# Changes of Perceived Neighborhood Environment: A Longitudinal Study of Collective Efficacy among Vulnerable Families

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Dr. Fei Pei and Dr. Kathryn Maguire-Jack conceptualized the research idea and Dr. Fei Pei wrote most part of the paper. Dr. Zhaojun Li took in charge of the data analysis and writing of methods and results sections. Dr. Xiaomei Li mainly focused on the making of figures and tables. Janie Kleinberg participated in writing of the literature and copy-editing. Correspondence concerning this article should be addressed to Fei Pei, School of Social Work, Syracuse University, White Hall, 440, Syracuse, NY 13244. Phone: (732) 429-6697. Email: fpei01@syr.edu

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Abstract

Neighborhood level factors are associated with individual's behaviors but limited empirical research investigate the long-term changes of neighborhood factors, especially neighborhood collective efficacy. Moreover, the longitudinal effects of neighborhood structural factors on neighborhood process factors worth further research. Thus, the current study examined the 1) the long-term trajectory of collective efficacy; 2) whether the time-varying neighborhood structural factors are associated with collective efficacy over time. Using the four waves of FFCWS data (N=4,898), the current research found that neighborhood social cohesion and informal social control increased over time, and the changes of neighborhood structural factors are associated

with the changes of collective efficacy over time. Identifying the dynamic changes of neighborhood factors would benefits the further investigations of the influences of neighborhood factors on individuals and the implication of the findings were discussed.

*Keywords:* Collective Efficacy; Longitudinal effects; Neighborhood Structural Factors; Latent growth curve model

***What is known about this topic?***

- Neighborhood environment, including both neighborhood structural factors and collective efficacy, as one of the multilevel living environments is related to child development and maltreatment.
- Social science research has moved beyond neighborhood structural factors and started exploring the influences of perceived neighborhood process factors, which mainly refers to neighborhood collective efficacy, including social cohesion and social control.
- Many individual-level and family-level factors are associated with neighborhood collective efficacy.

***What this paper adds?***

- Authors capture the co-development of neighborhood social cohesion and social control, and cross-domain relationships were found in this study, which means both the initial levels of and the increase in social cohesion and informal social control were correlated with each other.
- The changes of neighborhood structural factors (economic disadvantages and ethnic heterogeneity) are associated with the increase of neighborhood social cohesion and social control over time. Understanding these processes can improve interventions aimed at improving neighborhood relationships and residents' behaviors.

- Non-significant relationships are identified among ethnic heterogeneity and economic disadvantage and social cohesion in early waves. This suggests that the economic status of the neighborhood and a high proportion of Latinos and/or foreign-born residents do not have immediate effects on social cohesion.



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## Introduction

### Neighborhood Environment & Collective Efficacy

Neighborhood is a multidisciplinary concept referring to geographic communities or social process-based communities with shared characteristics (Sampson, Raudenbush, & Earls, 1997; Suttles, 1972). According to Bronfenbrenner's (1979) social ecological theory, the multilevel living environment significantly affect individuals' behaviors and development. Neighborhood environment as one of the multilevel living environments is commonly mentioned in child development and behavior studies (Sampson et al.'s 2002). In the past century, many social scientists focused on investigating how the structural characteristics of neighborhoods,

including house ownership rate, unemployment rate, poverty rate, and residential instability, shape individual's behaviors and people's living environment (Sampson et al., 2002). The Chicago School developed social disorganization theory to systematically investigate the influences of neighborhood structural characteristics (Shaw & McKay, 1942), which is one of the most extensively applied neighborhood theories. Neighborhood structural factors are composed of three main indices: economic disadvantage, residential instability, and ethnic heterogeneity (Sampson, Morenoff, & Earls, 1999). The economic disadvantage index relates to the economic status of a neighborhood, while the residential instability reflects residential moves in a neighborhood, and ethnic heterogeneity captures the percentage of people from various ethnic backgrounds living within a neighborhood (Castellini, Colombo, Maffeis, & Montali, 2011).

In the past decade, social science research has moved beyond neighborhood structural factors and started exploring the influences of perceived neighborhood process factors, which mainly refers to neighborhood collective efficacy (Sampson et al., 2002). Collective efficacy theory improved the social disorganization theory by adding the effects of social cohesion and social control. Collective efficacy was originally defined in Sampson et al.'s (1997) study as the combination of informal social control and social cohesion. It reflects the social interactional relationships among residents and whether neighbors care about the common good (Sampson et al., 1997; Sampson et al., 2002). Informal social control captures residents' ability to get together and intervene the negative behaviors in their neighborhoods. Residents are asked to measure how likely neighbors would intervene in various situations such as "if a fight broke out in front of the house or building" or "if the fire station closest to the neighborhood was threatened" (Sampson et al., 1997). Social cohesion relates to residents' feeling of belonging and interpersonal

relationships (Sampson et al., 1997; Forrest & Kearns, 2001). Residents are asked to answer to respond how much they agree with statements like "whether this is a close-knit neighborhood" and "whether people in this neighborhood generally don't get along with each other" (Sampson et al., 1997).

