

HOMEOWNERSHIP, NEIGHBORHOOD CHARACTERISTICS, AND CHILDREN'S POSITIVE BEHAVIORS AMONG LOW- AND MODERATE-INCOME HOUSEHOLDS

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Homeownership, Neighborhood Characteristics, and Children's Positive Behaviors
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Abstract

Using data on low-to-moderate income households in the Community Advantage Program (CAP) survey we examine homeownership, neighborhood characteristics and the interaction between the two on the positive behavior of children from low and moderate-income households. In order to control for potential selection bias and endogeneity problems, we employ propensity score weighting and hierarchical regression to tease apart the effects of homeownership, neighborhood characteristics, and their interaction on child positive behavior. We find no effect of homeownership or neighborhood characteristics, respectively, on children's positive behavior when the interaction between the two is not included in the model. However, homeownership was found to have a stronger positive effect on children's positive behavior as neighborhood population density increases and at approximately 4,000 persons per square mile (approximate population density of San Diego, CA), homeownership significantly increases children's overall scores on the positive behavior scale.

Homeownership has long been regarded as a beneficial investment for individuals and households. Empirical research suggests that homeownership is associated with wealth accumulation, increased physical and psychological wellbeing, increased social capital, and improvements in neighborhood quality and stability (Boehm & Schlottman, 2008; Cairney & Boyle, 2004; DiPasquale & Glaeser, 1999; Rohe & Stegman, 1994a). Another important positive benefit of homeownership explored in past research is the effect on child outcomes including educational attainment, behavior problems, academic achievement, depression, and physical health outcomes (Aronson, 2000; Boehm & Scholottman, 1999; Boyle, 2002; Cairney, 2005; Green & White, 1997; Harkness & Newman, 2003a; Harkness & Newman, 2003b; Haurin, Parcel, & Haurin, 2002). However, several studies have suggested that the previously observed effects of homeownership may have been overstated due to the influence of unobservable variables and that the same benefits may not accrue to low- and moderate-income households who may face additional economic challenges to homeownership (Mohanty & Raut, 2009; Barker & Miller, 2009; Herbert & Belsky, 2006).

Understanding the effects of homeownership on low- and moderate-income (LMI) households is perhaps even more important today as policy makers face acute questioning on homeownership promotion programs given the ongoing housing foreclosure crisis. The purpose of our study is to build on this body of work and expand it in several ways. First, the present paper examines the factors that contribute to the incidence of positive,

developmentally healthy behaviors in children, compared with many previous studies that focus on the presence of negative behavior or educational outcomes. Second, few studies on the effects of homeownership specifically examine the experience of low-to-moderate income (LMI) households who may face a different set of circumstances that moderate the effects of owning a home. This paper takes advantage of a unique data set on LMI homeowners and a comparison group of renters matched on neighborhood characteristics. Third, we expand the analysis in an attempt to empirically separate the effects attributable to neighborhood characteristics, from those attributable to homeownership, and those due to the intersection of the two.

We first discuss the theories that explain why homeownership is thought to have a positive effect on child behavior and previous studies that have examined the relationship among homeownership, neighborhood context, and child outcomes. Then we describe in detail our unique data and the methods applied to distinguish between homeownership and neighborhood effects. We apply propensity score weighting techniques and hierarchical regression that ensure balance between renters and owners on other characteristics and estimate neighborhood-level effects, respectively. Finally, we interpret the results generated by the analytic model and offer implications for researchers, policy makers, and practitioners.

Literature Review

There are several theories that aim to explain why homeownership could have a

positive direct effect on child behavior and outcomes including parenting practices, the physical environment, residential mobility and stability, and wealth. According to the theory posited by Green and White (1997) “parents acquire do-it-yourself skills, interpersonal skills, and financial skills through home ownership, which they can pass on to their children.” Indeed, at least one study that accounts for potential selection effects and clustering has found that homeownership is associated with more engaged parenting practices, which may lead to better outcomes in children (Grinstein-Weiss, Williams Shanks, Manturuk, Key, Paik, & Greeson, 2010). Others have also suggested that the improved psychological well-being of those who are homeowners may also result in better parenting and child outcomes (Dietz & Haurin, 2003; Cairney, 2005).

The difference in the physical environments between owner’s and renter’s homes could explain why homeownership has been found to have a positive impact on children’s cognitive and social outcomes (Haurin, et al., 2002). Much research has been done to investigate the economic rational choice theory which suggests that homeowners have more incentive to protect their investment than renters do (DiPasquale & Glaeser, 1999, Herbert & Belsky, 2006). Haurin and colleagues (2002) who use panel data from the National Longitudinal Survey of Youth (NLSY) to investigate the effects of homeownership on children explored this mechanism and found that owning a home led to a 13 to 23 percent higher quality home environment compared to renting even when controlling for sample selection bias. For a review of the literature on the link between homeownership, improved physical environments, and social outcomes please see Retsinas and Belsky (2002).

Residential stability associated with homeownership is thought to be a key characteristic explaining why owning a home may confer more benefits than renting (Rohe & Stewart, 1996). Several studies have shown that residential stability has a positive effect on children's development (Astone & McLanahan, 1994; Haveman, Wolfe, & Spaulding, 1991). Aaronson (2000), using a sample from the Panel Study of Income Dynamics (PSID) and controlling for the mobility frequency, distance of the move, and reason for move; found the impact of parental homeownership on children's educational attainment is partially driven by residential stability.

