = New York City) and treatment group (E = Experimental group, S = Section 8 group, C = control group). The slope of the line is equivalent to a 2SLS estimate of the relationship between subjective well-being and the mediator shown in each panel, using interactions of indicators for MTO treatment group assignment and demonstration site as instruments for the mediator (controlling for site indicator main effects). The estimated impact of 1sd decrease in poverty (Panel A) is a 0.129sd increase in SWB (SE=0.054, P=0.017), and The estimated impact of 1sd decrease in poverty controlling for minority share (Panel C) is a 0.255sd increase in SWB (SE=0.095, P=0.008), and the estimated impact of 1sd decrease in minority share controlling for poverty (Panel D) is a 0.289sd decrease in SWB (SE=0.176, P=0.101). The p-value from an F test of whether the coefficients on poverty and minority share are the same (that is, whether the slope in panel C equals the slope in panel D) is 0.036.
Source and Sample: Adult long-term survey. Sample is all adults who were interviewed as part of the long-term survey with non-missing subjective well-being and duration-weighted census tract characteristics data (N=3,263).

APPENDIX TABLE 1
BASELINE CHARACTERISTICS (1994-98) CONTROLLED FOR IN THE MAIN ANALYSIS

	Control	Experimental	Section 8
	N=1139	N=1456	N=678
Female	0.978	0.988 ~	0.978
Age as of December 31, 2007			
≤ 35	0.143	0.145	0.132
36-40	0.229	0.212	0.236
41-45	0.234	0.236	0.223
46-50	0.175	0.184	0.203
> 50	0.249	0.251	0.240
Race and ethnicity			
African-American (any ethnicity)	0.660	0.648	0.629
Other non-white (any ethnicity)	0.270	0.283	0.283
Hispanic ethnicity (any race)	0.304	0.314	0.340
Other demographic characteristics			
Never married	0.637	0.623	0.624
Parent before age 18	0.246	0.249	0.277
Working	0.245	0.271	0.269
Enrolled in school	0.167	0.161	0.174
High school diploma	0.361	0.381	0.347
GED	0.199	0.159 *	0.183
Receiving Aid to Families with Dependent Children (AFDC)	0.763	0.763	0.736
Household characteristics			
Household income (2009 dollars)	$12,438.64	$12,865.83	$12,788.32
Own car	0.170	0.190	0.190
Disabled household member	0.148	0.145	0.168
No teens in household	0.646	0.608 ~	0.610
Household size			
Two	0.194	0.223	0.210
Three	0.330	0.302	0.291
Four or more	0.221	0.233	0.238

APPENDIX TABLE 1 (continued)

	Control	Experimental	Section 8
Site			
Baltimore	0.135	0.134	0.140
Boston	0.205	0.201	0.207
Chicago	0.205	0.205	0.209
Los Angeles	0.226	0.233	0.214
New York	0.229	0.227	0.231
Neighborhood characteristics			
Household member was crime victim in last six months	0.416	0.434	0.414
Streets unsafe at night	0.512	0.493	0.517
Very dissatisfied with neighborhood	0.467	0.478	0.477
Lived in neighborhood 5+ years	0.606	0.599	0.616
Moved more than 3 times in past 5 years	0.108	0.093	0.090
No family in neighborhood	0.639	0.640	0.611
No friends in neighborhood	0.409	0.396	0.400
Chatted with neighbors at least once per week	0.549	0.524	0.486 *
Very likely to tell neighbor about child getting into trouble	0.555	0.556	0.521
Confident about finding a new apartment	0.456	0.477	0.499
Had Section 8 voucher before	0.426	0.400	0.379 ~
Primary or secondary reason for wanting to move			
To get away from gangs and drugs	0.779	0.786	0.749
Better schools for children	0.481	0.491	0.553 *
To get a bigger or better apartment	0.457	0.441	0.438
To get a job	0.069	0.063	0.050

Notes : All values represent shares (except income). Values are calculated using sample weights to account for changes in random assignment ratios across randomization cohorts, for survey sample selection, and for two-phase interviewing. Missing values (except for income) were imputed based on randomization site and whether randomized through 1997 or in 1998. * = p-value < 0.05, ~ = p-value < 0.10 on a pair-wise t-test of the difference between the control group and the Experimental group or the Section 8 group. The baseline head of household reported on the neighborhood characteristics listed here. Analysis control variables not listed include whether the adult was part of the first survey release and whether education level is missing. An omnibus F-test fails to reject the null hypothesis that the set of baseline characteristics presented above is the same for both the control group and the randomly assigned housing voucher treatment groups (p-value for the Experimental vs. control comparison is P=0.473; and p-value for the Section 8 vs. control comparison is P=0.268).
Source and Sample : Baseline survey. The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 2
EFFECTS ON EXPANDED SET OF HOUSING AND NEIGHBORHOOD CONDITION MEASURES

		Experimental vs. Control				Section 8 vs. Control			
	CM	ITT	TOT	CCM	N	ITT	TOT	CCM	N
Tract share poor									
At baseline									
Share poor	0.531	-0.004	-0.009	0.539	2555	-0.003	-0.004	0.544	1797
		(0.005)	(0.009)			(0.006)	(0.010)		
Share poor, z-score on U.S. tracts	3.172	-0.036	-0.074	3.241	2555	-0.021	-0.034	3.280	1797
		(0.037)	(0.076)			(0.049)	(0.079)		
Share poor, z-score on MTO controls	0.000	-0.030	-0.062	0.057	2555	-0.018	-0.028	0.089	1797
		(0.031)	(0.063)			(0.041)	(0.065)		
1 year post-random assignment									
Share poor	0.499	-0.169 *	-0.352 *	0.507	2552	-0.134 *	-0.213 *	0.505	1793
		(0.008)	(0.013)			(0.009)	(0.013)		
Share poor, z-score on U.S. tracts	2.916	-1.372 *	-2.853 *	2.982	2552	-1.085 *	-1.728 *	2.965	1793
		(0.062)	(0.102)			(0.073)	(0.102)		
Share poor, z-score on MTO controls	0.000	-1.043 *	-2.168 *	0.050	2552	-0.825 *	-1.313 *	0.037	1793
		(0.047)	(0.077)			(0.056)	(0.077)		
5 years post-random assignment									
Share poor	0.399	-0.098 *	-0.202 *	0.390	2544	-0.065 *	-0.104 *	0.392	1785
		(0.007)	(0.014)			(0.010)	(0.016)		
Share poor, z-score on U.S. tracts	2.109	-0.793 *	-1.634 *	2.030	2544	-0.526 *	-0.842 *	2.052	1785
		(0.060)	(0.110)			(0.083)	(0.131)		
Share poor, z-score on MTO controls	0.000	-0.594 *	-1.225 *	-0.059	2544	-0.394 *	-0.631 *	-0.042	1785
		(0.045)	(0.083)			(0.062)	(0.098)		
10-15 years post-random assignment (May 2008)									
Share poor	0.311	-0.037 *	-0.076 *	0.285	2549	-0.021 *	-0.034 *	0.276	1778
		(0.007)	(0.014)			(0.010)	(0.016)		
Share poor, z-score on U.S. tracts	1.396	-0.298 *	-0.618 *	1.183	2549	-0.171 *	-0.275 *	1.108	1778
		(0.057)	(0.115)			(0.080)	(0.127)		
Share poor, z-score on MTO controls	0.000	-0.220 *	-0.456 *	-0.157	2549	-0.126 *	-0.203 *	-0.212	1778
		(0.042)	(0.085)			(0.059)	(0.094)		