Limited empirical evidence is provided about the relationship between social cohesion and informal social control and the conclusions are inconsistent. Sampson theoretically pointed out that the overlap between social cohesion and informal social control and suggested these two scales should be combined (Sampson, 2017; Sampson, 1997). However, Gau (2014) in his empirical study claimed there are significant differences between social cohesion and informal social control and suggested they should be treated as two separate scales, which is consistent with Warner's perspective (2003, 2007). Therefore, more empirical studies are needed to investigate the relationship between social cohesion and informal social control.

A robust body of previous studies investigate the connection between collective efficacy and children's behaviors, individual perceptions, and other neighborhood structural factors like crime, disorder, and socioeconomic status (Ma & Grogan-Kaylor, 2017; Mrug and Windle, 2009). However, little is known about the ways in which neighborhood factors change over time. The changes of collective efficacy over time reflects the changes of resident's perceptions of their living environment, which is closely related to the residents' social mobility. Capturing such changes will help researchers and policymakers to understand neighborhood changes and development, as well as social stratification. Also, capturing the longitudinal neighborhood changes would promote the investigations of neighborhood influences on individual behaviors, including child maltreatment, child developmental problems, substance use, and mental health (Abdullah et al., 2020; Pei et al., 2020; Emery et al., 2015).

Researching changes in the neighborhood environment is challenging because longitudinal data on neighborhood factors are rare. Additionally, people move in and out of neighborhoods frequently, resulting in low retention for follow-up surveys. Research on the dynamic changes within neighborhoods is rare as most theories focus on the influence of neighborhood factors on individual behaviors (e.g., social disorganization theory, collective efficacy theory, broken window theory, etc.) rather than understanding the neighborhood itself.

**The Factors related to Collective Efficacy**

Residents' perceptions of their living environment might change over time along with the changes of their neighborhood structural factors, including economics, ethnic demographics, and safety (e.g., Mrug & Windle, 2009; Brody et al., 2001), as well as their individual level factors (e.g., Woolley & Grogan-Kaylor, 2006; Pei et al., 2022), including their movement. People moving in and out of a neighborhood naturally lead to changes of their perception of collective efficacy. The current study is focused on changes in perceptions of collective efficacy after controlling their movement. According to existing literature, individual factors like socioeconomic status, social connection, family relationships and disfunction, and mental health status have been associated with an individual's perception of neighborhood factors including collective efficacy, social cohesion, and collective action (Karriker-Jaffe et al., 2013), but the direction of individual level factors and collective efficacy is inconsistent.

Previous studies indicate that socioeconomic status influences self-perceived efficacy, and therefore, collective efficacy and collective action (Fernández-Ballesteros et al., 2002). Social position also significantly affects levels of perceived personal efficacy and collective efficacy. Individuals who have access to resources and opportunities that exist in conjunction with advantaged status are able to build a stronger sense of efficacy than those who do not have

access (Fernández-Ballesteros et al., 2002). The idea of socioeconomic status and social position being linked to collective efficacy is supported by the fact that neighborhood tracts with the highest measured levels of efficacy are located in areas of concentrated affluence and that individuals who rely on income assistance have lower levels of perceived collective efficacy and social cohesion (Cohen, Inagami, & Finch, 2008; Higgins & Hunt, 2016).

Family relationship is another factor that buffers the interactional relationship between individual characteristics and neighborhood factors (e.g., Karriker-Jaffe et al., 2013). Family could provide social support for individuals, and Matthieu and Carbone (2020) believe that based on their findings, it is "feasible that social support, which is derived from strong social ties, may impact collective efficacy" (p. 1987). The type of social support received also impacts neighborhood factors. Belonging social support, a type of support that emphasizes acceptance and connectedness, is positively, and directly associated with collective action (Matthieu & Carbone, 2020). Almost 45% of the relationship between self-efficacy and collective action is moderated by collective efficacy (Matthieu & Carbone, 2020). Additionally, maternal depression is a significant factor that is associated with children's outdoor activity and neighborhood social cohesion (Frech & Kimbro, 2011; McCloskey & Pei, 2019).

In addition to individual level factors, neighborhood structural factors, including economic disadvantage, residential instability, and ethnic heterogeneity, are commonly associated with neighborhood collective efficacy (Mrug & Windle, 2009; Brody et al., 2001). Many empirical studies have found that neighborhood structural factors affect collective efficacy (Coulton et al., 2007; Brody et al., 2001; Mrug & Windle, 2009). For example, Mrug and Windle (2009) reported that concentrated poverty significantly affects neighborhood social cohesion using a community sample of 704 preadolescents, which is supported by Coulton and colleague's

literature review (2007). Meanwhile, presence of the extended family in the neighborhood and preservation of close relationships with neighbors promotes social cohesion (Higgins & Hunt, 2016). Residents who rent are less likely to view their neighborhood as cohesive than community members who own their homes (Higgins & Hunt, 2016). Previous research has shown that "strong social ties among individuals are associated with collective efficacy" (Matthieu & Carbone, 2020, p 1987; e.g., Brody et al., 2001).