Wealth accumulation and household financial stability which have been associated with owning a home may also help explain the beneficial effects of homeownership on child outcomes. Among the American middle class, home equity represents 60 percent of the total wealth (Wolff, 2002) and parental wealth has been shown to positively affect child outcomes (Duncan & Brooks-Gunn, 1997; Williams Shanks, 2007). Thus, the positive effect of homeownership on child outcomes observed in previous research may be attributable to higher levels of parental wealth (Aaronson, 2000; Williams Shanks, 2007).

In addition to these direct effects of homeownership on child outcomes, there are also potential indirect homeownership effects due to neighborhood characteristics. The effects of neighborhood conditions on child development have been explored in depth (see for example Brooks-Gunn, Duncan, & Aber, 1997; Leventhal & Brooks-Gunn, 2000; Huston & Bentley, 2010; and Sampson, Morenoff, & Gannon-Rowley, 2002). Sampson, Morenoff, & Gannon-Rowley (2002) identified that social ties, collective efficacies, institutional resources, and routine activities as possible mechanisms linked with neighborhood effects. Since homeownership has been found to be related to these factors, homeownership may have an

indirect impact on children through changes in neighborhood conditions. For example, homeowners often live in communities with superior schools and safer neighborhoods - thus these neighborhood characteristics might explain the better child outcomes, not the tenure status. Previous studies that found positive effects of homeownership on child outcomes have been called into question for lacking sufficient controls for the effects of neighborhood characteristics (Mohanty & Raut, 2009; Barker & Miller, 2009; Harkness & Newman, 2003b).

With regard to potential interaction effects between homeownership and neighborhood characteristics, Harkness and Newman (2003b) speculate that homeownership could buffer the effects of the neighborhood characteristics. For example, Aaronson (2000) examined the effect of homeownership and neighborhood characteristics on children's high school graduation, and found that the effect of parental homeownership was much stronger and more robust in neighborhoods with low mobility than neighborhoods with high mobility while controlling for neighborhood socio-economic status (SES). Harkness and Newman (2003b) also identified some patterns of association indicating that children of homeowners were more strongly influenced by neighborhood characteristics than children of renters, but were not able to find significant differences between the statistical estimates for children of renters and owners. Despite the lack of significant findings, the statistical patterns suggest the need to examine the interaction effects of homeownership and neighborhood on child outcomes (Harkness & Newman, 2003b).

Homeownership and Child Behavior

Two studies (Haurin, et al. 2002 and Boyle 2002) have looked specifically at homeownership and children's behavior. Haurin and colleagues (2002) use the National Longitudinal Survey of Youth (NLSY) and the NLSY child data to examine the effects of

homeownership over time on children aged 5 to 8 years old. Utilizing the treatment effects model to address possible selection bias, they found that children of homeowners have fewer behavioral problems than children of renters, but the lack of statistical significance suggests that the effect is less than hypothesized by the authors based on observations in earlier research.

Boyle (2002) found similar results using two nationally representative data sets from Canada, the Ontario Child Health Study and National Longitudinal Survey of Children and Youth. They found that homeownership was associated with lower levels of problem behavior for children ages 4 to 16. However, after controlling for socioeconomic variables including the child's age and gender, family income, and neighborhood disadvantage the effects of homeownership on children's emotional and behavioral problems diminished from a .20 to .43 ratings range to a .07 to .17 range.

Most studies examining the effect of parental homeownership, including the two above on child behavior, have focused on how homeownership prevents or hinders negative child outcomes (Boyle, 2002; Cairney, 2005; Haurin et al., 2002). Yet, positive behaviors are known to be important for child development and outcomes (Blumberg, Carle, O'Connor, Moore, & Lippman, 2008) and the absence of problem behaviors and/or negative outcomes does not necessarily equate to the presence of positive ones (Rutter, 1990). Thus, the present study is the first of its kind, that we are aware of, to investigate this gap in knowledge on the effects of homeownership, neighborhood characteristics and the interaction between the two on the positive behavior of children from LMI households using propensity score matching of

LMI households to addressing the methodological issue of selection and omitted variable bias.

Methods

Data and Sample

This study uses data from the Community Advantage Program (CAP) survey. A secondary-market mortgage program for LMI households, CAP was started in 1994 by the Self-Help Credit Union, a community development financial institution in Durham, North Carolina. Through CAP, Self-Help made available 30-year, fixed-rate mortgages and provided flexible underwriting features such as low or no down payments, a waiver of private mortgage insurance, and acceptance of limited credit or work histories to enable LMI borrowers to obtain prime financing for homeownership.

To qualify for CAP, applicants must meet at least one of three criteria: (a) have an income under 80 percent of the area median income (AMI); (b) have racial/ethnic minority status and income below 120 percent of AMI; or (c) purchase a home in a high minority (greater than 30 percent concentration of minority populations) or low-income census tract area (less than 80 percent AMI) and have an income below 120 percent of AMI. Since its inception, CAP has loaned \$4.6 billion to more than 50,000 homeowners in 47 states and the District of Columbia (Self-Help, n.d.).

The annual CAP panel survey collects information (e.g., demographics, parenting and child outcomes, financial resources, social capital, and so on) from a random sample of CAP

homeowners (i.e., the CAP participants) and a comparison group of renters, to evaluate the effect of homeownership on families who purchased homes through CAP. The comparison group of renters was matched to the homeowners based on neighborhood proximity and income eligibility of the CAP. The baseline sample, drawn from the 2004 CAP survey, was comprised of 3,743 homeowners and 1,530 renters.

