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Timing of housing crises: Impacts on maternal depression

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Abstract

Housing problems threaten maternal mental health, but the nature of the relationship between housing and depression across time is not fully understood. Drawing upon the literatures of household shocks and depressive illness, the present study leveraged longitudinal data from the Fragile Families and Child Well-Being Study to probe the relationship between a housing-related crisis and depression among at-risk mothers ($N = 2,503$). Binary logistic regression tested whether a housing crisis predicted an episode of depression across up to one-, three-, and seven-year time lags. The sample was then balanced on key predictors of housing crises using greedy matching with propensity scores; regression models were replicated on the new matched samples. Results showed a housing crisis significantly elevated risk for depression within one year, but effects were attenuated across three and seven years; findings were consistent in the matched samples. Implications include the need to develop new conceptualizations of depression in the context of housing instability. Brief interventions may be most effective for addressing distress associated with housing crises and improving treatment access. Policies and programs addressing the lack of affordable housing in the United States may be effective means of reducing the burden of mental disorder on families with children.

Keywords

Families; housing instability and homelessness; maternal depression; propensity score analysis

Mothers in families experiencing homelessness and inadequate housing are vulnerable to a number of negative health and mental health outcomes. Prior research suggests maternal health and well-being are crucial to family and housing stability. Poor, unstably housed, and homeless mothers display worse mental health compared to the general female population—in particular, they experience substantially elevated rates of depression; however, the nature and course of depression among vulnerable mothers have not yet been fully elucidated. Maternal depression has been found to predict housing problems, but the impact of housing problems on mental health is less clear. Some research suggests a housing crisis may represent a trauma with potential to trigger mental health disorders. However, it is unknown whether a housing crisis constitutes a significant trigger for enduring maternal depression requiring ongoing treatment. Services for mothers experiencing a housing crisis typically

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emphasize stabilizing housing and child well-being, with variable access to mental health treatment for mothers. Greater understanding of the effects of a housing crisis on maternal mental health is required to target efficient services.

Literature review

A large body of research links housing instability and homelessness with maternal depression. Homeless mothers display substantially higher rates of the disorder than the general population of U.S. mothers. A nationally representative study found approximately 10% of all U.S. mothers had suffered from depression in the past year (Ertel, Rich-Edwards, & Koenen, 2011); among homeless mothers, however, the 12-month prevalence rate has been estimated to be over 50%. Estimates of lifetime depression rates among homeless mothers range from 45% to 85% (Bassuk, Buckner, Perloff, & Bassuk, 1998; Weinreb, Buckner, Williams, & Nicholson, 2006). Depression is associated with substantially increased utilization and costs across multiple domains of health services (Alexandre, Hwang, Roth, Gallo, & Eaton, 2016; Byford, Barrett, Despiegel, & Wade, 2011), as well as substantial negative impacts on child development and well-being (Bauer, Knapp, & Parsonage, 2016; Wachs, Black, & Engle, 2009).

The nature of the relationship between a housing crisis and depression is not entirely clear. Depression has been identified as a risk factor for housing problems, including homelessness (Corman, Curtis, Noonan, & Reichman, 2016; 2014). Other studies have identified depression as a consequence of housing instability (Park, Fertig, & Metraux, 2011; Suglia, Duarte, & Sandel, 2011), but little is known about the short and long-term impacts of a housing crisis on mental health. The nature of housing instability and depression complicate efforts to assess their relationship; both occur episodically in the context of enduring periods of risk, yet assessment and intervention do not always align with need. For example, individuals may endure long periods of less severe housing problems, yet only come to the attention of service providers when they escalate to the level of literal homelessness. Likewise, at-risk individuals may experience low-level dysphoria that does not warrant clinical intervention until a high stress event triggers a clinically significant depressive episode. Greater understanding of the nature and relationship between both phenomena is required to aid prevention efforts and efficient service delivery.

Conceptualizing depression in the context of housing instability

Depression is considered a chronic disorder, but the actual course of the disease is marked by relapse and remission (National Institute of Mental Health, 2016). Presence and severity of symptoms vary widely across the life course, with episodes of extreme mental distress separated by periods of relatively robust mental health (Colman & Ataullahjan, 2010; Thomas, 2016; Wickrama, Conger, Lorenz, & Jung, 2008). Women face particular risk, experiencing depression at nearly twice the rate of men (NIMH, 2016). Furthermore, the majority of women suffering from clinically significant depressive symptoms remain undetected and untreated by medical professionals. An investigation of low-income California women receiving Medicaid found that only approximately half diagnosed with clinical depression received any pharmacological or psychosocial treatment during

pregnancy or in the first year after giving birth (Geier, Hills, Gonzales, Tum, & Finley, 2015). Untreated mental illness contributes to significantly reduced quality of life, productivity, and parenting capabilities.