**The Current Study**

While there is a significant body of literature surrounding neighborhood factors, very little of existing research offers insight into the long-term influences of time-varying neighborhood structural factors on the changes of collective efficacy. There is a lack of systematic data collection and analysis among the existing studies. A majority of the current data is pulled from cross-sectional studies, rather than longitudinal studies. There is immense value in building causal relationships between neighborhood structural factors and neighborhood collective efficacy when it comes to identifying and implementing community level interventions.

To fill these gaps, the current study aimed to examine 1) the long-term trajectory of collective efficacy, especially caregivers' perspective of collective efficacy from children's birth to age 15; 2) whether the time-varying neighborhood structural factors are associated with collective efficacy over time. We hypothesized that: a) collective efficacy increases over time, and social cohesion and social control are correlated across domains; and b) time-varying neighborhood structural factors are associated with the collective efficacy.

## Methods

### Participants and Procedures

This study used restricted data from the *Fragile Families and Child Wellbeing Study* (FFCWS; for further information, see https://fragilefamilies.princeton.edu/) – a longitudinal study with a stratified, multi-stage sample of 4,898 children largely from Black or Hispanic, low-income families. The nationally representative sample includes children born in twenty large U.S. cities (with a population over 200,000). The FFCWS included interview data collected at six waves from 1998 to 2017: baseline (i.e., shortly after children were born), as well as when children were approximately 1, 3, 5, 9, and 15 years old. For the current study, we analyzed data from Wave 3-6 (i.e., focal child age 3, 5, 9, and 15 years), in which the neighborhood factors were measured. Children's and mothers' demographic information from Wave 1 were also included.

### Measures

#### *Neighborhood Collective Efficacy*

Neighborhood collective efficacy included two aspects – informal social control and social cohesion. The informal social control subscale contained five items asking how likely they think that the neighbors would intervene if "children were skipping school and hanging out on the street," "children were spray-painting buildings with graffiti," "children were showing disrespect to an adult," "a fight broke out in front of the house or building," and "the fire station closest to the neighborhood was threatened." The social cohesion subscale included five items asking how much they agree that "people around here are willing to help their neighbors," "this is a close-knit neighborhood," "people in this neighborhood generally don't get along with each other," "people in this neighborhood do not share the same values (reverse-scored)," and "people

in this neighborhood can be trusted (reverse-scored)." Both subscales were used in *the Project on Human Development in Chicago Neighborhoods* (PHDCN; Sampson, Raudenbush, & Earls, 1997), although the third item in the social cohesion subscale was not included in PHDCN.

Of note, there were two modifications in the measurement across waves. The first modification was made to the scale: the measurement adopted a 5-point Likert scale at Wave 3 but changed to a 4-point Likert scale in following waves. In line with a previous study by Ma and Grogan-Kaylor (2017), we rescaled the 5-point responses in Wave 3 with a proportional linear transformation as follows: 1 to 1, 2 to 1.75, 3 to 2.5, 4 to 3.25, and 5 to 4, such that responses in all waves had the same range and the distance between response options in Wave 3 were proportional to that of the other waves.

The second modification in the measurement was the social cohesion subscale that included the aforementioned five items at Wave 3. The fifth item "people in this neighborhood can be trusted" was removed in later waves. To evaluate the impact of removing the fifth item, we compared the average scores of the social cohesion subscale in Wave 3 when the fifth item was or was not included. Given that the model estimation was based on the mean vector and covariance matrix of variables, we specifically compared the scores in respect of mean, standard deviation, and correlation. The average scores including the fifth item had a mean of 2.14 and a standard deviation of 0.74, and the average scores excluding the fifth item had a mean of 2.11 and a standard deviation of 0.73. The correlation between the two types of average scores was 0.97. Given the close means and standard deviations as well as the high correlation, it is reasonable to expect that removing the fifth item at Wave 3 would not bring substantial influence on the model estimation. Therefore, we only used the first four items in the social cohesion subscale across all waves in the following analyses.

To examine the cross-domain relationships between social cohesion and informal social control, separate sum scores were used for each subscale, such that higher scores represented higher levels of the respective subscale. The Cronbach's alpha for the social control and social cohesion subscales ranged 0.87-0.88 and 0.73-0.80, respectively in Waves 3-6, which indicated good internal consistency for the two subscales.