In order to evaluate the generalizability of the CAP panel survey sample, the Center for Community Capital at the University of North Carolina compared the CAP survey sample to LMI individuals in the national Current Population Survey (CPS) (Riley, Ru & Quercia, 2009). They found the socio-demographic composition of the CAP sample is very similar to the CPS LMI sample, with a few differences. Compared to the CPS LMI homeowner sample, members of the CAP homeowners sample are more likely to be male (56% versus 50%), and more likely to be employed (92% versus 70%). Higher employment among the CAP sample likely reflects that all CAP homeowners purchased their homes within the immediate years prior to the start of the panel survey and therefore may have been more likely than the CPS homeowners to have a steady source of income. Compared with the CPS LMI renters, the CAP renters were more likely to be female (67% versus 58%). In spite of a few differences between the CAP survey sample and the CPS LMI sample, the CAP survey sample are comparable to CPS respondents regarding major socio demographic characteristics such as household size, income distribution, minority representation and marital status (Riley, Ru &

Quercia, 2009).

This study used the 2009 CAP survey which collected information on positive behaviors of a child through the 10 items of the Positive Behavior Scale (PBS). At baseline (the 2004 CAP survey), one child was randomly selected from each household in the sample with children ages 0–17 years (1,349 owners; 731 renters). Because of sample attrition, children aging out, or children moving out of the household, the 2009 CAP survey only includes 695 owners and 244 renters who have a target child, 18 years of age or younger, still living in the household. For the sample attrition among the CAP survey respondents from the baseline to the 2009 survey, sampling weights of the 2009 CAP sample were developed by the Center for Community Capital at University of North Carolina (Riley & Ru, 2010) and applied to the analyses in this study.

Among the 939 respondents eligible from the 2009 CAP data sample, cases with any missing data on variables of interest were removed. The majority of removed cases were missing information on income ($n=100$) or neighborhood variables ($n=22$). A comparison between cases excluded because of missing data and the final cases included in this study does not produce significant differences in major demographic characteristics. Further, three extreme cases of financial assets (i.e., households with more than \$400K in financial assets) were removed from the sample. Thus, the final analytic sample for this study is comprised of 812 LMI households (614 owners; 198 renters) with a target child between 4 and 18 years old.

Measures

Dependent variables. This study focuses on positive behaviors of a child measured by a short version of the Positive Behavior Scale (PBS). PBS was originally developed by Quint, Bos and Polit (1997) for a study of children of poor mothers who participated in an intervention called New Chance. The original PBS includes 25 items structured by the following three subscales: social competence and sensitivity, compliance and self-control, and autonomy. Out of the 25 original items of the PBS, 10 items were selected by Child Trends, Inc, and included in the nationally representative survey, the Panel Study of Income Dynamics (PSID). The reliability and validity of this short version of PBS has been supported by previous studies (Epps, Park, Huston & Ripke, 2005; Mistry, Vandewater, Huston & McLoyd, 2002).

In the 2009 CAP data, primary caregivers completed a short version of the PBS with 10 items focused on social competence and compliance, which are similar to the PSID PBS question but do not exactly align. The primary caregiver responded on a five-point scale ranging from “not at all like my child” to “totally like my child” to describe the frequency that the primary caregiver observes each behavior.

Based on this 10-item version of PBS and guided by the scale structure, this study has three outcome variables: PBS score (10 items, $\alpha=.84$), PBS competence subscale score (6 items, $\alpha=.77$), and PBS compliance subscale score (4 items, $\alpha=.71$). These

three outcome variables are treated as continuous measures following previous studies using PBS as an outcome (e.g., Epps, et al, 2005; Mistry, et. al, 2002; Neblett, 2007). Table 2 provides specific information of each item used in this 10-item short version of PBS.

Independent variables and covariates. This study includes two independent variables: 1) housing tenure status (1=homeowner, 0=renter), and 2) neighborhood characteristics. For the neighborhood characteristics, retrieved by census tract from the 2000 Census, we include three indicators as follows: percent living in poverty (representing the neighborhood economic conditions), percent of residents who lived in the same house for at least five years (indicating neighborhood stability), and population density (showing neighborhood population concentration).

Additional covariates include child characteristics, respondent/household characteristics, and financial resources. Child characteristics include child gender (1=male, 0=female) and child age in the 2009 CAP survey. Respondent/household characteristics consist of gender (1=male, 0=female), age (in years), race/ethnicity (Black, Hispanic, other, and White as the reference), level of education (less than high school graduate, some college, bachelor's degree or more, and high school graduate as the reference), marital status (divorced/separated/widowed, single, and married/partnered as the reference), employment status (1=employed, 0=unemployed), number of persons in household, and a dichotomous measure of whether the child's father is present at home (1=yes, 0=no).

This study also has a variety of measures of financial resources of the household including the amount of annual household income (logged), the amount of household liquid assets (logged), dichotomous measures of saving account ownership (1=yes, 0=no), credit/charge card ownership (1=yes, 0=no), and receiving a debt collector's call (1=yes, 0=no).

Analysis

This study applies propensity score weighting to remedy potential sample selection and endogeneity problems in the data (Freedman & Berk, 2008; Leslie & Ghomrawi, 2008). For example, tenure would be endogenous if the decision of whether or not to be a homeowner is correlated with observable or unobservable factors that affect the positive behaviors of a child. Without a longitudinal design employing a random sampling at baseline, the directionality between tenure and the positive behaviors of a child cannot be certain. Since it is not possible to randomly assign housing tenure status (homeowner or renter) to our sample, the model of analysis should take into consideration sample selection when estimating causal impacts of homeownership on outcomes.