APPENDIX TABLE 2 (continued)

	CM	Experimental vs. Control				Section 8 vs. Control			
		ITT	TOT	CCM	N	ITT	TOT	CCM	N
Tract share poor (continued)									
Duration-weighted									
Share poor	0.396	-0.088 *	-0.183 *	0.383	2592	-0.062 *	-0.099 *	0.384	1817
		(0.006)	(0.010)			(0.007)	(0.011)		
Share poor, z-score on U.S. tracts	2.082	-0.716 *	-1.482 *	1.974	2592	-0.501 *	-0.800 *	1.985	1817
		(0.046)	(0.080)			(0.058)	(0.088)		
Share poor, z-score on MTO controls	0.000	-0.702 *	-1.454 *	-0.107	2592	-0.491 *	-0.785 *	-0.095	1817
		(0.045)	(0.078)			(0.057)	(0.086)		
Duration-weighted poverty rate is…									
Less than 20%	0.054	0.233 *	0.483 *	0.076	2592	0.104 *	0.165 *	0.066	1817
		(0.015)	(0.026)			(0.019)	(0.030)		
Less than 30%	0.242	0.268 *	0.555 *	0.310	2592	0.148 *	0.236 *	0.317	1817
		(0.019)	(0.035)			(0.027)	(0.043)		
Less than 40%	0.512	0.199 *	0.412 *	0.568	2592	0.207 *	0.331 *	0.532	1817
		(0.020)	(0.038)			(0.028)	(0.043)		
Tract share minority									
At baseline									
Share minority	0.912	0.001	0.003	0.909	2555	0.007	0.011	0.895	1797
		(0.007)	(0.014)			(0.010)	(0.016)		
Share minority, z-score on U.S. tracts	1.898	0.005	0.010	1.889	2555	0.023	0.036	1.845	1797
		(0.021)	(0.045)			(0.032)	(0.051)		
Share minority, z-score on MTO controls	0.000	0.008	0.016	-0.015	2555	0.037	0.059	-0.088	1797
		(0.035)	(0.073)			(0.052)	(0.084)		
1 year post-random assignment									
Share minority	0.904	-0.111 *	-0.230 *	0.897	2552	-0.031 *	-0.049 *	0.881	1793
		(0.009)	(0.017)			(0.011)	(0.018)		
Share minority, z-score on U.S. tracts	1.875	-0.356 *	-0.740 *	1.852	2552	-0.098 *	-0.156 *	1.802	1793
		(0.028)	(0.054)			(0.036)	(0.057)		
Share minority, z-score on MTO controls	0.000	-0.574 *	-1.194 *	-0.036	2552	-0.158 *	-0.252 *	-0.118	1793
		(0.045)	(0.086)			(0.058)	(0.092)		

APPENDIX TABLE 2 (continued)

	CM	Experimental vs. Control				Section 8 vs. Control			
		ITT	TOT	CCM	N	ITT	TOT	CCM	N
Tract share minority (continued)									
5 years post-random assignment									
Share minority	0.886	-0.056 *	-0.116 *	0.868	2544	-0.014	-0.023	0.868	1785
		(0.009)	(0.017)			(0.012)	(0.019)		
Share minority, z-score on U.S. tracts	1.815	-0.181 *	-0.374 *	1.760	2544	-0.046	-0.074	1.759	1785
		(0.028)	(0.055)			(0.038)	(0.061)		
Share minority, z-score on MTO controls	0.000	-0.285 *	-0.588 *	-0.086	2544	-0.072	-0.116	-0.088	1785
		(0.043)	(0.086)			(0.060)	(0.096)		
10-15 years post-random assignment (May 2008)									
Share minority	0.844	-0.036 *	-0.075 *	0.856	2549	0.004	0.007	0.812	1778
		(0.010)	(0.021)			(0.015)	(0.024)		
Share minority, z-score on U.S. tracts	1.681	-0.115 *	-0.239 *	1.719	2549	0.013	0.022	1.578	1778
		(0.032)	(0.066)			(0.048)	(0.077)		
Share minority, z-score on MTO controls	0.000	-0.157 *	-0.325 *	0.051	2549	0.018	0.029	-0.140	1778
		(0.043)	(0.090)			(0.065)	(0.104)		
Duration-weighted									
Share minority	0.880	-0.060 *	-0.123 *	0.873	2592	-0.010	-0.016	0.857	1817
		(0.007)	(0.013)			(0.010)	(0.015)		
Share minority, z-score on U.S. tracts	1.798	-0.191 *	-0.396 *	1.775	2592	-0.033	-0.052	1.723	1817
		(0.022)	(0.043)			(0.031)	(0.049)		
Share minority, z-score on MTO controls	0.000	-0.368 *	-0.763 *	-0.044	2592	-0.063	-0.100	-0.143	1817
		(0.042)	(0.083)			(0.059)	(0.094)		
Other tract characteristics									
10-15 years post-random assignment (May 2008)									
Concentrated disadvantage index	1.128	-0.104 *	-0.215 *	1.077	2549	-0.053 *	-0.085 *	1.047	1778
		(0.018)	(0.036)			(0.025)	(0.039)		
Concentrated disadvantage index, z-score on MTO controls	0.000	-0.245 *	-0.508 *	-0.119	2549	-0.125 *	-0.201 *	-0.190	1778
		(0.042)	(0.085)			(0.058)	(0.093)		
Share college graduates	0.220	0.021 *	0.043 *	0.211	2549	0.003	0.005	0.241	1778
		(0.006)	(0.012)			(0.009)	(0.014)		