Episodes of depression are frequently triggered by stressful life events. The diathesis-stress model, which has dominated depression research for several decades, posits that depression is a product of a dispositional vulnerability combined with a stressful experience (Grant & McMahon, 2005). Most depressive episodes follow major negative life events such as divorce, death of a friend or family member, or job loss (Hammen, 2016), and some research suggests this link is causal (Kendler & Gardner, 2010). However, understanding of the timing of triggers and persistence of depressive episodes remains murky. Few studies explicitly examine the persistence of depression—whether symptoms remain elevated over an extended period of time versus spiking in response to a crisis and then receding. One exception investigated depression in a sample of 1,058 mothers of young children at baseline and one-year follow-up assessments (Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007). Results showed one in six (17%) mothers experienced clinically significant depressive symptoms at baseline assessment, and approximately half (46%) of those continued to display elevated depression symptoms at a one-year follow-up assessment. Thus, 8% of the total sample displayed persistent depression across one year, 9% experienced an initial depressive episode followed by recovery within one year, and 11% were not depressed at baseline but experienced a new depressive episode at follow-up. Furthermore, different predictors were associated with persistent depression, recovery, and follow-up depression only; for example, high family conflict predicted persistent depression, whereas experiencing three or more major life events predicted follow-up depression. Other research suggests that in addition to the impacts of acute stressors on mental health, chronic hardship associated with poverty can also trigger or exacerbate mental disorders (Bruce, Takeuchi, & Leaf, 1991; Wadsworth, Raviv, Compas, & Connor-Smith, 2005). More nuanced exploration of the links between family dynamics, external stressors, and the incidence and persistence of depression among mothers is needed to develop and implement the most effective interventions.

Efficient service delivery is challenging for mothers in inadequately housed families. In the context of limited resources, mental health needs tend to be superseded by the perceived more urgent issue of seeking shelter (Bassuk & Beardslee, 2014). Although homelessness may expose women to traumatic experiences (Lee & Schreck, 2005; Lewinson, Thomas, & White, 2014) or constitute a trauma in itself (Goodman, Saxe, & Harvey, 1991), homeless shelters are often ill equipped to provide comprehensive mental health treatment and shelter clients face multiple barriers to accessing services (Bassuk & Beardslee, 2014; Salize et al., 2001). Some evidence suggests long-term mental health treatment is not required in the aftermath of a homeless episode. A randomized controlled trial conducted among mothers in homeless shelters in Westchester County, NY, compared overall mental health symptoms between those who received intensive case management addressing maternal needs plus housing services versus those who received housing services only (Samuels et al., 2015). Although mothers in the treatment group returned to stable housing more quickly, they did not differ from mothers in the control group on mental health trajectories. On average, all mothers displayed high levels of mental distress at the time of shelter entry but experienced

significant reduction in symptoms across the 15-month follow-up period, suggesting that the passage of time was the key determinant of improvement in maternal mental after connection to stable housing. However, this study examined a shelter population only. It is not known whether similar improvements are observed or service needs vary among a more generalizable population of mothers experiencing housing instability, and how long services are required. If no treatment or only brief, “light touch” mental health treatment is adequate to help women navigate the stressful immediate aftermath of a housing crisis, there could be substantial timeand cost-saving implications for shelters and other homeless service providers.

A housing crisis as a trigger for depression

Like depression, housing instability and homelessness are often considered to be persistent circumstances for many households in poverty. The Department of Housing and Urban Development defines literal homelessness as living in a shelter; staying in a vehicle, abandoned building, streets, or other place not meant for human habitation; or facing imminent homelessness due to eviction or fleeing a domestic violence situation with no resources to secure subsequent housing through the most recent reauthorization of the McKinney-Vento Homeless Assistance Act (PL100-77). In fact, literal homelessness is a relatively rare occurrence for families with children, and housing problems more often cluster in specific typologies not captured by current assessments. Families that become homeless typically experience brief shelter stays (Culhane, Metraux, Park, Schretzman, & Valente, 2007; Culhane, Park, & Metraux, 2011), while other at-risk families may utilize strategies such as doubling up in periods of hardship to avoid utilizing shelters (Gubits, Spellman, Bunton, Brown, & Wood, 2013; Miller, 2015). Avoiding more visible types of homelessness such as entering shelters masks the scope and severity of housing problems among families, who remain hidden from service providers until ongoing precarious situations culminate in catastrophe such as eviction from independent housing or conflict that threatens informal doubled-up situations. Housing instability among families, therefore, is characterized by periods of risk punctuated by crises that poor families are less equipped to withstand than their wealthier counterparts. In terms of service provision, therefore, it may be more practically beneficial to consider housing crises that occur as acute stressors in the context of more chronic financial hardship and instability (Marcal, 2016).