To improve our understanding of the relationship among these factors, this study employs regression adjustment with a propensity score weighting that involves the following steps. First, the logistic regression to estimate propensity score of homeowners is applied. The propensity score is the conditional probability that a participant will be a homeowner

based on the observable characteristics. The logistic regression includes the same set of independent variables as those used in the regression models to predict PBS. The objective of creating the propensity score for each participant is to create a balance between the treatment group (i.e., homeowners) and the non-treatment group (renters) regarding observable covariates so as to reduce bias of treatment selection and obtain an unbiased estimate of the causal relationship between homeownership and children's positive behaviors.

Second, a propensity weight is calculated as the inverse of its propensity score for a homeowner, and as the inverse of one minus its propensity score for a renter. In propensity score weighting, the treatment and comparison groups are weighted in order to make them more similar on covariates (França, Payet, Lay & Launois, 2006). Propensity score weighted linear regressions are then fitted to investigate the relationship between housing tenure, neighborhood characteristics, and the positive behaviors of a child. Thus, propensity score weighting is applied to the following main hierarchical OLS models.

To determine if homeownership significantly predicts PBS outcomes, hierarchical OLS models are performed for three outcomes: PBS overall, PBS competence, and PBS compliance. The first step of the hierarchical regression explores tenure status associated with PBS by controlling for child/respondent/household characteristics and financial resources. The second step of the hierarchical regression model adds three neighborhood variables as predictors, and examines tenure status association with PBS while controlling for

neighborhood characteristics as well as individual and household characteristics. The second model also shows which neighborhood variables are significantly associated with PBS. The third step of the hierarchical regression model adds interaction terms between tenure and each neighborhood variable to the second model, to test if the effect of tenure on PBS differs by the level of each neighborhood indicator. Only significant interaction terms are included in the final model (i.e., the third model). Significant interaction terms between tenure and neighborhood variables are graphically presented for easier interpretations.

Results

Sample characteristics by homeowners and renters. Table 1 presents the characteristics of CAP homeowners versus CAP renters with children aged between 4 and 18 years old in the 2009 CAP survey. Child characteristics between the two groups are similar: 52% of homeowners' children are male, and the mean age is 10 years old; 50% of renter's children are male, the average age is again 10 years old.

However, respondent characteristics between the two groups are quite different for all variables except age and number of persons in household. Although more than 50% of the responding homeowners are male, only 22% of the responding renters are male. About 40% of homeowners are Black versus 17% for renters. Homeowners are more likely to have higher levels of education (28% of homeowners have a bachelor's degree or more, versus 14% of renters), to be married or partnered (78% of homeowners versus 38% of renters), to be

employed (89% of homeowners versus 71% of renters), and to have the child's father present at home (67% of homeowners versus 33% of renters). Homeowners also have greater financial resources than renters. The annual household income and the liquid assets of homeowners are about twice those of renters (\$54,413 and \$16,594 for homeowners versus \$16,594 and \$7,304 for renters). Homeowners are more likely than renters to have a savings account (79% versus 58%) and credit/charge card (78% versus 32%), but less likely to receive a debt collector's call (27% versus 52%).

Compared to renters, homeowners are less likely to reside in poor neighborhoods (i.e., poverty rate 12% versus 15%), and tend to live in more stable neighborhoods. For homeowners, the percent of residents in their neighborhood who lived in the same house for at least five years is 54% compared to 50% to renters. Not surprisingly, homeowners live in less dense census tracts, the average population density for homeowners being 2,339 compared to 3,234 for renters.

Table 1 about here

Differences in child's positive behaviors between homeowners and renters. Table 2 compares PBS scores for the children of homeowners to those for the children of renters. The average score of PBS among homeowners children is 4.09 compared to 4.02 for renters

children. On the two subscales of PBS, the average competence scores are 4.22 for homeowners children and 4.21 for renters children; the average compliance scores are 3.90 for homeowners children and 3.73 for renters children. However, the differences in PBS overall and two subscales between two groups are not statistically significant in some tests.

The average scores of each indicator also are similar between homeowners and renters with a few exceptions. Children of homeowners have higher scores for four PBS indicators; getting over being upset ($<.05$), waiting turns ($<.05$), not being impulsive ($<.001$), and following directions ($<.05$); but children of renters have higher scores of curiosity ($<.01$).

PBS scores in our sample are similar to previous studies. Using the PSID, Neblett (2007) found the average PBS score for children from families headed by single mothers was 4.01. Among children from the New Hope work-based poverty intervention program for families with low-incomes in Milwaukee, Epps and colleagues (2005) found the average PBS competence score from parent reporting varies between 3.93 and 4.09 by child's age and gender, and between 3.54 and 3.88 for PBS compliance. They also reported the average score of PBS was 4.23 for the children aged less than 13 years old in the nationally representative PSID sample.

Table 2 about here

Homeownership, neighborhood conditions, and PBS. Results of hierarchical regressions for overall PBS score are presented in Table 3. In model 1, we control for child, individual, and household characteristics, including financial resources and apply weights to address differences between owners and renters. Model 2 adds three neighborhood indicators to model 1 as additional covariates. In both model 1 and model 2, the PBS overall scores among homeowners are not significantly different from those among renters. Model 2 also shows that neighborhood conditions are not significant predictors of PBS overall scores.