APPENDIX TABLE 2 (continued)

	CM	Experimental vs. Control				Section 8 vs. Control			
		ITT	TOT	CCM	N	ITT	TOT	CCM	N
Other tract characteristics (continued)									
Duration-weighted									
Concentrated disadvantage index	1.389	-0.235 *	-0.487 *	1.345	2592	-0.171 *	-0.273 *	1.362	1817
		(0.016)	(0.028)			(0.020)	(0.030)		
Concentrated disadvantage index, z-score on MTO controls	0.000	-0.637 *	-1.319 *	-0.122	2592	-0.462 *	-0.738 *	-0.073	1817
		(0.042)	(0.075)			(0.053)	(0.081)		
Share college graduates	0.161	0.042 *	0.087 *	0.159	2592	0.014 *	0.022 *	0.172	1817
		(0.004)	(0.008)			(0.005)	(0.009)		
Residential mobility									
Number of moves after random assignment	2.165	0.555 *	1.152 *	2.276	2595	0.588 *	0.940 *	2.511	1817
		(0.073)	(0.146)			(0.103)	(0.158)		
Safety, housing and neighborhood problems, and social networks									
Feel unsafe during day	0.196	-0.036 *	-0.076 *	0.200	2587	-0.047 *	-0.075 *	0.181	1812
		(0.016)	(0.034)			(0.023)	(0.036)		
Number of housing problems (0-7)	2.051	-0.359 *	-0.745 *	2.186	2593	-0.395 *	-0.626 *	1.932	1812
		(0.080)	(0.166)			(0.115)	(0.181)		
Likely or very likely to report kids spraying graffiti (collective efficacy)	0.589	0.078 *	0.162 *	0.541	2581	0.018	0.028	0.611	1807
		(0.021)	(0.043)			(0.030)	(0.048)		
One or more friends with college degree	0.532	0.071 *	0.146 *	0.481	2543	-0.018	-0.028	0.583	1778
		(0.021)	(0.044)			(0.031)	(0.050)		

Notes : CM, control mean; ITT, intent-to-treat, from Equation (1); TOT, treatment-on-treated, from Equation (2); CCM, control complier mean. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. The concentrated disadvantage index is a weighted combination of census tract percent [i] poverty, [ii] on welfare, [iii] unemployed, [iv] female-headed family households, and [v] under age 18, with loading factors developed using 2000 Census tracts in Chicago by Sampson, Sharkey, and Raudenbush (2008), but does not include percent African-American. The safety measure reflects whether the respondent felt unsafe or very unsafe (vs. safe or very safe) in the neighborhood during the day. Housing problems include peeling paint, broken plumbing, rats, roaches, broken locks, broken windows, and broken heating system.

Source and Sample : Self-reported measures come from the adult long-term survey. Census tract characteristics are interpolated data from the 1990 and 2000 decennial censuses as well as the 2005-09 American Community Survey. The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 3
EFFECTS ON ADULT ECONOMIC SELF-SUFFICIENCY

		Experimental vs. Control				Section 8 vs. Control			
	CM	ITT	TOT	CCM	N	ITT	TOT	CCM	N
A. Survey data									
Employed and not receiving TANF	0.499	-0.020	-0.041	0.560	2585	-0.066 *	-0.106 *	0.577	1809
		(0.021)	(0.043)			(0.030)	(0.048)		
Employed	0.525	-0.007	-0.014	0.576	2586	-0.068 *	-0.108 *	0.606	1813
		(0.021)	(0.043)			(0.030)	(0.048)		
Earnings	$12,288.51	292.85	613.38	$12,624.65	2493	-251.02	-398.76	$12,717.42	1736
		(576.39)	(1207.55)			(883.41)	(1402.74)		
On TANF	0.158	0.011	0.022	0.147	2590	0.037 ~	0.059 ~	0.102	1806
		(0.015)	(0.031)			(0.022)	(0.035)		
Government income	$3,542.62	254.526	529.62	$2,901.69	2493	190.82	299.84	$3,168.79	1737
		(216.67)	(451.26)			(318.23)	(500.25)		
B. Administrative data									
Employed	0.465	-0.004	-0.009	0.495	2980	0.000	0.000	0.482	2526
		(0.017)	(0.036)			(0.019)	(0.030)		
Earnings	$11,325.14	-347.83	-731.73	$12,440.91	2980	112.93	180.50	$11,542.19	2526
		(523.80)	(1101.92)			(580.69)	(928.11)		

Notes : CM, control mean; ITT, intent-to-treat, from Equation (1); TOT, treatment-on-treated, from Equation (2); CCM, control complier mean. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. Rows shown in the table are the components of the economic self-sufficiency index described in the notes to Table 1. TANF denotes Temporary Assistance for Needy Families. The administrative data effects were calculated using a slightly different estimation approach, pooling all three groups and including indicators for both treatments (whereas the survey data effects were estimated via separate regressions for the two treatments). We expect the results to be very similar in either case and will update the estimates for the final paper.

Source and Sample : The survey data sample is all adults interviewed as part of the long-term survey (N=3,273). The administrative data sample is all adults with baseline consent (N=4,194).