In examining housing and depression in this way—brief and episodic rather than chronic—it is useful to draw upon the literature of household shocks. Given the similarities in the dynamics of housing instability and depression, a housing crisis—for example, an eviction or shelter stay—can be conceptualized as a household shock that threatens the mental health of vulnerable women. Research done around the world suggests low-income families are more vulnerable to unexpected crises, which can devastate family livelihoods and stability (Mendoza, 2009). In an examination of economic vulnerability to shocks, families with lower socioeconomic status were more likely to experience severe health shocks that threatened financial stability in Andhra Pradesh, the fifth-largest and primarily rural state in India (Dhanaraj, 2016). A study conducted in rural south India found that negative “crop shocks” such as drought or excessive rainfall could trigger periods of poverty for families lasting up to three years (Gahai & Imai, 2004). Climaterelated shocks have also been linked

to lower nutritional status, worse health, and compromised cognitive abilities among children (Bacloch & Behrman, 2016; Tiwari, Jacoby, & Skoufias, 2017). Poor families with few resources to buffer the effects of these shocks are at increased risk of experiencing catastrophic consequences.

The present study applies this conceptualization to probe the relationship between housing crises and episodes of clinically significant depression. It is hypothesized that severe housing problems (e.g., eviction or shelter stay) behave as household shocks that undermine stability and well-being of vulnerable families. The prevalence of both housing problems and depression among low-income families make it necessary to understand the nature and duration of risk facing mothers in these households. Greater knowledge of the relationship between housing shocks and depression will guide prevention and screening efforts, as well as timing and duration of services.

Present study

The present study conceptualizes housing instability as a type of household shock that has the potential to trigger clinically significant depression among at-risk mothers of young children. Analyses test whether emotional distress associated with a housing crisis endures, or declines naturally over time. The study leverages a more generalizable population than most investigations of the relationship between depression and housing problems by including a broader sample of at-risk families, rather than women in homeless shelters. The following hypotheses are tested to expand understanding of how timing of housing problems relate with depression:

1. A housing crisis increases the risk of maternal depression in the following 12 months.
2. A housing crisis has no enduring impact on maternal mental health across three or seven years in the absence of repeated housing problems.

Findings will inform prevention and screening efforts, as well as the period of risk for depression and the most effective window for treatment.

Method

Data and sample

Data for the present study came from the Fragile Families and Child WellBeing Study ("Fragile Families"), which followed a cohort of children born between 1998 and 2000 in 20 large American cities using a stratified random sampling strategy (Reichman, Teitler, Garfinkel, & McLanahan, 2001). Hospitals were randomly selected within cities, and births randomly selected within hospitals. Fragile Families intentionally oversampled children born to unmarried parents; this, combined with the purely urban sampling frame, yielded a disproportionately low-income sample. Mothers were administered the baseline interview in hospitals after giving birth; fathers were interviewed in the hospital if present, or as soon as possible thereafter (Bendheim-Thoman Center for Research on Child Wellbeing, 2008). Follow-up interviews occurred 1, 3, 5, and 9 years later. Because the present study was concerned with maternal well-being after a housing crisis, the primary analytic sample was

limited to mothers who retained custody of the focal child at all five waves of data collection ($N = 2,503$). Additional models examined the persistence of depression associated with an initial housing crisis among subsets of mothers who did not experience subsequent housing crises at the Year 5 ($N = 2,177$) and 9 ($N = 1,870$) follow-up interviews.

Measures

The dependent variable was *maternal depression* assessed using the World Health Organization's Composite International Diagnostic Interview-Short Form (CIDI-SF) at the Year 3, 5, and 9 interviews. Mothers answered a series of questions that indicated probable current major depressive disorder based on a threshold consistent with DSM-IV criteria (0 = not depressed, 1 = depressed). A categorical measure of depression was used for two major reasons. First, this measure aligned with DSM-IV criteria, which would have been used to determine mental health service eligibility at the time of Fragile Families data collection. Second, the cutoff indicated clinically significant mental distress sufficiently severe to interfere with daily functioning, childcare, and ability to engage in the tasks necessary to cope with housing problems and secure subsequent living arrangements.

The main independent variable of interest was a dichotomous indicator of whether mothers had experienced a *housing crisis* at any point during the 12 months prior to the Year 3 interview. Mothers reported whether they had experienced an episode of housing instability severe enough to qualify as a "household shock": eviction, moving in with others due to inability to afford housing, or spending at least one night in a shelter, abandoned building, vehicle, or on the streets in the past year.