In model 3, we tested interaction terms between homeownership and three neighborhood variables, and the interaction between homeownership and neighborhood population density is found to be significant ($p < .05$). Thus, the relationship between homeownership and PBS overall scores significantly differs by the level of neighborhood population density. From the positive sign on the coefficient of the interaction term, we see that the effect of tenure on PBS scores is larger for respondents who live in denser neighborhoods. PBS scores of boys are 0.16 points less than those of girls ($p < .05$). Children of Hispanic and other race/ethnicity caregivers have 0.23 points ($p < .01$) and 0.30 points ($p < .05$) higher than children from White caregivers respectively. Receiving a debt collector's call has a significantly negative effect on PBS scores ($p < .05$). Model 3 explains 22% of the variance in PBS overall scores ($R^2 = .223$, adjusted $R^2 = .199$) and significantly improves the fit of the model to data compared to Model 1 and Model 2.

Table 3 about here

Table 4 shows that the effect of homeownership on the PBS competence subscale is non-significant when the model does not include neighborhood characteristics (model 1) and when these are included (model 2). As in the analysis of PBS overall scores, none of neighborhood variables significantly relate to PBS competence scores. Model 3 shows that the effect of homeownership on the PBS competence subscale is significantly moderated by the level of neighborhood density, that is significant interaction between homeownership and neighborhood density ($p < .05$). Respondents in denser neighborhoods realize a significantly stronger effect of tenure on the PBS competence subscale than do those in less dense areas. Model 3 also shows that child gender and caregiver's race/ethnicity are important predictors of the PBS competence scores after controlling for the differences in child and respondents' characteristics and significant interaction terms between homeownership and neighborhood density. Boys have 0.16 lower scores of the PBS competence than girls do ($p < .05$). Children of Hispanic caregivers have 0.20 points ($p < .05$) higher scores than children from White caregivers. Model 3 explains 21% of the variance in the PBS competence scores ($R^2 = .214$, adjusted $R^2 = .189$) and significantly improves the fit relative to Model 1 and Model 2.

Table 4 about here

The results from the PBS compliance scale (Table 5) are very similar to those from PBS overall and the PBS competence scores. Specifically, model 2 shows that there is no significant difference of the PBS compliance scores between homeowners and renters when controlling for individual characteristics and neighborhood conditions. None of neighborhood variables significantly predict the PBS compliance scores in model 2. However, the interaction between homeownership and neighborhood density is significant in model 3 ($p < .01$), similar to PBS overall and PBS competence models.

In the Model 3, significant predictors of the PBS compliance scores are caregivers' race/ethnicity and debt collector's call. Children of Hispanic and other race/ethnicity caregivers have 0.26 points ($p < .05$) and 0.38 points ($p < .05$) higher scores than children from White caregivers, respectively. Caregivers receiving a debt collector's call report scores that are 0.23 points less than their counterparts ($p < .01$). Model 3 explains 20% of the variance in PBS compliance scores ($R^2 = .204$, adjusted $R^2 = .179$) and is a significantly better fit than Model 1 or Model 2.

Table 5 about here

Interaction between homeownership and neighborhood density. We found that the PBS scores for the homeowners were not statistically different from the PBS scores for the comparison group when controlling for the differences in individual and neighborhood characteristics. We further investigated whether the effect of homeownership on PBS scores varied by neighborhood characteristics. That is, do neighborhood variables (moderators) alter the strength of the relationship between homeownership and PBS. For all three outcomes (PBS overall, PBS competence, and PBS compliance), we found a significant interaction between homeownership and neighborhood population density. That is, the strength of linear causal relationship between homeownership and PBS is altered by neighborhood population density.

Homeownership has a stronger positive effect on PBS score as neighborhoods get denser. Figure 1 graphically presents interaction between homeownership and neighborhood density on PBS. For each outcome, we plot the marginal effect of homeownership on PBS, as estimated by Model 3 for each outcome, at various levels of population density. The values on the Y-axis are in points of PBS score and are estimated holding all covariates at their mean or population proportion. The estimated marginal effect is interpreted as the change in PBS score attributable to homeownership, net of other characteristics, at each level of density.

As shown in Figure 1, the effect of homeownership on PBS scores increases as density increases. In very disperse places, with population density below 1,000 persons per

square mile, we find that homeownership has a significant, negative effect on scores on the overall PBS scale and on the competence subscale. Homeownership is not significantly related to scores on the compliance subscale at this level of density. At a density of about 3,000 persons per square mile, we observe a positive and significant effect of homeownership on PBS compliance sub-scale scores. At approximately 4,000 persons per square mile, homeownership significantly increases scores on the PBS overall scale. At approximately 7,500 persons per square mile, homeowners have a significantly higher PBS competence subscale score than do renters. When the neighborhood population density is about 10,000 persons per square mile, the PBS scores for owners are more than a 0.6 points higher than those of renters on the overall scale and on both subscales.

Figure 1 about here

To put the densities discussed above into context, Table 6 shows the approximate population density of selected cities from the 2010 Decennial Census. The levels reported in the Table are the population densities for the entire city whereas the analysis density are at the Census tract level. Density, obviously, varies substantial across the areas listed in Table 6. They are included here to give the reader a sense of instances where homeownership may or may not affect PBS scores. It should be noted that even areas thought to be less dense, like suburban Orange County, CA, have densities approaching the threshold above which homeownership significantly increases PBS scores.