***Neighborhood Structural Factors***

At each wave, neighborhood structural factors were measured with three components: economic disadvantage, residential instability, and ethnic heterogeneity (Sampson & Groves, 1989; Shaw & McKay, 1942). Specifically, economic disadvantage was composited following prior literature (Moilanen et al., 2010; Sampson et al., 1997; Sampson, Morenoff, & Earls, 1999) from the percentage of families identified as non-Hispanic Black ($M$=39.35, $SD$=36.59), below the federal poverty line ($M$ = 18.00, $SD$ = 13.90), with civilian labor force (age 16+) unemployed ($M$ = 10.00, $SD$ = 7.30), with adults who had a degree lower than bachelor's ($M$ = 83.00, $SD$ = 14.80), and on public assistance ($M$ = 7.00, $SD$ = 6.60). According to Sampson et al.'s (1999) study, the percentage of renter-occupied homes was used to measure residential instability ($M$ = 54.00, $SD$ = 18.00). Ethnic heterogeneity was indexed by percentage of Latinos ($M$ = 19.44, $SD$ = 25.06), Asians ($M$ = 4.00, $SD$ = 8.60), and foreign-born residents ($M$ = 13.00, $SD$ = 15.10; Castellini, Colombo, Maffeis, & Montali, 2011). The percentage of Black residents was not an indicator of ethnic heterogeneity because it was already included in the measure of economic disadvantage. Economic disadvantage and ethnic heterogeneity were assessed as the average across their corresponding indicators, and residential instability was assessed as the value of its unique indicator.

***Covariates***

***Demographic Information.*** Demographic variables in Wave 3 including the focal child's gender (0=male, 1=female), as well as mother's race (White, Black, Hispanic, or "other race;" other includes types such as mixed race and refused to answer), age, education level (1=less than high school, 2=high school degree or equivalent, 3=some college or technical school, 4=college degree or higher), and marital status (0=not married, 1=married) were controlled as time-invariant covariates. In addition, we controlled for mother's poverty level (1=0-49%, 2=50-99%, 3=100-199%, 4=200-299%, 5=300%+, where the percentage represents the ratio of total household income to the official poverty thresholds) at each wave. Race was recoded into three dummy variables, with "other race" as the reference group (coded as 0). Mothers' age was treated as continuous variables.

***Neighborhood Safety.*** Mean scores of the eight-item Neighborhood Environment for Children Rating Scales (Coulton, Korbin, Su, & Chow, 1995; Coulton, Korbin, & Su, 1999) were used to indicate neighborhood safety. This measure was only conducted at Wave 3 (i.e., the first wave considered in this study), therefore we treated it as a time-invariant variable in this study. This measure was reliable with Cronbach's alpha of 0.93.

***Maternal Depression.*** In each wave, questions derived from the Composite International Diagnostic Interview-Short Form (CIDI-SF), Section A (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998) were used to indicate whether mother met the depression criteria (conservative) since last wave. Mother's depression (0=No, 1=Yes) was a time-varying binary covariate.

***Move Since the Last Wave***. Whether the focal child had moved since the last wave was controlled since the neighborhood collective efficacy was likely to change if the family moved to another place. Move since the last wave (0=No, 1=Yes) was a time-varying binary covariate.

**Analytic Strategy**

SPSS Version 27.0 (IBM Corp, 2020) was used for descriptive and reliability analyses, and Mplus Version 8.0 (Muthén & Muthén, 2017) was used for latent growth modeling analyses. Parallel-process latent growth modeling was adopted in this study to capture growth trajectories for social control and social cohesion. First, we estimated a linear unconditional parallel-process latent growth model to investigate developmental trajectories of the two dependent variables. Preliminary data analysis found that the linear growth curve described the development of informal social control and social cohesion better compared to the quadratic growth curve. Afterwards, predictors and covariates were added, and a linear conditional parallel-process latent growth model was estimated. Model-fit indices RMSEA, SRMR, and CFI were used to assess the goodness of fit of the models. RMSEA no larger than .05, SRMR no larger than .05, and CFI no smaller than .95 indicate a good model fit (Hu & Bentler, 1999).

**Results**

**Missing Data**

The missing rates of the dependent variables ranged from 22.97% to 35.40%, and the missing rates of data on the independent variables and control variables ranged from 0.00% to 34.61%. Details about missing rates of each variable in each wave were displayed in Table 1. To handle the relatively large missing rates of data among both dependent variables and covariates, we conducted multiple imputation with Monte Carlo Markov chain method using Mplus. Missing data of all variables were imputed based on the whole dataset, and the number of imputations was 10. The main models were estimated after the multiple imputation with Maximum Likelihood estimation. Imputation-based model-fit indices and parameter estimates were automatically produced by Mplus (Enders & Mansolf, 2018).

**Descriptive Results**

Descriptive statistics of all variables used in this study were shown in Table 1. Children were 47.79% female. Mothers were 21.03% White, 47.49% Black, 23.28% Hispanic, and 8.20% Other. Mothers' age ranged from 16 to 50 ($M$ = 28.21, $SD$ = 6.06). Maternal education was relatively low, with 27.93% holding less than a high school degree and 28.45% holding a high school degree or equivalent. Only 32.09% of mothers were married to their children's biological fathers in Wave 3. The mean score of neighborhood safety at Wave 3 was 1.80 (SD=0.88). The descriptive statistics of time varying predictors (i.e., economic disadvantage, residential instability, and ethnic heterogeneity) and covariates (i.e., poverty level, maternal depression, and move since last wave) were shown in Table 1.

The mean score of social cohesion increased steadily across waves. The mean score of informal social control also increased between Wave 3 and Wave 4, while the growth pattern after Wave 4 was not as clear. The observed growth patterns of mean scores of social control and social cohesion were shown in Figure 1.