A number of covariates were entered into the model. *Family history of depression*, a dichotomous measure of whether the mother's mother (the child's grandmother) had ever experienced clinically significant depressive symptoms, was self-reported by mothers at the baseline interview. *Domestic violence* was a dichotomous indicator of whether the mother had ever been hit, kicked, or slapped by the child's father or a current partner in the past year at each wave. *Parenting stress* was measured at each wave using items derived from the Child Development Supplement of the Panel Study of Income Dynamics (PSID) that were developed for the Job Opportunities and Basic Skills Training Program (JOBS) Child Outcomes Study (Child Trends Inc., 1993). The modified scale was developed for the Fragile Families dataset used in the present study and included four items scored on a 4-point Likert scale; scores were summed and divided by the number of items such that scores ranged from 1 to 4, with higher scores indicating greater parenting stress.

Additionally, several demographic characteristics were incorporated into analyses. *Mother's age* was measured as the mother's age in years when the child was born. *Mother's race/ethnicity* was dummy coded into four groups: white (reference group), black, Hispanic, and other. *Mother's highest level of education completed* was dummy coded into four categories: less than a high school degree (reference group), high school degree or GED, some college, and college degree or higher. *Household poverty status* was assessed at each wave and categorized as below the federal poverty level (FPL), 100–299% of FPL, and 300%+ of FPL. *Marital/cohabitating status* was a dichotomous measure of whether or not the mother was married to or cohabitating with the child's father at the time of the child's birth (1 = yes, 0 =

no). Finally, although the Fragile Families study design planned for follow-ups to occur at specific time intervals, slight variation occurred; therefore, the present study controlled for time between interviews.

Analytic strategy

All data were weighted to be representative of all births in the 20 sampled cities using the jackknife estimation of standard errors. This approach leveraged the study sample's statistical power while correcting for the sampling strategy to reflect the population of each particular city. Univariate statistics described the sample. A series of binary logit models examined the relationship between housing crises and depression at distinct time points, controlling for household and demographic characteristics. Three models tested the impact of an acute housing crisis on mental health with increasing time lags in order to ascertain the enduring nature of a depressive episode associated with a traumatic housing experience. Model 1 tested whether a housing crisis elevated the risk for a depressive episode among mothers across 12 months. Model 2 tested whether this relationship endured through the Year 5 interview, and Model 3 tested whether it endured through the Year 9 interview, assuming a subsequent housing crisis did not occur (Figure 1). Given the emphasis on time lags and the fact that interviews may not have occurred at exactly the same time intervals for each family, models also controlled for the amount of time between interviews.

Findings of logit models using observational data must be interpreted with caution due to the possibility of endogeneity, which may bias results. A second set of models applied corrective methods to address overt selection bias that may have influenced rates of housing problems in the sample. Greedy matching was utilized to balance the sample on key covariates, accounting for observed confounders, and serving as a sensitivity analysis for the pattern of findings in Models 1–3. Propensity scores were defined as $\log[(1-p)/p]$, where p represented predicted values generated from a logistic regression with the dependent variable of whether mothers reported experiencing a housing crisis at the Year 3 interview. A nearestneighbor within caliper scheme matched mothers who had experienced a housing crisis with those who had not based on propensity scores within a caliper size of 0.25* standard deviation of the propensity scores for each other three samples used in Models 1–3. Thus, three new analytic samples were generated. Bivariate analyses tested for systematic group differences on key covariates in the original and matched samples to assess the extent to which the matching procedure addressed imbalance. Models 1–3 were replicated on the matched samples as Models 4–6, respectively, to test the robustness of the original findings.

Results

Sample characteristics

Nearly one-third (30%) of mothers reported depression at any point during the study period. At each wave, rates of depression ranged from just under 12% (Year 5) to 15% (Year 3). Approximately 12% of mothers reported that their families had experienced a housing crisis sometime in the 12 months prior to the Year 3 interview.

On average the sample was socioeconomically disadvantaged, with one in four (25%) mothers living below the federal poverty line. Over two-thirds of mothers were nonwhite (33% black, 27% Hispanic, and 7% other), and over half (56%) had not achieved beyond a high school degree by the time the child was born. Three out of four mothers were married or cohabitating with the child's father (75%), though the majority of this group was comprised of unmarried cohabitating partners. Just over 6% of mothers reported being victims of domestic violence. Interviews occurred largely according to schedule; the average time between the Year 3 and Year 5 interviews was 2.01 years, and the average time between the Year 5 and Year 9 interviews was 4.11 years.