Table 6 about here

Limitations. This paper faces several challenges in generalizability and interpretation that should be addressed. First, while CAP borrowers and the renters are similar to the LMI population generally (Riley & Ru, 2010), the particular experiences of this population described in this paper may not be identical to other LMI populations. Though the sample covers a broad array of geographic areas, it is not a random sample of the LMI population and thus may differ systematically as an artifact of sampling. At the same time, though, our use of neighborhood-level analysis helps to overcome the risk of findings driven by unobserved ecological characteristics. Also, CAP borrowers received loans on very favorable terms given their location in the mortgage market. Consequently, their experiences as homeowners and holders of loans may not be representative of LMI borrowers in general. The homeowners in this paper are best understood as representing owners who borrow with fair loans and without predatory lending practices.

In the measure of the outcome variable, this paper relies on reporting from the respondent, the head of the child's household. It is possible that parents may generally misestimate the level of positive behavior in their child and that a recent event (e.g. tantrums, parental depression) may color the evaluation leading the parent to under report a generally positive set of behaviors. In any subjective measure, these issues will be present. This issue, in part, drove the choice to divide the full PBS into its sub-scales for analysis. Most of the items in the compliance sub-scale are directly and concretely observable and the authors suspect that scale's reporting may be less subject to misestimation by parents. Also, because

the CAP survey uses a short version of the PBS, it may be that more indicators would yield a different or less varied measure of positive behavior. Ideally, we would evaluate children's positive behavior through in-depth interviews with multiple observers. Still, we are confident that the measure of PBS and its sub-scales give strong, reliable information on the behavior of the children of study respondents.

Finally, we acknowledge that the nature of the cross-sectional analyses may not adequately show effect of homeownership over time. The duration of ownership, not simply a point-in-time tenure status, is likely to have important implications that are not measured in this present study. Never-the-less this research makes significant contributions to this field by examining positive behavior among children from LMI households and attempts to empirically separate the effects attributable to neighborhood from those attributable to the household the child lives in, particularly homeownership by the child's parents.

Discussion

As found in previous studies (Haurin et al. 2002 and Boyle 2002), the effects of tenure and neighborhood characteristics, independently, on child behaviors were not found to be statistically significant when the interaction term is not included in the model. The present study does find however, neighborhood characteristics have a moderating effect on the relationship between tenure and child positive behaviors. Specifically, this analysis suggests that tenure effect on PBS is significantly altered by the level of neighborhood population density. In other words, for low-to-moderate income households, homeownership has a stronger positive effect on children's positive behavior as neighborhood population density increases. This finding supports Harkness and Newman's (2003b) buffering hypothesis that

suggests homeownership could mitigate the effects of neighborhood characteristics.

Two possible explanations for the tenure effect on child positive behavior among LMI households in urban areas, but not among LMI households in rural and suburban areas that have lower population density, are the possible differences in housing quality and residential stability between urban and non-urban areas. Previous research has shown that the home environment and quality of housing (i.e. home maintenance or play area available) have important effects on children's behavior and outcomes (Haurin, et al., 2002). If, for example, the rental options for LMI families in urban areas have fewer opportunities for outdoor play or less room available for private space, we would expect the children in these dense communities to exhibit lower PBS scores. Moreover, the type of dwelling unit (single family mobile homes versus high rise multi-family apartment buildings), may mediate the impact of tenure on behavior (Barker & Miller, 2009).

Previous research also suggests that residential stability also plays an important role on the impact of tenure on children (Aaronson, 2000). Again, if there are significant differences between the residential stability of LMI households in urban versus non-urban areas this could help explain the observed effect of tenure on children's PBS scores. For example, LMI renters in urban areas may be able to move more frequently to respond to employment opportunities than renters in rural communities. However, the potential higher

residential stability for LMI households in non-urban communities could help preserve the positive behaviors for those children living in rental housing.

This study fills a critical gap in the current literature, exploring the interconnected relationship of homeownership and neighborhood characteristics that affect positive behaviors for children in LMI households while controlling for the potential selectivity bias. The findings have two potentially important implications for policy. First, while this study does not find significant impacts of homeownership on LMI children's positive behavior, previous research suggests that it can reduce negative behavior or outcomes. Thus homeownership for LMI households may serve to protect against delinquency but does not necessarily improve positive child behaviors. Second, LMI homeownership may be more beneficial for households with children in dense urban areas, and thus homeownership promotions programs maybe more successful at improving child outcomes if they target these areas.

On the other hand, any implications suggested by these findings must be understood in the context of the CAP program; specifically, CAP homeowners are not typical of all LMI homeowners. CAP homeowners received favorable mortgage terms and did not face the risk of predatory lending like many LMI households, thus may represent the upper bound for success in homeownership for LMI households. Given the potential for both positive and negative outcomes of LMI homeownership all the potential externalities of homeownership

should be carefully weighed when evaluating the success of housing policies and programs.

Future research should build and expand on this work with different samples of LMI

households. In addition, future studies should explore additional child outcomes to determine

if these findings hold. Finally, exploring the interaction of other neighborhood characteristics

and homeownership on children's outcomes will be important for targeting homeownership

policies appropriately.