**Unconditional Parallel-Process Latent Growth Model**

The linear unconditional parallel-process latent growth model for the two measures of neighborhood collective efficacy, informal social control and social cohesion, fitted the data well; RMSEA=.05, [.05, .06]; SRMR=.03; and CFI=.96. As shown in Table 2, the intercept and slope growth factors for the two measures were significantly greater than zero, suggesting that both informal social control and social cohesion were high at the beginning and increased over time. Moreover, variances of the intercept and slope growth factors for the two measures were all significantly larger than zero, suggesting that there was significant between-person variability in both the baseline and the growth rate of neighborhood collective efficacy. All covariances among

the intercept and slope growth factors of informal social control and social cohesion were significant. Specifically, the intercept-slope covariances of both informal social control and social cohesion were negative, indicating that for both informal social control and social cohesion, higher baseline scores were associated with lower growth rate. The covariance between intercept factors of informal social control and social cohesion was positive and the covariance between slope factors of informal social control and social cohesion was positive, indicating that individuals with higher baseline scores of informal social control tended to also have higher baseline scores of social cohesion and individuals with higher growth rates of informal social control were likely to have higher growth rates of social cohesion.

**Conditional Parallel-Process Latent Growth Model**

Effects of neighborhood structural characteristics on neighborhood collective efficacy, after accounting for influence of the covariates, were examined with a conditional parallel-process latent growth model (see Figure 2). The conditional parallel-process model fitted the data well; RMSEA=.02, [.01, .02]; SRMR= .02; and CFI=.97. Results were reported in Table 3, and findings for our main predictors of interest were depicted in Figure 3. Effects of the three components of neighborhood structural characteristics on the two aspects of neighborhood collective efficacy in all waves had negative estimates, though a few of the estimates were not significant. Specifically, the significant negative associations included economic disadvantage with social cohesion in Waves 5-6, residential instability with social cohesion in all waves, ethnic heterogeneity with social cohesion in Waves 5-6, economic disadvantage with informal social control in Waves 3, 5, and 6, residential instability with informal social control in Waves 3, 4, and 6, and ethnic heterogeneity with informal social control in all waves. The consistent negative estimates suggested that in general, higher economic disadvantage, residential

instability, and ethnic heterogeneity were associated with lower neighborhood collective efficacy.

## Discussion

The current study identified parents' perception of collective efficacy from children' birth to age 15, as well as the influence of neighborhood structural factors on collective efficacy. It contributed to the community and neighborhood research in two ways: first, the current study extends the knowledge of the trajectory of neighborhood collective efficacy. Knowing the changes of neighborhood collective efficacy could help understand social mobility and further intervene the influences of collective efficacy on individual's behaviors in time, but little is known about such changes in previous literature. Second, revealing the time-varying effects of neighborhood structural factors on collective efficacy goes beyond the traditional cross-sectional method, which significantly promotes the knowledge foundation of neighborhood and community research.

Co-occurring increased trajectories were identified for neighborhood social cohesion and informal social control, which reflects the increased collective efficacy over time. The longer residents live in a neighborhood, the stronger social ties among neighbors are built (Higgins & Hunt, 2016). As residents get to know each other, collective efficacy increases, which is consistent with social support theory (Cohen & Wills, 1985; House, 1981). Matthieu and Carbone (2020) believe that it is "feasible that social support, which is derived from strong social ties, may impact collective efficacy" (p. 1987). Belonging social support, a type of support that emphasizes acceptance and connectedness, is positively, and directly associated with collective action (Matthieu & Carbone, 2020). Our finding provided empirical evidence of the trajectory of

collective efficacy, which expands the existing knowledge of neighborhood collective efficacy theory.

Cross-domain relationships were found in this study, which means both the initial levels of and the changes in social cohesion and informal social control were correlated with each other. The high social cohesion is strongly related to high informal social control, and the direction of changes of residents' social cohesion is positively related to the changes of informal social control. This finding supported Sampson's theoretical framework that social cohesion and informal social control share an overlapped element (Sampson, 1997). The correlated social cohesion and informal social control suggest that researchers should consider constructing the subscales under the same concept, collective efficacy, despite these two measures having their unique focus points.

For the second aim of this study, the finding of the relationship between time-varying neighborhood structural factors (3 indices) and collective efficacy suggested that the changes of neighborhood structural factors are associated with the changes of collective efficacy over time. In particular, economic disadvantage showed more effects on informal social control than social cohesion at the beginning (it is significantly related to informal social control in wave 3,5,6 and social cohesion in only wave 5 and 6). High residential instability is closely tied to low social cohesion and informal social control, which provide empirical evidence that supports the social support theory. Because residential instability decreases the social support among residents, and further affects social cohesion and informal social control. Our findings not only show the development of neighborhood structural factors and collective development over time, but also provide a solid foundation for researchers to further investigate the reciprocal relationship between neighborhood structural factors and collective efficacy.