Logistic regressions predicting maternal depression

Model 1 tested the effect of a housing crisis within the past year on maternal depression at the Year 3 interview (Table 1). A housing crisis in the 12 months prior to the Year 3 interview more than tripled the risk for maternal depression at the time of the Year 3 interview ($OR = 3.27$; 95% $CI = 1.73-6.16$). Each one-unit increase on the parenting stress scale doubled odds for depression. A family history of depression had the largest effect—more than quadrupling the likelihood that a mother would screen positive compared to mothers with no family history. Socioeconomic indicators had no impact on maternal depression when other factors were controlled.

Model 2 increased the lag time between a housing crisis and a depressive episode to test whether depression endured through the Year 5 interview. Compared to mothers who remained continuously stably housed, mothers who had experienced a housing crisis in the year prior to the Year 3 interview were no more likely to be depressed at Year 5, assuming they did not experience a subsequent crisis. Family history of depression remained a significant predictor of depression ($OR = 4.33$; 95% $CI = 2.37-7.92$).

Model 3 tested whether a housing crisis had an impact on depression across a longer period—through Year 9. To account for the effects of more recent housing instability, the sample was limited to mothers who were stably housed after Year 3. Results showed an isolated episode of housing instability in the 12 months prior to the Year 3 interview had no enduring impacts on later maternal depression. Significant predictors in this model included having a college degree, earning a higher income, and having a family history of depression, the latter of which—consistent with Models 1 and 2—increased the odds of depression by nearly three-fold compared to mothers who did not have a family history of the illness. All three models had insignificant Hosmer and Lemeshow test statistics, indicating they were well-fitted to the data.

Sensitivity analysis using greedy matching

Robustness of findings was checked by testing and correcting for observed confounders in the sample using greedy matching. Bivariate analyses before and after matching on the samples used in Models 1–3 indicated substantial reductions in group differences on a number of covariates (full results of balance checks available in Appendix). While nearly all predictors were significantly associated with the likelihood of experiencing a housing crisis in the original samples, none remained so in the matched samples. Results of the balance

checks indicated improvement of overt selection bias, thus improving internal validity of outcome analyses.

Models 1–3 were replicated on the new matched sample as Models 4–6, respectively (Table 2), as a sensitivity analysis for the original findings. Results were consistent; a housing crisis significantly elevated the risk for a depressive episode within the first 12 months, but had no effect on depression across three or seven years. Family history of depression had significant and large effects on depression risk across all three models, while parenting stress remained a significant indicator of depression risk in two of three models. Goodness-of-fit tests indicated all models were appropriately fit to the data.

Discussion

This study enriches understanding of the relationship between housing and mental health among at-risk mothers. A recent episode of housing instability significantly increases the likelihood of depression for mothers of young children, controlling for a number of demographic and household characteristics. An isolated housing crisis, however, does not have any enduring effects on maternal depression. Family history remains a strong predictor of depression risk across all six models. This pattern of findings remains consistent after using greedy matching on propensity scores to address overt selection bias and improve internal validity, thus increasing confidence in their robustness. A housing-related crisis constitutes a household shock that threatens maternal mental health and destabilizes families. Conceptualizing depression as a short-term, relatively normative experience triggered by stressful events may reduce stigma and empower women to engage with brief, solutions-focused therapies. This reconceptualization more closely reflects the actual course of depressive disorders among low-income families, providing insight into disease etiology, mechanisms, and treatment potential.

A number of implications for the detection and treatment of depression among at-risk women may be drawn from the present study. Findings support prior research suggesting that a housing crisis triggers high levels of mental distress, which may regress to the mean once the initial crisis has passed (Samuels et al., 2015). The months immediately following a housing-related crisis are particularly high risk for clinically significant levels of psychological distress. The short-term effect of a housing-related shock on mental health observed in the present study indicates only brief treatment may be needed; services should emphasize stabilizing housing along with bolstering coping strategies for periods of high stress. Mental health services are often inaccessible for low-income families due to cost, geographic or transportation limitations, long waiting lists, or awareness (Bassuk & Beardslee, 2014; Rosen, Tolman, & Warner, 2004). When shelters refer depressed mothers to the community for treatment, there is a greater chance that these barriers will prevent some mothers from ever receiving care; it may be feasible for homeless shelters to meet the needs of more women by offering short-term therapies in-house. This approach would reduce barriers to access for homeless mothers, as well as alleviate burden on the mental health services system.