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Table 1. Characteristics of Homeowners and Renters with Children Aged between 4 and 18 Years Old: CAP sample

Variables	Owners (N=614)		Renters (N=198)	
	Mean / %	S.D.	Mean / %	S.D.
<i>Child Characteristics</i>				
Male (%)	52.44	--	50.51	---
Age (in years)	9.91	4.22	10.44	4.51
<i>Respondent/household Characteristics</i>				
Male (%)	53.91	---	21.72	---
Age (in years)	38.21	7.90	38.09	8.98
Race/ethnicity (%)				
White	43.43	---	63.03	---
Black	39.39	---	16.61	---
Hispanic	14.65	---	16.94	---
Others	2.53	---	3.42	---
Education (%)				
Less than high school grad.	9.12	---	13.13	---
High school grad.	24.27	---	22.22	---
Some college	39.09	---	51.01	---
BA and more	27.52	---	13.64	---
Marital status (%)				
Married/partnered	78.18	---	37.88	---
Divorced/separated/widowed	13.68	---	31.31	---
Single	8.14	---	30.81	---
Employed (%)	89.09	---	70.71	---
Number of persons in household	4.04	1.31	3.55	1.46
Dad present at home	66.61	---	32.83	---
<i>Financial Resources</i>				
Annual household income (\$)	54,413	29,031	27,825	21,664
Liquid assets (\$)	16,594	1,504	7,304	1,723
Owned a saving account (%)	78.66	---	57.58	---
Owned a credit/charge card (%)	77.85	---	31.82	---
Received a collector's call (%)	26.71	---	51.52	---
<i>Neighborhood Characteristics</i>				
Percent Poverty	12.14	8.66	15.01	10.16
Percent Same house 5 years and more	54.04	10.28	50.26	11.12
Population density	2,339	3,579	3,234	4,621

Table 2. Positive Behavior Scale by Homeowners and Renters

Indicators	Owners (N=614)		Renters (N=198)	
	M	S.D.	M	S.D.
<i>Positive Behavior Scale</i>	4.09	0.61	4.02	0.66
<i>Competence Subscale</i>	4.22	0.60	4.21	0.65
The target child:				
Is cheerful, happy	4.48	0.87	4.46	0.98
Does neat, careful work	3.72	1.14	3.61	1.26
Is curious and exploring	4.42	0.93	4.67**	0.81
Gets along well with other kids	4.46	0.82	4.41	0.92
Can get over being upset quickly	3.79	1.06	3.57*	1.24
Is admired and well liked by other kids	4.48	0.75	4.54	0.76
<i>Compliance Subscale</i>	3.90	0.77	3.73	0.83
The target child:				
Does things for (him/her)self, is self-reliant	4.36	0.93	4.43	0.87
Waits his or her turn during activities	4.01	1.08	3.79*	1.25
Thinks before he or she acts, is not impulsive	3.40	1.20	3.07***	1.25
Usually does what I tell (hem/her) to do	3.81	1.05	3.64*	1.19

Note: +<.01; *<.05; **<.01; ***<.001

Table 3. Homeownership and Positive Behavior Scale: OLS Outcomes

Variables	Model 1		Model 2		Model 3	
	<i>Coef.</i>	<i>s.e.</i>	<i>Coef.</i>	<i>s.e.</i>	<i>Coef.</i>	<i>s.e.</i>
Intercept	4.462***	0.513	4.406***	0.558	4.687***	0.587
Tenure	0.065	0.082	0.069	0.080	-0.204*	0.103
Child Male	-0.220**	0.085	-0.222**	0.085	-0.159*	0.071
Child Age	-0.017	0.013	-0.018	0.012	-0.010	0.011
Male	-0.159	0.114	-0.152	0.105	-0.119	0.091
Age	0.002	0.005	0.003	0.005	-0.001	0.005
Race/ethnicity						
(White)						
Black	0.055	0.111	0.076	0.107	0.100	0.097
Hispanic	0.121	0.110	0.201*	0.092	0.226**	0.084
Others	0.225	0.145	0.251	0.145	0.291*	0.145
Education						
(>= high school grad.)						
High school grad.	0.118	0.182	0.090	0.154	0.032	0.121
Some college	-0.130	0.174	-0.139	0.159	-0.162	0.132
BA and more	-0.021	0.203	-0.017	0.194	-0.053	0.152
Marital status						
(Married/partnered)						
Divorced/widowed	-0.120	0.123	-0.114	0.124	-0.125	0.121
Single	0.117	0.144	0.138	0.149	0.122	0.144
Employed	0.288	0.207	0.247	0.155	0.103	0.088
N of persons in HH	0.015	0.031	0.012	0.031	0.011	0.029
Dad present at home	0.083	0.122	0.072	0.121	0.097	0.121
Household income (log)	-0.048	0.056	-0.028	0.044	-0.015	0.041
Liquid assets (log)	0.025	0.028	0.025	0.029	0.017	0.027
Saving account	0.102	0.098	0.076	0.086	0.054	0.079
Credit/charge card	-0.085	0.092	-0.101	0.096	-0.112	0.083
Collector's call	-0.126	0.069	-0.152*	0.067	-0.171*	0.069
Neighborhood poverty	----		0.169	0.437	0.125	0.395
Neighborhood stability	----		-0.100	0.358	-0.180	0.326
Neighborhood density	----		-0.027	0.022	-0.084*	0.036
Tenure X Neighborhood density	----		----		0.087*	0.035
<i>N</i>	812		812		812	
<i>F</i>	2.585***		2.453***		2.952***	
<i>R</i> ² (<i>adj.R</i> ²)	0.133 (0.110)		0.157 (0.131)		0.223 (0.199)	