Ethnic heterogeneity was significantly related to social cohesion in wave 5 and 6 and associated to informal social control at all four time points. The finding of this study suggests that living in a neighborhood with high ethnic heterogeneity is significantly related to lower social control over time, which is consistent with some previous research (Trawick & Howsen, 2006). Within our study, ethnic heterogeneity was conceptualized as the percentage of Latinos and/or foreign-born residents within the neighborhood. It is possible that concerns about immigration status or discrimination may contribute to a lack of willingness to intervene in various social problems, and correspondingly the perceptions regarding neighbors' willingness to intervene.

Interestingly, non-significant relationships are identified among ethnic heterogeneity and economic disadvantage and social cohesion in wave 3 and wave 4. This suggests that within our sample, the economic status of the neighborhood and a high proportion of Latinos and/or foreign-born residents were not related to social cohesion at these waves. It is possible that these differences may be driven by variation in the amount of time parents interact with their neighbors at different ages of children – waves 3 and 4 occurred when the focal child was age 3 and 5. It is possible that when neighbors engage with each other more, for example when children are younger and have playmates within their close proximity, that social cohesion is not impacted negatively by structural conditions. More research is needed to understand these differences across developmental stages of children.

**Limitations**

There are several limitations of this study. First, the social cohesion and informal social control subscales in wave 3 are 5-point Likert scale but changed to 4-point Likert scale in wave 4,5,6. We rescaled the 5-point scale to 4-point scale according to one previous study. Similarly,

the social cohesion subscale changed from 5-item to 4-item after wave 3. Although we followed the rigorous method to deal with these two changes, we must consider the potential effects of such two changes. Second, since FFCWS includes many families living in disadvantaged neighborhoods, the findings of the current study cannot be generalized to the general population. Finally, the study was focused on urban cities, and it is unknown the extent to which these findings would translate to more rural contexts.

**Implications**

Understanding the trajectory of collective efficacy is critical for advancing neighborhood research. Acknowledging the dynamic changes that occur within neighborhoods is key for understanding the ways in which neighborhoods impact individuals and families. Additionally, understanding these processes can improve interventions aimed at improving individual outcomes. Once practitioners are equipped with knowledge of the changes of social cohesion and informal social control over time in a specific community, they can target interventions to prevent the negative effects of lack of collective efficacy. In particular, the foundational knowledge of the changes of collective efficacy promotes the cost-benefits efficiency of many community level interventions. Practitioners would have a better sense of when they should utilize the community level interventions to serve residents. Additionally, our findings are important for community development professionals and policymakers who aim to engage community resources to improve collective efficacy of specific neighborhoods. For example, policies or government programs that aim to change the economic status of a neighborhood would have beneficial impacts on social cohesion and informal social control of the neighborhood.

Moreover, understanding the important link between structural factors and process factors over time is critical for considering the multiple ways in which neighborhood environments affect residents. Research studies examining the impact of neighborhoods on various individual-level outcomes must consider both the structural aspects and process factors of neighborhoods.



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**Table 1**

*Descriptive Statistics of Observed Variables (N = 4,898)*

| | *M* (*SD*) | % | Range | % missing |
|---|---|---|---|---|
| Focal child's gender | | | | 0.00 |
| female | | 47.79 | | |
| male | | 52.21 | | |
| Mother's Race | | | | 0.24 |
| White | | 21.03 | | |
| Black | | 47.49 | | |
| Hispanic | | 23.28 | | |
| Other | | 8.20 | | |
| Mother's age | 28.21 (6.06) | | 16-50 | 13.64 |
| Mother's education | | | | 13.68 |
| Less than high school | | 27.93 | | |
| High school or equivalent | | 28.45 | | |
| Some college or technical school | | 31.06 | | |
| College or higher | | 12.56 | | |
| Mother married to child's biological father | | 32.09 | | 13.74 |
| Poverty level at Wave 3 | 2.88 (1.41) | | 1-5 | 13.62 |
| Poverty level at Wave 4 | 2.90 (1.40) | | 1-5 | 15.50 |
| Poverty level at Wave 5 | 2.99 (1.35) | | 1-5 | 28.91 |
| Poverty level at Wave 6 | 3.23 (1.36) | | 1-5 | 27.07 |
| Neighborhood safety | 1.80 (0.88) | | 0-4 | 34.61 |
| Maternal depression at Wave 3 | | 14.38 | | 13.82 |
| Maternal depression at Wave 4 | | 11.77 | | 15.70 |
| Maternal depression at Wave 5 | | 12.38 | | 29.07 |
| Maternal depression at Wave 6 | | 6.26 | | 30.56 |
| Move since last wave at Wave 3 | | 48.77 | | 13.64 |
| Move since last wave at Wave 4 | | 49.87 | | 15.62 |
| Move since last wave at Wave 5 | | 60.20 | | 28.28 |
| Move since last wave at Wave 6 | | 61.15 | | 27.05 |
| Economic disadvantage at Wave 3 | 31.63 (12.97) | | 2.44-77.56 | 16.74 |
| Economic disadvantage at Wave 4 | 30.75 (12.91) | | 4.41-66.81 | 16.41 |
| Economic disadvantage at Wave 5 | 29.43 (12.64) | | 4.41-71.31 | 27.79 |
| Economic disadvantage at Wave 6 | 29.54 (12.56) | | 3.15-67.35 | 27.66 |
| Residential instability at Wave 3 | 49.03 (23.96) | | 0.00-100.00 | 16.76 |
| Residential instability at Wave 4 | 46.53 (24.23) | | 0.80-100.00 | 16.46 |
| Residential instability at Wave 5 | 43.57 (24.27) | | 0.68-100.00 | 27.79 |
| Residential instability at Wave 6 | 45.20 (23.07) | | 0.00-100.00 | 27.66 |
| Ethnic heterogeneity at Wave 3 | 12.32 (13.07) | | 0.13-56.37 | 16.74 |
| Ethnic heterogeneity at Wave 4 | 11.65 (12.57) | | 0.10-56.12 | 16.41 |
| Ethnic heterogeneity at Wave 5 | 11.24 (12.34) | | 0.09-53.71 | 27.79 |
| Ethnic heterogeneity at Wave 6 | 13.44 (12.69) | | 0.00-55.12 | 27.66 |
| Social control at Wave 3 | 14.81 (4.60) | | 5-20 | 35.40 |