Findings also highlight the potential of housing interventions to prevent mental disorder in vulnerable women. Lack of available affordable housing contributes to housing instability and homelessness in cities throughout the United States, and the living arrangements of poor families are frequently marked by chaos and unpredictability (Desmond & Gershenson, 2016). Effective housing interventions such as long-term subsidies have the potential to prevent housing crises among at-risk families, thus reducing risk for depression (Gubits et al., 2016). Stabilizing housing may provide a platform to promote psychological well-being in mothers who would otherwise face elevated risk for mental disorder.

These findings must be considered in light of a few limitations. First, Fragile Families contains a purely urban sample, and findings may not be generalizable to rural populations, for whom housing problems and mental health disorders are significant issues (Jones, Reupert, Sutton, & Mayberry, 2014; Nicholson, 2008). The study also only examined intact families—those in which mothers retained primary custody of their children across the study period. It is likely that families from which children are removed due to allegations of maltreatment experience unique socioeconomic and psychosocial dynamics that affect housing stability and risk for mental disorder. Furthermore, the study did not test the impact of repeated episodes of housing instability, which may have a cumulative effect on mental health.

Elements of the study design also must be considered when interpreting findings. Models 1–3 benefit from a large sample of vulnerable, underrepresented mothers across the country, but potential exists for selection bias in this uncorrected (pre-matching) sample. Models 4–6 correct for this bias, but an inherent limitation of greedy matching is substantial loss of cases; the upshot is improved internal validity, but reduced generalizability. Nonetheless, the pattern of findings is consistent across models and approaches.

Conclusions

The present study points to important issues in the conceptualization and measurement of both housing instability and depression. For at-risk families with high levels of socioeconomic need, it may be more practically useful to understand depression as an illness triggered by life events common to impoverished households. Alternative conceptualizations of depression in the context of poverty and housing instability have important implications for service delivery and costs.

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Appendix

Table A1

Balance check before and after greedy matching on samples for Models 1 and 4.

	Before Matching (N = 2,503)			After Matching (N = 812)		
	Housing Crisis in Past Year at Year 3 Interview		<i>t</i> or χ^2	Housing Crisis in Past Year at Year 3 Interview		<i>t</i> or χ^2
	No <i>M(SD)</i> or %	Yes <i>M(SD)</i> or %		No <i>M(SD)</i> or %	Yes <i>M(SD)</i> or %	
Age (M, SD)	25.79 (6.11)	22.45 (4.63)	10.46 ***	22.41 (4.56)	22.47 (4.63)	-0.18
Race						
White	88.10	11.90	10.73 **	50.00	50.00	0.00
Black	82.31	17.69	3.39	51.13	48.87	0.50
Hispanic	81.83	18.17	2.06	48.36	51.64	0.31
Other	87.06	12.94	0.73	42.11	57.89	0.49
Highest Education						
< HS degree	77.27	22.73	31.81 ***	48.92	51.08	0.25
HS degree/GED	82.78	17.22	0.71	49.82	50.18	0.01
Some college	86.18	13.82	3.95 *	53.85	46.15	1.52
College degree or higher	95.67	4.33	38.92 ***	33.33	66.67	2.40
Poverty Status						
Below FPL	78.94	21.06	20.65 ***	50.14	49.86	0.01
100–299% FPL	82.87	17.13	0.90	51.23	48.77	0.40
300%+ FPL	91.39	8.61	36.24 ***	44.90	55.10	1.16
Married/Cohabiting	87.37	12.63	39.80 ***	49.87	50.13	0.00
Parenting Stress (M, SD)	2.21 (0.65)	2.30 (0.69)	-2.35 *	2.27 (0.66)	2.29 (2.23)	-0.40
Domestic Violence	66.30	33.70	44.05 ***	46.90	53.10	0.50
Family History of Depression	80.06	19.94	9.49 **	50.89	49.11	0.14

 $p < 0.001$;

**
 $p < 0.01$;

*
 $p < 0.05$.

Model 1 uses the before-matching sample. Model 4 uses the after-matching sample.

Table A2

Balance check before and after greedy matching on samples for Models 2 and 5.

	Before Matching (N = 2,166)			After Matching (N = 562)		
	Housing Crisis in Past Year at Year 3 Interview		<i>t</i> or χ^2	Housing Crisis in Past Year at Year 3 Interview		<i>t</i> or χ^2
	No <i>M(SD)</i> or %	Yes <i>M(SD)</i> or %		No <i>M(SD)</i> or %	Yes <i>M(SD)</i> or %	
Age (M, SD)	26.03 (6.12)	22.59 (4.54)	8.20 ***	22.63 (4.66)	22.63 (4.54)	-0.01
Race						
White	91.12	8.88	1.81	56.48	43.52	1.58