APPENDIX TABLE 4
EFFECTS ON ADULT MENTAL AND PHYSICAL HEALTH

		Experimental vs. Control				Section 8 vs. Control			
	CM	ITT	TOT	CCM	N	ITT	TOT	CCM	N
A. Mental health									
Psychological distress, K6 z-score	0.000	-0.106 *	-0.219 *	0.058	2595	-0.081	-0.130	-0.014	1817
		(0.042)	(0.087)			(0.060)	(0.096)		
Calm and peaceful	0.487	0.015	0.032	0.502	2594	-0.039	-0.063	0.552	1816
		(0.022)	(0.045)			(0.031)	(0.050)		
B. Physical health									
Fair or poor self-rated health	0.436	-0.004	-0.007	0.433	2591	0.017	0.028	0.369	1814
		(0.020)	(0.042)			(0.030)	(0.048)		
Slept 7-8 hours last night	0.291	0.014	0.029	0.285	2569	0.015	0.024	0.291	1800
		(0.020)	(0.042)			(0.029)	(0.047)		
Has trouble climbing stairs or carrying groceries	0.510	-0.050 *	-0.104 *	0.514	2592	-0.026	-0.041	0.476	1815
		(0.021)	(0.043)			(0.030)	(0.048)		
Asthma attack in past year	0.293	-0.017	-0.036	0.285	2593	-0.037	-0.058	0.303	1811
		(0.019)	(0.040)			(0.028)	(0.044)		
Hypertension	0.315	0.007	0.015	0.268	2462	-0.023	-0.036	0.304	1719
		(0.020)	(0.042)			(0.029)	(0.045)		
Obese, BMI >= 30	0.584	-0.011	-0.023	0.589	2550	-0.010	-0.017	0.581	1788
		(0.021)	(0.045)			(0.031)	(0.050)		
Obese, BMI >= 35	0.351	-0.044 *	-0.092 *	0.404	2550	-0.061 *	-0.098 *	0.389	1788
		(0.020)	(0.042)			(0.029)	(0.047)		
Obese, BMI >= 40	0.175	-0.036 *	-0.074 *	0.213	2550	-0.038 ~	-0.060 ~	0.215	1788
		(0.016)	(0.032)			(0.023)	(0.037)		
HbA1c test detected diabetes	0.204	-0.050 *	-0.103 *	0.255	2130	-0.015	-0.023	0.229	1554
		(0.018)	(0.038)			(0.026)	(0.041)		

Notes : CM, control mean; ITT, intent-to-treat, from Equation (1); TOT, treatment-on-treated, from Equation (2); CCM, control complier mean. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. Both rows in panel A and the first five rows in panel B are the components of the mental and physical health indices described in the notes to Table 1. The effects on obesity and diabetes represent key findings from earlier work. Psychological distress consists of 6 items (sadness, nervousness, restlesss, hopelessness, feeling that everything is an effort, worthlessness) scaled on a score from 0 (no distress) to 24 (highest distress) and then converted to a z-score using the mean and standard deviation for control group adults. Hypertension is high blood pressure based on systolic >= 140 mm Hg or diastolic >= 90 mm Hg. Body mass index (BMI) is weight in kilograms divided by height in meters squared (BMI >= 30 indicates obesity, >= 35 indicates severe obesity, >= 40 indicates extreme obesity). Glycosolated hemoglobin (HbA1c) level is from a blood sample, and a level >= 6.5% indicates diabetes.

Source and Sample : The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 5
EFFECTS ON ADULT ECONOMIC SELF-SUFFICIENCY AND HEALTH BY AGE AT BASELINE

	Age < 33 at Baseline			Age >= 33 at Baseline			Difference by Age	
	CM	E – C	S – C	CM	E – C	S – C	E – C	S – C
A. Economic self-sufficiency								
Employed and not on TANF	0.564	-0.032	-0.066 ~	0.421	-0.005	-0.068 ~	0.027	-0.002
		(0.029)	(0.040)		(0.029)	(0.040)	(0.041)	(0.052)
Employed	0.599	-0.017	-0.07 ~	0.439	0.005	-0.066 ~	0.023	0.004
		(0.028)	(0.040)		(0.029)	(0.040)	(0.040)	(0.052)
Earnings in 2009	$14,232.32	814.53	-571.64	$10,036.88	-311.50	49.44	-1126.03	621.08
		(838.97)	(1197.58)		(771.962)	(1117.477)	(1138.45)	(1501.06)
On TANF	0.187	0.003	0.022	0.122	0.02	0.053 ~	0.017	0.031
		(0.022)	(0.030)		(0.021)	(0.028)	(0.030)	(0.038)
Government income in 2009	3065.61	273.98	-307.65	4112.25	231.70	763.05	-42.28	1070.70 ~
		293.23	384.89		317.55	475.68	429.65	578.95
B. Mental health								
Psychological distress, K6 z-score	-0.031	-0.162 *	-0.15 *	0.037	-0.04	0.000	0.122	0.149
		(0.054)	(0.075)		(0.065)	(0.084)	(0.085)	(0.104)
Calm and peaceful	0.48	0.019	-0.008	0.495	0.01	-0.075 ~	-0.009	-0.067
		(0.029)	(0.040)		(0.032)	(0.042)	(0.043)	(0.054)
C. Physical health								
Fair or poor self-rated health	0.357	-0.015	-0.009	0.529	0.009	0.046	0.024	0.055
		(0.027)	(0.038)		(0.030)	(0.041)	(0.041)	(0.051)
Slept 7-8 hours per night	0.277	0.013	0.015	0.309	0.016	0.016	0.003	0.001
		(0.027)	(0.037)		(0.030)	(0.040)	(0.040)	(0.049)
Has trouble climbing stairs or carrying groceries	0.415	-0.074 *	-0.042	0.624	-0.023	-0.005	0.051	0.037
		(0.028)	(0.039)		(0.030)	(0.040)	(0.041)	(0.051)
Asthma attack in past year	0.294	-0.056 *	-0.081 *	0.293	0.027	0.013	0.083 *	0.094 *
		(0.026)	(0.036)		(0.029)	(0.038)	(0.039)	(0.047)
Has hypertension	0.253	-0.002	-0.051	0.389	0.017	0.012	0.019	0.063
		(0.026)	(0.034)		(0.032)	(0.042)	(0.041)	(0.050)

APPENDIX TABLE 5 (continued)

	Age < 33 at Baseline			Age >= 33 at Baseline			Difference by Age	
	CM	**E – C**	**S – C**	**CM**	**E – C**	**S – C**	**E – C**	**S – C**
C. Physical health (continued)								
Obese, BMI >= 30	0.576	0.022	-0.02	0.594	-0.05	0	-0.072 ~	0.021
		(0.029)	(0.041)		(0.032)	(0.041)	(0.043)	(0.053)
Obese, BMI >= 35	0.381	-0.063 *	-0.099 *	0.315	-0.023	-0.021	0.04	0.079
		(0.028)	(0.038)		(0.029)	(0.039)	(0.040)	(0.050)
Obese, BMI >= 40	0.194	-0.039 ~	-0.062 *	0.153	-0.033	-0.01	0.006	0.052
		(0.022)	(0.030)		(0.022)	(0.031)	(0.031)	(0.039)
HbA1c test detected diabetes	0.132	-0.047 *	-0.023	0.294	-0.053 ~	-0.006	-0.006	0.017
		(0.021)	(0.030)		(0.031)	(0.040)	(0.037)	(0.046)