Note: *<.05; **<.01; ***<.001

Table 4. Homeownership and Positive Behavior Competence Subscale: OLS Outcomes

Variables	Model 1		Model 2		Model 3	
	<i>Coef.</i>	<i>s.e.</i>	<i>Coef.</i>	<i>s.e.</i>	<i>Coef.</i>	<i>s.e.</i>
Intercept	4.677***	0.526	4.761***	0.550	5.035***	0.585
Tenure	0.008	0.082	0.013	0.079	-0.254*	0.108
Child Male	-0.213*	0.085	-0.221**	0.085	-0.159*	0.072
Child Age	-0.028*	0.012	-0.027*	0.012	-0.019	0.010
Male	-0.198	0.115	-0.187	0.105	-0.155	0.092
Age	0.002	0.005	0.002	0.005	-0.002	0.005
Race/ethnicity (White)						
Black	0.064	0.112	0.066	0.106	0.089	0.100
Hispanic	0.125	0.108	0.180*	0.085	0.204*	0.085
Others	0.164	0.145	0.191	0.142	0.230	0.142
Education (\geq high school grad.)						
High school grad.	0.143	0.192	0.123	0.162	0.066	0.126
Some college	-0.070	0.182	-0.071	0.167	-0.093	0.139
BA and more	-0.017	0.215	-0.011	0.207	-0.046	0.166
Marital status (Married/partnered)						
Divorced/widowed	-0.151	0.121	-0.150	0.122	-0.160	0.118
Single	0.029	0.141	0.059	0.144	0.044	0.140
Employed	0.241	0.217	0.201	0.163	0.060	0.090
N of persons in HH	0.003	0.030	0.007	0.030	0.006	0.028
Dad present at home	0.057	0.120	0.039	0.117	0.064	0.117
Household income (log)	-0.035	0.058	-0.014	0.043	-0.0002	0.041
Liquid assets (log)	0.023	0.027	0.025	0.028	0.017	0.026
Saving account	0.097	0.101	0.076	0.087	0.054	0.079
Credit/charge card	-0.034	0.093	-0.055	0.098	-0.066	0.087
Collector's call	-0.084	0.070	-0.115	0.067	-0.134	0.069
Neighborhood poverty	----		0.236	0.438	0.194	0.405
Neighborhood stability	----		-0.483	0.347	-0.562	0.332
Neighborhood density	----		-0.025	0.023	-0.082*	0.040
Tenure X Neighborhood density	----		----		0.085*	0.038
<i>N</i>	812		812		812	
<i>F</i>	2.819***		2.701***		2.895***	
<i>R</i> ² (<i>adj.R</i> ²)	0.124 (0.101)		0.151 (0.125)		0.214 (0.189)	

Note: * $<.05$; ** $<.01$; *** $<.001$

Table 5. Homeownership and Positive Behavior Compliance Subscale: OLS Outcomes

Variables	Model 1		Model 2		Model 3	
	<i>Coef.</i>	<i>s.e.</i>	<i>Coef.</i>	<i>s.e.</i>	<i>Coef.</i>	<i>s.e.</i>
Intercept	4.140***	0.579	3.874***	0.660	4.165***	0.678
Tenure	0.150	0.101	0.154	0.097	-0.129	0.113
Child Male	-0.231*	0.101	-0.225*	0.098	-0.159	0.085
Child Age	-0.001	0.015	-0.004	0.014	0.004	0.013
Male	-0.101	0.128	-0.099	0.119	-0.065	0.107
Age	0.002	0.006	0.003	0.006	-0.001	0.006
Race/ethnicity						
(White)						
Black	0.042	0.124	0.091	0.123	0.116	0.116
Hispanic	0.115	0.140	0.233	0.132	0.260*	0.118
Others	0.316	0.175	0.340	0.177	0.382*	0.179
Education						
(>= high school grad.)						
High school grad.	0.080	0.196	0.041	0.172	-0.020	0.153
Some college	-0.221	0.190	-0.241	0.178	-0.264	0.158
BA and more	-0.028	0.218	-0.026	0.206	-0.064	0.173
Marital status						
(Married/partnered)						
Divorced/widowed	-0.073	0.145	-0.060	0.146	-0.072	0.144
Single	0.251	0.169	0.255	0.174	0.239	0.168
Employed	0.358	0.201	0.317*	0.158	0.166	0.107
N of persons in HH	0.032	0.035	0.019	0.035	0.018	0.033
Dad present at home	0.120	0.141	0.121	0.141	0.147	0.141
Household income (log)	-0.067	0.058	-0.050	0.049	-0.036	0.047
Liquid assets (log)	0.027	0.037	0.025	0.035	0.016	0.033
Saving account	0.110	0.109	0.076	0.101	0.053	0.096
Credit/charge card	-0.163	0.111	-0.170	0.112	-0.181	0.096
Collector's call	-0.189*	0.084	-0.206*	0.081	-0.226**	0.085
Neighborhood poverty	----	---	0.068	0.532	0.023	0.488
Neighborhood stability	----	---	0.475	0.457	0.392	0.411
Neighborhood density	----	---	-0.029	0.022	-0.088**	0.032
Tenure X Neighborhood density			----	---	0.091**	0.032
<i>N</i>	812		812		812	
<i>F</i>	2.407***		2.368***		2.704***	
<i>R</i> ² (<i>adj.R</i> ²)	0.131 (0.108)		0.156 (0.130)		0.204 (0.179)	

Note: *<.05; **<.01; ***<.001

Table 6. Population Density in Selected Areas

Population Density of Selected Places	
Place	Density
Austin, TX	1,207
Tulsa, OK	2,135
Orange County, CA	3,175
San Diego, CA	4,175
Cleveland, OH	5,113
Washington, DC	9,800
San Francisco, CA	17,243
New York City	27,532

Author's calculations from 2010

Census Data from Census Fact-Finder

Figure 1. Marginal effect of homeownership on PBS at different population densities