| | | | |
|---|---|---|---|
| Social control at Wave 4 | 16.27 (4.12) | 5-20 | 22.97 |
| Social control at Wave 5 | 16.18 (4.08) | 5-20 | 33.38 |
| Social control at Wave 6 | 16.24 (3.94) | 5-20 | 32.38 |
| Social cohesion at Wave 3 | 11.55 (2.92) | 4-16 | 34.87 |
| Social cohesion at Wave 4 | 11.74 (2.70) | 4-16 | 23.76 |
| Social cohesion at Wave 5 | 11.96 (2.74) | 4-16 | 34.87 |
| Social cohesion at Wave 6 | 12.48 (2.92) | 4-16 | 33.48 |

**Table 2**

*Parameter Estimates from Unconditional Parallel-Process Latent Growth Curve Model*

| | Social cohesion intercept | | | Social cohesion slope | | | Social control intercept | | | Social control slope | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Growth factors | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| *Intercepts* | **11.52** | **.04** | **<.001** | **0.15** | **0.01** | **<.001** | **15.57** | **.06** | **<.001** | **0.13** | **.01** | **<.001** |
| *Random effects (variances-covariances)* | | | | | | | | | | | | |
| Social cohesion intercept | **2.97** | **.17** | **<.001** | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Social cohesion slope | **-.22** | **.04** | **<.001** | **.10** | **.02** | **<.001** | -- | -- | -- | -- | -- | -- |
| Social control intercept | **2.97** | **.22** | **<.001** | **-.17** | **.05** | **.011** | **4.64** | **.39** | **<.001** | -- | -- | -- |
| Social control slope | **-.22** | **.05** | **<.001** | **.09** | **.02** | **<.001** | **-.22** | **.09** | **.009** | **.12** | **.03** | **<.001** |

**Table 3**

*Parameter Estimates from the Conditional Model Predicting Neighborhood Collective Efficacy*