Notes : E − C denotes Experimental − control; S − C denotes Section 8 − control; CM, control mean. Estimates are the intent-to-treat mean effect sizes, from Equation (1). The estimated equations all include site indicators and the baseline covariates listed in Appendix A with those in Table A1 included for adults and those in Tables A1 and A2 included for youth. Adult impacts by age at baseline were estimated as an interaction with treatment status. Difference by Age is under age 33 – age 33 and over. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. All rows in panels A and B and the first five rows in panel C are the the components of the economic self-sufficiency, physical health, and mental health indices described in the notes to Table 1. The effects on obesity and diabetes represent key findings from earlier work. Psychological distress consists of 6 items (sadness, nervousness, restlesss, hopelessness, feeling that everything is an effort, worthlessness) scaled on a score from 0 (no distress) to 24 (highest distress) and then converted to a z-score using the mean and standard deviation for control group adults. Hypertension is high blood pressure based on systolic >= 140 mm Hg or diastolic >= 90 mm Hg. Body mass index (BMI) is weight in kilograms divided by height in meters squared (BMI >= 30 indicates obesity, >= 35 indicates severe obesity, >= 40 indicates extreme obesity). Glycosolated hemoglobin (HbA1c) level is from a blood sample, and a level >= 6.5% indicates diabetes.

Source and Sample : The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 6
EFFECTS ON YOUTH OUTCOMES

	FEMALE			MALE			M-F DIFFERENCE	
	CM	E-C	S-C	CM	E-C	S-C	E-C	S-C
A. Mental health								
Psychological distress, K6 z-score	0.000	-0.143 *	-0.032	0.000	0.039	0.081	0.182 *	0.113
		(0.062)	(0.070)		(0.063)	(0.070)	(0.085)	(0.094)
B. Physical health								
Fair or poor self-rated health	0.149	-0.014	-0.017	0.11	-0.003	-0.008	0.011	0.009
		(0.022)	(0.024)		(0.020)	(0.023)	(0.029)	(0.032)
Asthma attack in past year	0.217	-0.016	-0.025	0.159	0.022	-0.011	0.038	0.014
		(0.025)	(0.026)		(0.024)	(0.027)	(0.034)	(0.037)
Non-sports injury in past year	0.128	-0.013	-0.019	0.107	0.024	0.050 *	0.037	0.069 *
		(0.020)	(0.022)		(0.020)	(0.023)	(0.029)	(0.032)
Overweight, BMI > 95th percentile	0.269	-0.059 *	-0.050 ~	0.196	0.015	0.008	0.074 *	0.058
		(0.028)	(0.030)		(0.025)	(0.028)	(0.036)	(0.039)
C. Education								
Educationally on track	0.827	-0.004	0.012	0.801	-0.018	-0.061 *	-0.014	-0.073 *
		(0.023)	(0.024)		(0.025)	(0.029)	(0.032)	(0.036)
Currently idle (neither in school nor working)	0.194	0.030	0.025	0.235	-0.019	0.025	-0.049	0.000
		(0.024)	(0.027)		(0.027)	(0.030)	(0.035)	(0.040)
Reading assessment, z-score	0.000	-0.019	0.080	0.000	0.016	-0.033	0.035	-0.113
		(0.062)	(0.069)		(0.060)	(0.066)	(0.083)	(0.092)
Math assessment, z-score	0.000	-0.026	0.007	0.000	-0.057	0.014	-0.031	0.007
		(0.065)	(0.075)		(0.061)	(0.067)	(0.084)	(0.097)
D. Risky behavior								
Used marijuana in past 30 days	0.186	-0.021	-0.019	0.274	0.003	0.012	0.024	0.031
		(0.025)	(0.028)		(0.030)	(0.033)	(0.038)	(0.043)
Used alcohol in past 30 days	0.427	-0.034	0.001	0.474	-0.044	0.003	-0.010	0.002
		(0.029)	(0.033)		(0.031)	(0.033)	(0.041)	(0.045)
Smoked in past 30 days	0.163	0.044 ~	0.024	0.250	0.047 ~	0.089 *	0.003	0.066 ~
		(0.024)	(0.026)		(0.027)	(0.031)	(0.034)	(0.039)
Ever pregnant or gotten someone pregnant	0.343	0.002	-0.017	0.273	-0.047 ~	-0.025	-0.049	-0.009
		(0.028)	(0.031)		(0.026)	(0.031)	(0.038)	(0.044)

APPENDIX TABLE 6 (continued)

Notes : E − C denotes Experimental − control; S − C denotes Section 8 − control; CM, control mean. Estimates are the intent-to-treat mean effect sizes, from Equation (1). The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1 for adults as well as youth-specific covariates not presented in Appendix Table 1. Youth impacts by gender were estimated as an interaction with treatment status. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. Rows shown in the table are the components of the mental health, physical health, education, and risky behavior indices as described in the notes to Table 1. Psychological distress consists of 6 items (sadness, nervousness, restlesss, hopelessness, feeling that everything is an effort, worthlessness) scaled on a score from 0 (no distress) to 24 (highest distress) and then converted to a z-score using the mean and standard deviation for control group youth ages 15-20 (with male and female youth standardized separately). Body mass index (BMI) values greater than the 95th percentile indicate overweight for youth. Educationally on track indicates the youth was currently in school or had recieved a high school diploma or GED. Test scores are from Early Childhood Longtitudinal Study-Kindergarten (ECLS-K) cohort study assessments adapted for the MTO study. The math and reading achievement assessment measures were converted to z-scores as described above for the psychological distress index.
Source and Sample : The sample is youth ages 15-20 as of December 2007 interviewed as part of the long-term survey (N=3,621).