	Before Matching (N = 2,166)			After Matching (N = 562)		
	Housing Crisis in Past Year at Year 3 Interview			Housing Crisis in Past Year at Year 3 Interview		
	No M(SD) or %	Yes M(SD) or %	t or χ^2	No M(SD) or %	Yes M(SD) or %	t or χ^2
Black	89.11	10.89	0.43	64.08	35.92	1.43
Hispanic	88.35	11.65	1.12	61.01	38.99	0.06
Other	93.42	6.58	1.26	61.54	38.46	0.00
Highest Education						
< HS degree	84.50	15.50	22.68 ***	59.91	40.09	0.56
HS degree/GED	89.28	10.72	0.09	63.00	37.00	0.18
Some college	91.27	8.73	2.45	65.52	34.48	1.13
College degree or higher	96.78	3.22	20.27 ***	41.18	58.82	3.15
Poverty Status						
Below FPL	86.71	13.29	8.55 **	61.74	38.26	0.00
100–299% FPL	88.90	11.10	0.72	63.93	36.07	1.03
300%+ FPL	93.87	6.13	15.96 ***	54.43	45.57	2.10
Married/Cohabiting	91.68	8.32	18.68 ***	60.27	39.73	0.57
Parenting Stress (M, SD)	2.21 (0.64)	2.30 (0.67)	–2.05 *	2.24 (0.65)	2.29 (0.66)	–0.91
Domestic Violence	75.52	24.48	32.24 ***	57.14	42.86	0.81
Family History of Depression	86.97	13.03	5.81 *	62.12	37.88	0.01

p < 0.001;

**
p < 0.01;

*
p < 0.05.

Model 2 uses the before-matching sample. Model 5 uses the after-matching sample.

Table A3

Balance check before and after greedy matching on samples for Models 3 and 6.

	Before Matching (N = 1,870)			After Matching (N = 460)		
	Housing Crisis in Past Year at Year 3 Interview			Housing Crisis in Past Year at Year 3 Interview		
	No M(SD) or %	Yes M(SD) or %	t or χ^2	No M(SD) or %	Yes M(SD) or %	t or χ^2
Age (M, SD)	26.38 (6.16)	22.75 (4.62)	7.34 ****	22.89 (4.81)	22.78 (4.62)	0.24
Race						
White	92.65	7.35	1.43	60.23	39.77	1.31
Black	90.96	9.04	0.26	68.16	31.84	1.66
Hispanic	89.80	10.20	1.76	62.70	37.30	0.58
Other	96.97	3.03	2.76	80.00	20.00	0.96
Highest Education						
< HS degree	86.93	13.07	15.74 ***	63.10	36.90	0.65
HS degree/GED	91.11	8.89	0.05	67.48	32.52	0.45

	Before Matching (N = 1,870)			After Matching (N = 460)		
	Housing Crisis in Past Year at Year 3 Interview		<i>t</i> or χ^2	Housing Crisis in Past Year at Year 3 Interview		<i>t</i> or χ^2
	No <i>M(SD)</i> or %	Yes <i>M(SD)</i> or %		No <i>M(SD)</i> or %	Yes <i>M(SD)</i> or %	
Some college	92.43	7.57	1.07	68.85	31.15	0.84
College degree or higher	96.97	3.03	14.22 ***	43.75	56.25	3.54
Poverty Status						
Below FPL	88.99	11.01	5.37 *	65.71	34.29	0.01
100–299% FPL	90.47	9.53	1.22	67.25	32.75	0.63
300%+ FPL	94.96	5.04	12.58 ***	58.46	41.54	1.63
Married/Cohabiting	92.66	7.34	8.04 **	61.70	38.30	2.94
Parenting Stress (M, SD)	2.20 (0.64)	2.27 (0.67)	–1.34	2.26 (0.64)	2.27 (0.66)	–0.03
Domestic Violence	79.25	20.75	20.64 ***	61.82	38.18	0.37
Family History of Depression	90.29	9.71	0.87	68.49	31.51	0.86

 $p < 0.001$;

**
 $p < 0.01$;

*
 $p < 0.05$.

Model 3 uses the before-matching sample. Model 6 uses the after-matching sample.

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Figure 1.
Measurement strategy for regression models.

Table 1

Logistic regressions predicting maternal depression in unmatched sample.

