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Housing mobility and adolescent mental health: The role of substance use, social networks, and family mental health in the moving to opportunity study

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ABSTRACT

The Moving to Opportunity (MTO) experiment was a housing mobility program begun in the mid-nineties that relocated volunteer low income families from public housing to rental units in higher opportunity neighborhoods in 5 US cities, using the Section 8 affordable housing voucher program. Compared to the control group who stayed behind in public housing, the MTO voucher group exhibited a harmful main effect for boys' mental health, and a beneficial main effect for girls' mental health. But no studies have examined how this social experiment caused these puzzling, opposite gender effects. The present study tests potential mediating mechanisms of the MTO voucher experiment on adolescent mental health (n=2829, aged 12–19 in 2001–2002). Using Inverse Odds Ratio Weighting causal mediation, we tested whether adolescent substance use comorbidity, social networks, or family mental health acted as potential mediators. Our results document that comorbid substance use (e.g. past 30 day alcohol use, cigarette use, and number of substances used) significantly partially mediated the effect of MTO on boys' behavior problems, resulting in -13% to -18% percent change in the total effect. The social connectedness domain was a marginally significant mediator for boys' psychological distress. Yet no tested variables mediated MTO's beneficial effects on girls' psychological distress. Confounding sensitivity analyses suggest that the indirect effect of substance use for mediating boys' behavior problems was robust, but social connectedness for mediating boys' psychological distress was not robust. Understanding how housing mobility policies achieve their effects may inform etiology of neighborhoods as upstream causes of health, and inform enhancement of future affordable housing programs.

1. Introduction

Mental health disorders are a major worldwide public health concern (Murray & Lopez, 2002), and the societal costs of such disorders are high (Ingoldsby & Shaw, 2002). Mental health and behavior problems often originate in childhood or adolescence (Kessler, Berglund, Demler, Jin, Merikangas & Walters, 2005), and may set youth on a negative trajectory of escalating mental health problems (Ingoldsby & Shaw, 2002). Exposure to disadvantaged neighborhoods is associated with poorer mental health (Leventhal & Brooks-Gunn, 2003), yet it remains unknown what specific mechanisms explain why certain neighborhood characteristics influence health (Macintyre, Ellaway, & Cummins, 2002).

We leverage the Moving to Opportunity (MTO) for Fair Housing demonstration, which tested whether receiving a rental voucher to move from disadvantaged neighborhoods improved families' outcomes, compared to public housing control group families. The MTO study provides strong causal inference and unbiased effects of being offered a housing voucher on outcomes because random assignment ensures that no confounder, measured or unmeasured, is associated with offered treatment, except by chance (Kleinbaum, Sullivan, & Barker, 2007). Moreover, MTO is a policy-relevant treatment, given that over 5 million low-income Americans in over 2 million households use Housing Choice Vouchers, the leading federal affordable housing policy, to subsidize housing costs (Center on Budget & Policy Priorities, 2015). Policy-relevant exposures identify concrete and realistic intervention points that can enhance impacts on health and health disparities (Glymour, Osypuk, & Rehkopf, 2013).

Abbreviations: MTO, Moving to Opportunity; RCT, Randomized Controlled Trial; HUD, US Department of Housing and Urban Development; ITT, Intention-to-treat

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The MTO experiment aimed to improve household economic self-sufficiency among a low-income, predominantly minority, urban population, but the program changed very few socioeconomic outcomes (Kling, Liebman, & Katz, 2007; Orr et al., 2003). Recent work has highlighted some economic benefits for the younger cohort of children (Chetty, Hendren, & Katz, 2016), but the main domain affected by the program was, unexpectedly, health (Orr et al., 2003). Interim survey findings (4–7 years after random assignment) documented reductions in girls' psychological distress, lifetime marijuana use, lifetime smoking, and risky behavior index, compared to the in-place public housing control group (Kling et al., 2007; Orr et al., 2003; Osypuk, Schmidt, Bates, Tchetgen-Tchetgen, Earls & Glymour, 2012; Osypuk, Tchetgen Tchetgen, et al., 2012). In contrast, MTO treatment unexpectedly increased boys' psychological distress, behavior problems, smoking, and risky behaviors compared to controls (Kling et al., 2007; Orr et al., 2003; Osypuk, Schmidt, et al., 2012; Osypuk, Tchetgen Tchetgen, et al., 2012). Final survey (10–15 years after random assignment) findings were similar, with reductions (among a younger adolescent cohort) in girls' psychological distress, serious behavioral/emotional problems, and alcohol use, and increases in lifetime smoking for the total sample and for boys (Ludwig et al., 2011; Sanbonmatsu et al., 2011). These opposite gender findings have been quite puzzling, and this paper provides the first attempt to explicitly examine potential mediating mechanisms of MTO on adolescent mental health using causal mediation methods.