APPENDIX TABLE 7
EFFECTS ON YOUTH ACHIEVEMENT ASSESSMENT SCORES, BY GENDER AND AGE AT BASELINE

	All Youth		Female Youth		Male Youth		M – F Difference	
	E – C	S – C	E – C	S – C	E – C	S – C	E – C	S – C
Math	-0.024	0.027	-0.026	0.007	-0.057	0.014	-0.031	0.007
	(0.047)	(0.053)	(0.065)	(0.075)	(0.061)	(0.067)	(0.084)	(0.097)
Reading	0.010	0.032	-0.019	0.080	0.016	-0.033	0.035	-0.113
	(0.045)	(0.050)	(0.062)	(0.069)	(0.060)	(0.066)	(0.083)	(0.092)
Math/Reading	-0.009	0.031	-0.019	0.058	-0.029	-0.019	-0.011	-0.076
	(0.047)	(0.052)	(0.063)	(0.073)	(0.061)	(0.066)	(0.082)	(0.094)

	All Youth		Under Age 6		Age 6 and Over		Difference by Age	
	E – C	S – C	E – C	S – C	E – C	S – C	E – C	S – C
Math	-0.025	0.029	-0.068	-0.030	0.012	0.076	0.080	0.106
	(0.046)	(0.052)	(0.068)	(0.071)	(0.060)	(0.072)	(0.087)	(0.097)
Reading	0.008	0.030	0.061	0.084	-0.037	-0.013	-0.098	-0.097
	(0.045)	(0.050)	(0.064)	(0.068)	(0.060)	(0.069)	(0.085)	(0.095)
Math/Reading	-0.010	0.030	-0.005	0.035	-0.015	0.026	-0.010	-0.009
	(0.047)	(0.051)	(0.068)	(0.070)	(0.060)	(0.070)	(0.087)	(0.096)

Notes : E − C denotes experimental − control; S − C denotes Section 8 − control; CM, control mean. Estimates are the intent-to-treat mean effect sizes, from Equation (1), fully interacted with gender as described in the text. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1 for adults as well as youth-specific covariates not presented in Appendix Table 1. M – F difference is male – female difference. Difference by Age is under age 6 – age 6 and over. Youth impacts by gender and by age at baseline were estimated as an interaction with treatment status. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. Test scores are from Early Childhood Longtitudinal Study-Kindergarten (ECLS-K) cohort study assessments adapted for the MTO study. All test score measures were standardized using the mean and standard deviation for control group youth ages 15-20 (with male and female youth and youth under age 6 and age 6 and over standardized separately). The combined math and reading z-score is an average of the standardized math and reading score measures, restandardized as described above.

Source and Sample : The sample is youth ages 15-20 as of December 2007 interviewed as part of the long-term survey (N=3,621).

APPENDIX TABLE 8
EFFECTS ON ADULT SUBJECTIVE WELL-BEING

		Experimental vs. Control				Section 8 vs. Control			
	CM	**ITT**	**TOT**	**CCM**	**N**	**ITT**	**TOT**	**CCM**	**N**
Very happy	0.228	0.010	0.022	0.242	2593	0.050 ~	0.079 ~	0.192	1811
(vs. pretty happy or not very happy)		(0.018)	(0.037)			(0.027)	(0.043)		
Very happy or pretty happy	0.725	0.045 *	0.094 *	0.712	2593	0.034	0.054	0.730	1811
(vs. not very happy)		(0.018)	(0.038)			(0.027)	(0.042)		
Happiness 3-point scale	1.953	0.056 ~	0.116 ~	1.954	2593	0.084 ~	0.133 ~	1.922	1811
		(0.029)	(0.061)			(0.043)	(0.069)		
Happiness 3-point scale, z-score	0.000	0.079 ~	0.163 ~	0.001	2593	0.119 ~	0.187 ~	-0.045	1811
		(0.042)	(0.086)			(0.061)	(0.097)		

Notes : CM, control mean; ITT, intent-to-treat, from Equation (1); TOT, treatment-on-treated, from Equation (2); CCM, control complier mean. The estimated equations all include site indicators and the baseline covariates listed in Appendix Table 1. Robust standard errors adjusted for household clustering are in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. Subjective well-being is from a 3-point happiness scale (1=not too happy, 2=pretty happy, 3=very happy), and the z-score was standardized using the control group mean and standard deviation.
Source and Sample : The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 9
INSTRUMENTAL VARIABLES (IV) ESTIMATES OF THE RELATIONSHIP BETWEEN ADULT OUTCOMES AND DURATION-WEIGHTED TRACT POVERTY RATE OR TRACT SHARE MINORITY

	Model					First Stage Statistics	
Outcome and Single Mediator Included in Model	**2SLS**	**LIML**	**Fuller (c=1)**	**Fuller (c=2)**	**Fuller (c=4)**	**Partial R-Sq.**	**Angrist-Pischke F-stat**
Outcome=Economic self-sufficiency index							
Share poor (duration-weighted)	0.043	0.048	0.047	0.047	0.046	0.097	29.827
	(0.054)	(0.056)	(0.056)	(0.055)	(0.055)		
Share minority (duration-weighted)	0.028	0.033	0.032	0.032	0.031	0.035	10.493
	(0.095)	(0.108)	(0.107)	(0.106)	(0.104)		
Outcome=Physical health index							
Share poor (duration-weighted)	-0.105 ~	-0.110 ~	-0.110 ~	-0.109 ~	-0.109 ~	0.096	29.648
	(0.055)	(0.058)	(0.058)	(0.057)	(0.057)		
Share minority (duration-weighted)	-0.086	-0.104	-0.103	-0.102	-0.100	0.035	10.509
	(0.096)	(0.120)	(0.118)	(0.117)	(0.115)		
Outcome=Mental health index							
Share poor (duration-weighted)	-0.104 ~	-0.106 ~	-0.105 ~	-0.105 ~	-0.105 ~	0.096	29.648
	(0.057)	(0.058)	(0.058)	(0.058)	(0.058)		
Share minority (duration-weighted)	-0.151	-0.161	-0.160	-0.159	-0.156	0.035	10.509
	(0.101)	(0.110)	(0.109)	(0.108)	(0.106)		
Outcome=Subjective well-being scale							
Share poor (duration-weighted)	-0.141 *	-0.143 *	-0.143 *	-0.143 *	-0.142 *	0.098	30.265
	(0.054)	(0.056)	(0.056)	(0.055)	(0.055)		
Share minority (duration-weighted)	-0.069	-0.073	-0.073	-0.073	-0.072	0.035	10.697
	(0.098)	(0.115)	(0.114)	(0.113)	(0.111)		

Notes : Coefficient estimates for the various IV regressions shown use site and treatment group interactions as instruments. Each regression also controlled for the baseline covariates presented in Appendix Table 1 and for field release and was weighted. Columns labels are as follows: 2SLS columns report results for two-stage least squares, LIML is an unmodified limited information maximum likelihood (LIML) model, and columns labeled Fuller present Fuller-modified LIML models with constants 1, 2 and 4, respectively. Robust standard errors shown in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. All measures were converted to z-scores using the control group mean and standard deviation. See the notes to Table 1 for a description of the indices. Subjective well-being (SWB) scale refers to the 3-point happiness scale (1=not too happy, 2=pretty happy, 3=very happy). Share poor is the fraction of census tract residents living below the poverty threshold, and share minority is the fraction of census tract residents who are members of racial or ethnic minority groups. Both share poor and share minority are average measures weighted by the amount of time respondents lived at each of their addresses between random assignment and May 31, 2008 (just prior to the start of the long-term survey fielding period).