	Model 4 Depression Year 3 (N = 2,503) OR [95% CI]	Model 5 Depression Year 5 (N = 2,166) OR [95% CI]	Model 6 Depression Year 9 (N = 1,870) OR [95% CI]
Intercept	0.01 ***	0.03 **	0.12
Time between interviews (years)	–	1.47 (0.71–3.02)	0.83 (0.28–2.49)
Age	1.01 (0.93–1.09)	0.98 (0.94–1.03)	1.05 (0.96–1.14)
Race			
Black	1.47 (0.76–2.83)	0.70 (0.22–2.26)	0.37 (0.11–1.24)
Hispanic	1.23 (0.70–2.16)	0.59 (0.27–1.27)	0.28 (0.06–1.38)
Other	0.39 (0.13–1.22)	0.22 (0.04–1.13)	0.08* (0.01–0.70)
Highest Education			
High school diploma/GED	1.04 (0.52–2.07)	1.44 (0.82–2.51)	0.45 (0.19–1.03)
Some college	1.44 (0.30–3.61)	2.09 (0.75–5.88)	0.65 (0.19–2.20)
College degree or higher	1.04 (0.21–4.51)	0.72 (0.24–2.18)	0.32* (0.11–0.96)
Poverty Status			
100–200% FPL	0.72 (0.45–1.15)	0.87 (0.35–2.21)	0.48 (0.19–1.23)
300%+ FPL	0.64 (0.20–2.01)	0.78 (0.26–2.28)	0.24* (0.06–0.88)
Married or Cohabiting	1.10 (0.63–1.92)	1.19 (0.67–2.10)	0.88 (0.39–1.95)
Domestic Violence Victimization	3.69 (0.83–16.37)	1.94 (0.80–4.72)	3.09 (0.33–29.23)
Parenting Stress	2.04** (1.44–2.89)	1.23 (0.91–1.66)	1.59 (0.77–3.29)
Family History of Depression	4.49*** (2.61–7.73)	4.33*** (2.37–7.92)	3.13** (1.59–6.15)
Housing Crisis (Year 3)	3.27** (1.73–6.13)	1.40 (0.80–2.45)	1.45 (0.77–2.73)
Max-rescaled R²	0.26	0.14	0.19
Hosmer and Lemeshow	χ² p	χ² p	χ² p
	7.96 0.44	10.31 0.24	5.80 0.67

p < 0.001;

**
p < 0.01;

*
p < 0.05.

Model 1 uses the full sample. Models 2 and 3 exclude mothers who experienced subsequent housing crises after the Year 3 interview.

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Table 2

Logistic regressions predicting maternal depression in matched sample.

	Model 4 Depression Year 3 (N = 812) OR [95% CI]	Model 5 Depression Year 5 (N = 562) OR [95% CI]	Model 6 Depression Year 9 (N = 460) OR [95% CI]
Intercept	0.01 ***	0.03 *	0.15
Time between interviews (years)	–	0.93 (0.55–1.58)	0.86 (0.45–1.66)
Age	1.05 * (1.00–1.08)	1.03 (0.97–1.08)	1.03 (0.97–1.09)
Race			
Black	0.91 (0.57–1.45)	1.07 (0.58–1.99)	0.45 * (0.23–0.90)
Hispanic	0.68 (0.52–2.31)	0.72 (0.35–1.46)	0.37 * (0.17–0.82)
Other	0.96 (0.30–3.03)	1.00 (0.99–1.00)	1.00 (0.99–1.00)
Highest Education			
High school diploma/GED	1.24 (0.83–1.84)	1.55 (0.91–2.64)	1.07 (0.57–2.04)
Some college	1.31 (0.82–2.08)	0.97 (0.50–1.87)	1.03 (0.49–2.16)
College degree or higher	0.32 (0.08–1.29)	1.00 (1.00–1.00)	0.30 (0.03–2.93)
Poverty Status			
100–200% FPL	1.06 (0.73–1.53)	0.99 (0.60–1.64)	0.56 (0.31–1.00)
300%+ FPL	0.75 (0.40–1.40)	0.97 (0.43–2.22)	0.33 * (0.12–0.92)
Married or Cohabiting	1.06 (0.75–1.50)	1.25 (0.78–2.00)	0.99 (0.57–1.73)
Domestic Violence Victimization	1.75 * (1.12–2.72)	1.26 (0.68–2.34)	1.45 (0.70–2.99)
Parenting Stress	2.01 *** (1.56–2.59)	1.42 * (1.01–2.00)	1.38 (0.92–2.08)
Family History of Depression	2.23 *** (1.59–3.13)	2.65 *** (1.69–4.17)	3.10 *** (1.83–5.27)
Housing Crisis (Year 3)	1.54 * (1.10–2.15)	1.24 (0.78–1.97)	1.09 (0.64–1.84)
Max-rescaled R ²	0.09	0.07	0.10
Hosmer and Lemeshow	χ^2	χ^2	χ^2
	p	p	p
	8.33	13.80	10.92
	0.40	0.09	0.21

 $p < 0.001$;**
 $p < 0.01$;

Models 1–3 respectively, using the new matched samples.

$$.505_{*} > d'$$

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