1.1. Neighborhoods and mental health

Social stress theory (Aneshensel, 1992; Pearlin, 1989) provides a framework for understanding how exposure to disadvantaged neighborhoods adversely affects adolescent mental health (Kling et al., 2007; Leventhal & Brooks-Gunn, 2003). Neighborhood context may shape exposure to stressors, coping mechanisms available to deal with stressors, and the expression of stress-related outcomes (Pearlin, 1989). The socially patterned distribution of exposure to stressors may be especially relevant for understanding why disadvantaged neighborhoods are associated with worse mental health. People living in poor-quality neighborhoods are more likely to encounter adversity and traumatic events, elevating their stress levels and thereby increasing the likelihood of mental disorders (Aneshensel, 1992). Since minority families, such as those targeted by MTO, disproportionately reside in disadvantaged neighborhoods (Osypuk, Galea, McArdle, & Acevedo-Garcia, 2009), they may be especially vulnerable to mental health problems.

An unequal distribution of resources and opportunities across neighborhoods means residents of disadvantaged neighborhoods cannot necessarily draw on beneficial resources to buffer the effects of stressors (Aneshensel, 1992; Pearlin, 1989). Although structural factors increase the probability of experiencing stress in certain environments, some groups may be more or less affected than others, or affected only under certain circumstances (Aneshensel, 1992). Gender may be one such characteristic that differentiates how individuals are exposed to, cope with, and react to neighborhood/contextual stress.

1.2. Gender-specific pathways and mediating mechanisms

First, gender may influence the types of stressors that individuals experience (Pearlin & Schooler, 1978). Women consistently report feeling less safe in their neighborhoods than men (Mulvey, 2002; Perkins & Taylor, 1996), and qualitative work with MTO families revealed that teenaged girls who moved to lower poverty neighborhoods experienced reduced sexual harassment, compared to the high poverty control group (Popkin, Leventhal, & Weismann, 2008). Although we cannot measure girls' sexual harassment or threat of assault directly in our data, it is possible to shed light on this pathway. For example, if girls relied on destructive coping mechanisms like substance use to deal with sexual trauma (Miranda, Meyerson, Long, Marx, & Simpson, 2002), then perhaps removing this source of trauma would reduce substance use, and partially account for the mental health benefits of MTO among girls.

Second, boys and girls may experience the same structural context, but the effects of stressors may differ because of the different conditions that boys and girls experience in other domains (Pearlin, 1975). Both boys and girls in the MTO treatment group experienced the same structural context in new neighborhoods, yet they are conditioned to navigate them in very different ways. For example, boys in MTO were more likely to hang out in local parks, alleys, and street corners; since this is not the norm in low-poverty neighborhoods, treatment group boys who moved into these neighborhoods may have experienced more formal (e.g., police harassment) and informal (e.g., neighbors calling police) surveillance, and thus fallen in with riskier peer groups (Clampet-Lundquist, Edin, Kling, & Duncan, 2011). Moreover, treatment group boys often moved away from father figures (Clampet-Lundquist et al., 2011), and perhaps the loss of these social connections may explain their harmful outcomes. Therefore, social networks may be a potential mediating pathway to explain boys' harmful MTO effects.

Third, coping mechanisms differ by gender (Pearlin & Schooler, 1978). Boys rely more on problem-focused coping (Kort-Butler, 2009). Although problem-focused coping may buffer the effects of stress on depression, it also may exacerbate the effects of stress on externalizing behaviors (Kort-Butler, 2009), like substance use. Boys are more likely than girls to experience pro-drinking norms that are associated with increased substance use (Lo, 1995), and substance use, in turn, may affect mental health (Merikangas, Nakamura, & Kessler, 2009). Therefore substance use may be a potentially important mechanism for boys' mental health, particularly externalizing behaviors. Girls, however, rely more on emotion-focused coping (Kort-Butler, 2009), and inadequate emotional support from parents, in particular, is associated with depression (Stice, Ragan, & Randall, 2004). Parents with mental health problems are more unpredictable and less supportive (Cummings, Keller, & Davies, 2005); therefore, improving parental mental health may also increase parental ability to provide emotional support. Since the mental health of MTO mothers improved (Orr et al., 2003), this may be one potential mechanism to explain why girls' mental health also improved.

Girls are more likely to exhibit depression and anxiety, while boys are more likely to exhibit substance abuse and delinquency (Kessler & Zhao, 1999; Kort-Butler, 2009), so we focus on both internalizing and externalizing outcomes. We hypothesized that the harmful effect of MTO on boys' substance use and social networks may have partially accounted for some of the harmful effects of MTO on boys' mental health, while the beneficial effect of MTO on girls' substance use and maternal mental health may have partially accounted for the beneficial effect of MTO on girls' mental health.

2. Data and methods

2.1. Data

The US Department of Housing and Urban Development implemented the MTO trial in 5 large cities: Baltimore, Boston, Chicago, Los Angeles, and New York (US Department of Housing & Urban Development, 1996). Eligible volunteer families (N=4608) lived in public housing or housing projects, qualified for rental assistance, and had children under age 18 (Feins & McInnis, 2001). Public housing authorities drew applicants from waiting lists and evaluated families for eligibility, and applicants signed enrollment agreements, gave informed consent, and completed the Baseline Survey (Goering, Kraft, Feins, McInnis, Holin & Elhassan, 1999).