Source and Sample : SWB and the index components were self-reported or measured on the MTO long-term survey. Share poor and share minority come from interpolated data from the 1990 and 2000 decennial census as well as the 2005-09 American Community Survey. The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 10

INSTRUMENTAL VARIABLES (IV) ESTIMATES OF THE RELATIONSHIP BETWEEN ADULT OUTCOMES AND DURATION-WEIGHTED TRACT POVERTY RATE OR TRACT SHARE MINORITY IN ONE IV MODEL

	Model					First Stage Statistics		
Outcome and Both Mediators Included in Model	**2SLS**	**LIML**	**Fuller (c=1)**	**Fuller (c=2)**	**Fuller (c=4)**	**Partial R-Sq.**	**Angrist-Pischke F-stat**	**Cragg-Donald F-stat**
Outcome=Economic self-sufficiency index								
Share poor, controlling for share minority (duration-weighted)	0.073	0.088	0.086	0.085	0.082	0.052	14.126	6.132
	(0.087)	(0.103)	(0.101)	(0.100)	(0.097)			
Share minority, controlling for share poor (duration-weighted)	-0.068	-0.093	-0.091	-0.088	-0.084	0.019	4.484	
	(0.155)	(0.196)	(0.192)	(0.188)	(0.181)			
P-value of test that coefficients are equal	0.539	0.530	0.530	0.531	0.532			
Outcome=Physical health index								
Share poor, controlling for share minority (duration-weighted)	-0.155 ~	-0.183	-0.181	-0.179	-0.175	0.053	14.210	6.220
	(0.089)	(0.116)	(0.114)	(0.112)	(0.108)			
Share minority, controlling for share poor (duration-weighted)	0.118	0.170	0.166	0.162	0.155	0.019	4.546	
	(0.159)	(0.230)	(0.224)	(0.219)	(0.210)			
P-value of test that coefficients are equal	0.247	0.292	0.289	0.287	0.281			
Outcome=Mental health index								
Share poor, controlling for share minority (duration-weighted)	-0.089	-0.090	-0.090	-0.090	-0.090	0.053	14.210	6.220
	(0.091)	(0.100)	(0.098)	(0.097)	(0.095)			
Share minority, controlling for share poor (duration-weighted)	-0.034	-0.036	-0.036	-0.036	-0.035	0.019	4.546	
	(0.160)	(0.183)	(0.179)	(0.176)	(0.170)			
P-value of test that coefficients are equal	0.817	0.842	0.838	0.835	0.829			
Outcome=Subjective well-being scale								
Share poor, controlling for share minority (duration-weighted)	-0.261 *	-0.279 *	-0.276 *	-0.273 *	-0.268 *	0.052	14.246	6.077
	(0.093)	(0.102)	(0.100)	(0.099)	(0.096)			
Share minority, controlling for share poor (duration-weighted)	0.279 ~	0.316 ~	0.310 ~	0.304 ~	0.293 ~	0.019	4.552	
	(0.169)	(0.191)	(0.187)	(0.184)	(0.177)			
P-value of test that coefficients are equal	0.030	0.035	0.034	0.033	0.032			

Notes : Coefficient estimates for the various IV regressions shown use site and treatment group interactions as instruments. Each regression presents coefficients for the respective neighborhood measure controlling for the other mediator listed. Each regression also controlled for the baseline covariates presented in Appendix Table 1 and for field release and was weighted. Columns labels are as follows: 2SLS columns report results for two-stage least squares, LIML is an unmodified limited information maximum likelihood (LIML) model, and columns labeled Fuller present Fuller-modified LIML models with constants 1, 2 and 4, respectively. Robust standard errors shown in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. All measures were converted to z-scores using the control group mean and standard deviation. See the notes to Table 1 for a description of the indices. Subjective well-being (SWB) scale refers to the 3-point happiness scale (1=not too happy, 2=pretty happy, 3=very happy). Share poor is the fraction of census tract residents living below the poverty threshold, and share minority is the fraction of census tract residents who are members of racial or ethnic minority groups. Both share poor and share minority are average measures weighted by the amount of time respondents lived at each of their addresses between random assignment and May 31, 2008 (just prior to the start of the long-term survey fielding period).

Source and Sample : SWB and the index components were self-reported or measured on the MTO long-term survey. Share poor and share minority come from interpolated data from the 1990 and 2000 decennial census as well as the 2005-09 American Community Survey. The sample is all adults interviewed as part of the long-term survey (N=3,273).

APPENDIX TABLE 11
INSTRUMENTAL VARIABLES (IV) ESTIMATES OF THE RELATIONSHIP BETWEEN YOUTH OUTCOMES AND DURATION-WEIGHTED TRACT POVERTY RATE OR TRACT SHARE MINORITY

	Model					First Stage Statistics	
Outcome and Single Mediator Included in Model	**2SLS**	**LIML**	**Fuller (c=1)**	**Fuller (c=2)**	**Fuller (c=4)**	**Partial R-Sq.**	**Angrist-Pischke F-stat**
Outcome=Physical health index							
Share poor (duration-weighted)	-0.032	-0.032	-0.032	-0.032	-0.032	0.106	29.748
	(0.057)	(0.058)	(0.058)	(0.057)	(0.057)		
Share minority (duration-weighted)	0.022	0.021	0.021	0.022	0.022	0.035	11.579
	(0.094)	(0.097)	(0.096)	(0.096)	(0.094)		
Outcome=Mental health index							
Share poor (duration-weighted)	-0.067	-0.070	-0.070	-0.070	-0.070	0.106	29.748
	(0.056)	(0.059)	(0.059)	(0.059)	(0.059)		
Share minority (duration-weighted)	-0.097	-0.122	-0.121	-0.120	-0.117	0.035	11.579
	(0.094)	(0.113)	(0.112)	(0.111)	(0.109)		
Outcome=Education index							
Share poor (duration-weighted)	-0.029	-0.028	-0.028	-0.028	-0.028	0.106	29.748
	(0.055)	(0.058)	(0.058)	(0.058)	(0.057)		
Share minority (duration-weighted)	-0.016	-0.012	-0.012	-0.012	-0.013	0.035	11.579
	(0.096)	(0.115)	(0.114)	(0.113)	(0.111)		
Outcome=Risky behavior index							
Share poor (duration-weighted)	-0.008	-0.010	-0.010	-0.009	-0.009	0.107	30.247
	(0.056)	(0.058)	(0.058)	(0.058)	(0.058)		
Share minority (duration-weighted)	0.028	0.029	0.029	0.029	0.029	0.036	11.637
	(0.094)	(0.110)	(0.109)	(0.108)	(0.106)		

Notes : Coefficient estimates for the various IV regressions shown use site and treatment group interactions as instruments. Each regression also controlled for the baseline covariates presented in Appendix Table 1 and for field release and was weighted. Columns labels are as follows: 2SLS columns report results for two-stage least squares, LIML is an unmodified limited information maximum likelihood (LIML) model, and columns labeled Fuller present Fuller-modified LIML models with constants 1, 2 and 4, respectively. Robust standard errors shown in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. All measures were converted to z-scores using the mean and standard deviation for control group youth ages 15-20 (with male and female youth standardized separately). See the notes to Table 1 for a description of the indices. Share poor is the fraction of census tract residents living below the poverty threshold, and share minority is the fraction of census tract residents who are members of racial or ethnic minority groups. Both share poor and share minority are average measures weighted by the amount of time respondents lived at each of their addresses between random assignment and May 31, 2008 (just prior to the start of the long-term survey fielding period).
Source and Sample : Share poor and share minority come from interpolated data from the 1990 and 2000 decennial census as well as the 2005-09 American Community Survey, and the index measures are from the long-term survey. The sample is all youth ages 15-20 as of December 2007 who were interviewed as part of the long-term survey (N=3,621).

APPENDIX TABLE 12
INSTRUMENTAL VARIABLES (IV) ESTIMATES OF THE RELATIONSHIP BETWEEN YOUTH OUTCOMES AND DURATION-WEIGHTED TRACT POVERTY RATE OR TRACT SHARE MINORITY IN ONE IV MODEL

	Model					First Stage Statistics		
Outcome and Both Mediators Included in Model	**2SLS**	**LIML**	**Fuller (c=1)**	**Fuller (c=2)**	**Fuller (c=4)**	**Partial R-Sq.**	**Angrist-Pischke F-stat**	**Cragg-Donald F-stat**
Outcome=Physical health index								
Share poor, controlling for share minority (duration-weighted)	-0.079	-0.081	-0.080	-0.080	-0.079	0.070	18.920	8.345
	(0.083)	(0.084)	(0.084)	(0.083)	(0.082)			
Share minority, controlling for share poor (duration-weighted)	0.119	0.122	0.121	0.120	0.118	0.023	7.469	
	(0.137)	(0.142)	(0.141)	(0.139)	(0.136)			
P-value of test that coefficients are equal	0.335	0.341	0.339	0.337	0.333			
Outcome=Mental health index								
Share poor, controlling for share minority (duration-weighted)	-0.055	-0.048	-0.049	-0.049	-0.050	0.070	18.920	8.345
	(0.084)	(0.099)	(0.098)	(0.097)	(0.095)			
Share minority, controlling for share poor (duration-weighted)	-0.029	-0.056	-0.054	-0.053	-0.050	0.023	7.469	
	(0.140)	(0.187)	(0.184)	(0.181)	(0.175)			
P-value of test that coefficients are equal	0.901	0.977	0.983	0.989	0.999			
Outcome=Education index								
Share poor, controlling for share minority (duration-weighted)	-0.043	-0.051	-0.050	-0.050	-0.049	0.070	18.920	8.345
	(0.081)	(0.096)	(0.095)	(0.094)	(0.093)			
Share minority, controlling for share poor (duration-weighted)	0.036	0.058	0.056	0.055	0.052	0.023	7.469	
	(0.142)	(0.187)	(0.184)	(0.182)	(0.176)			
P-value of test that coefficients are equal	0.703	0.688	0.689	0.690	0.691			
Outcome=Risky behavior index								
Share poor, controlling for share minority (duration-weighted)	-0.037	-0.047	-0.046	-0.045	-0.044	0.070	18.958	8.374
	(0.079)	(0.092)	(0.091)	(0.090)	(0.088)			
Share minority, controlling for share poor (duration-weighted)	0.073	0.093	0.091	0.090	0.088	0.023	7.502	
	(0.133)	(0.172)	(0.169)	(0.167)	(0.162)			
P-value of test that coefficients are equal	0.574	0.577	0.577	0.576	0.576			

Notes : Coefficient estimates for the various IV regressions shown use site and treatment group interactions as instruments. Each regression presents coefficients for the respective neighborhood measure controlling for the other mediator listed. Each regression also controlled for the baseline covariates presented in Appendix Table 1 and for field release and was weighted. Columns labels are as follows: 2SLS columns report results for two-stage least squares, LIML is an unmodified limited information maximum likelihood (LIML) model, and columns labeled Fuller present Fuller-modified LIML models with constants 1, 2 and 4, respectively. Robust standard errors shown in parentheses; * = p-value < 0.05, ~ = p-value < 0.10. All measures were converted to z-scores using mean and standard deviation for control group youth ages 15-20 (with male and female youth standardized separately). See the notes to Table 1 for a description of the indices. Share poor is the fraction of census tract residents living below the poverty threshold, and share minority is the fraction of census tract residents who are members of racial or ethnic minority groups. Both share poor and share minority are average measures weighted by the amount of time respondents lived at each of their addresses between random assignment and May 31, 2008 (just prior to the start of the long-term survey fielding period).

Source and Sample : Share poor and share minority come from interpolated data from the 1990 and 2000 decennial census as well as the 2005-09 American Community Survey, and the index measures are from the long-term survey. The sample is all youth ages 15-20 as of December 2007 who were interviewed as part of the long-term survey (N=3,621).