| | Social cohesion intercept | | | Social cohesion slope | | | Social control intercept | | | Social control slope | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Growth factors | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| *Intercepts* | **12.66** | **.30** | **<.001** | .14 | .09 | .115 | **16.46** | **.55** | **<.001** | **.28** | **.14** | **.04** |
| *Random effects (variances-covariances)* | | | | | | | | | | | | |
| Social cohesion intercept | **1.53** | **.14** | **<.001** | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Social cohesion slope | **-.12** | **.03** | **<.001** | **.08** | **.01** | **<.001** | -- | -- | -- | -- | -- | -- |
| Social control intercept | **1.73** | **.15** | **<.001** | **-.11** | **.04** | **.011** | **3.81** | **.33** | **<.001** | -- | -- | -- |
| Social control slope | **-.15** | **.03** | **<.001** | **.08** | **.01** | **<.001** | **-.24** | **.06** | **<.001** | **.12** | **.02** | **<.001** |
| *TICs on growth factors* | | | | | | | | | | | | |
| Age | **.02** | **.01** | **<.001** | .02 | .01 | .117 | **-.01** | **.00** | **.009** | **-.01** | **.00** | **.017** |
| White = 1 | .21 | .20 | .273 | **.76** | **.31** | **.015** | .03 | .06 | .561 | .02 | .07 | .841 |
| Black = 1 | .02 | .21 | .937 | **.66** | **.31** | **.031** | **.12** | **.06** | **.029** | .05 | .08 | .536 |
| Hispanic = 1 | .09 | .20 | .650 | .55 | .31 | .078 | .04 | .06 | .465 | .04 | .07 | .628 |
| Male = 1 | -.08 | .08 | .291 | .01 | .11 | .950 | .03 | .02 | .115 | .02 | .03 | .540 |
| Education level | .03 | .04 | .457 | .00 | .07 | .974 | .01 | .01 | .510 | .02 | .02 | .301 |
| Married = 1 | .03 | .09 | .767 | .09 | .15 | .560 | .03 | .03 | .260 | .01 | .04 | .717 |
| Neighborhood safety | **-1.00** | **.05** | **<.001** | **-.74** | **.08** | **<.001** | **.13** | **.01** | **<.001** | **.10** | **.02** | **<.001** |
| | Wave 3 (Y3) | | | Wave 4 (Y5) | | | Wave 5 (Y9) | | | Wave 6 (Y15) | | |
| Residuals | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* | *B* | *SE* | *p* |
| *Predictors on social cohesion residuals* | | | | | | | | | | | | |
| Economic disadvantage | -.01 | .01 | .136 | .00 | .00 | .401 | **-.02** | **.00** | **<.001** | **-.04** | **.01** | **<.001** |
| Residential instability | **-.01** | **.00** | **<.001** | **-.01** | **.00** | **<.001** | **-.01** | **.00** | **<.001** | **-.02** | **.00** | **<.001** |
| Ethnic heterogeneity | .00 | .00 | .330 | .00 | .00 | .619 | **-.01** | **.00** | **.007** | **-.01** | **.01** | **.005** |
| *Predictors on social control residuals* | | | | | | | | | | | | |
| Economic disadvantage | **-.02** | **.01** | **.014** | -.01 | .01 | .088 | **-.05** | **.01** | **<.001** | **-.06** | **.01** | **<.001** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential instability | **-.02** | **.00** | **<.001** | **-.01** | **.00** | **<.001** | .00 | .00 | .670 | **-.01** | **.00** | **.027** |
| Ethnic heterogeneity | **-.02** | **.01** | **.020** | **-.02** | **.01** | **.010** | **-.04** | **.01** | **<.001** | **-.03** | **.01** | **<.001** |
| *TVCs on social cohesion residuals* | | | | | | | | | | | | |
| Poverty level | **.25** | **.03** | **<.001** | **.14** | **.03** | **<.001** | **.13** | **.03** | **<.001** | **.18** | **.04** | **<.001** |
| Depression = 1 | **-.28** | **.12** | **.016** | **-.34** | **.13** | **.008** | -.23 | .13 | .085 | -.34 | .20 | .089 |
| Moved = 1 | -.02 | .09 | .848 | .09 | .08 | .289 | .08 | .08 | .346 | .02 | .10 | .801 |
| *TVCs on social control residuals* | | | | | | | | | | | | |
| Poverty level | .09 | .06 | .159 | **.22** | **.05** | **<.001** | **.21** | **.04** | **<.001** | .09 | .05 | .074 |
| Depression = 1 | -.22 | .21 | .299 | -.10 | .20 | .630 | .04 | .21 | .855 | .03 | .24 | .914 |
| Moved = 1 | -.25 | .15 | .086 | .09 | .13 | .472 | -.15 | .13 | .254 | -.27 | .14 | .064 |

*Note.* TIC = time-invariant covariates; TVC = time-varying covariates.

a. Within-wave residual covariance between SCT and ISC were constrained to be equal across waves.

**Figure 1**

*Observed Trajectories of Social Control and Social Cohesion Mean Scores*

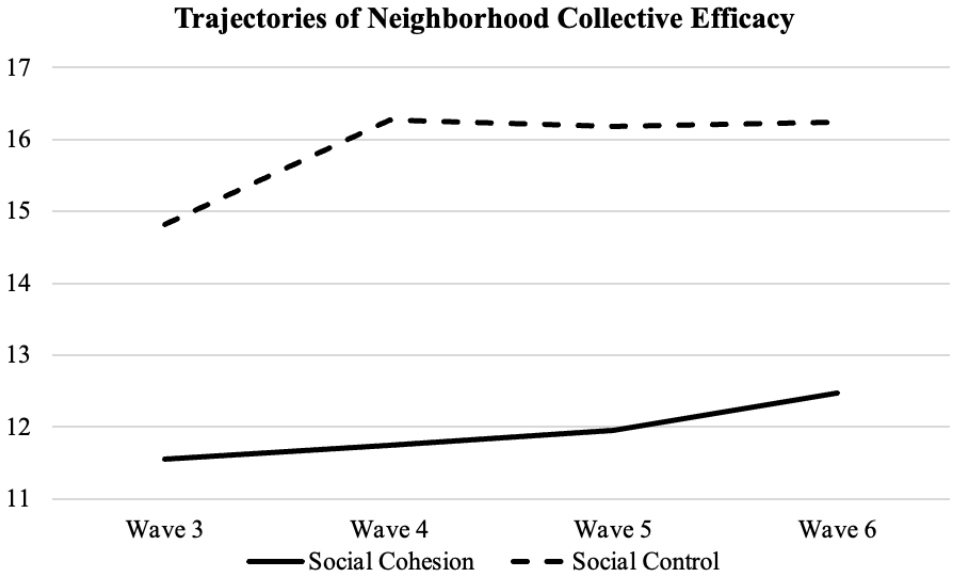
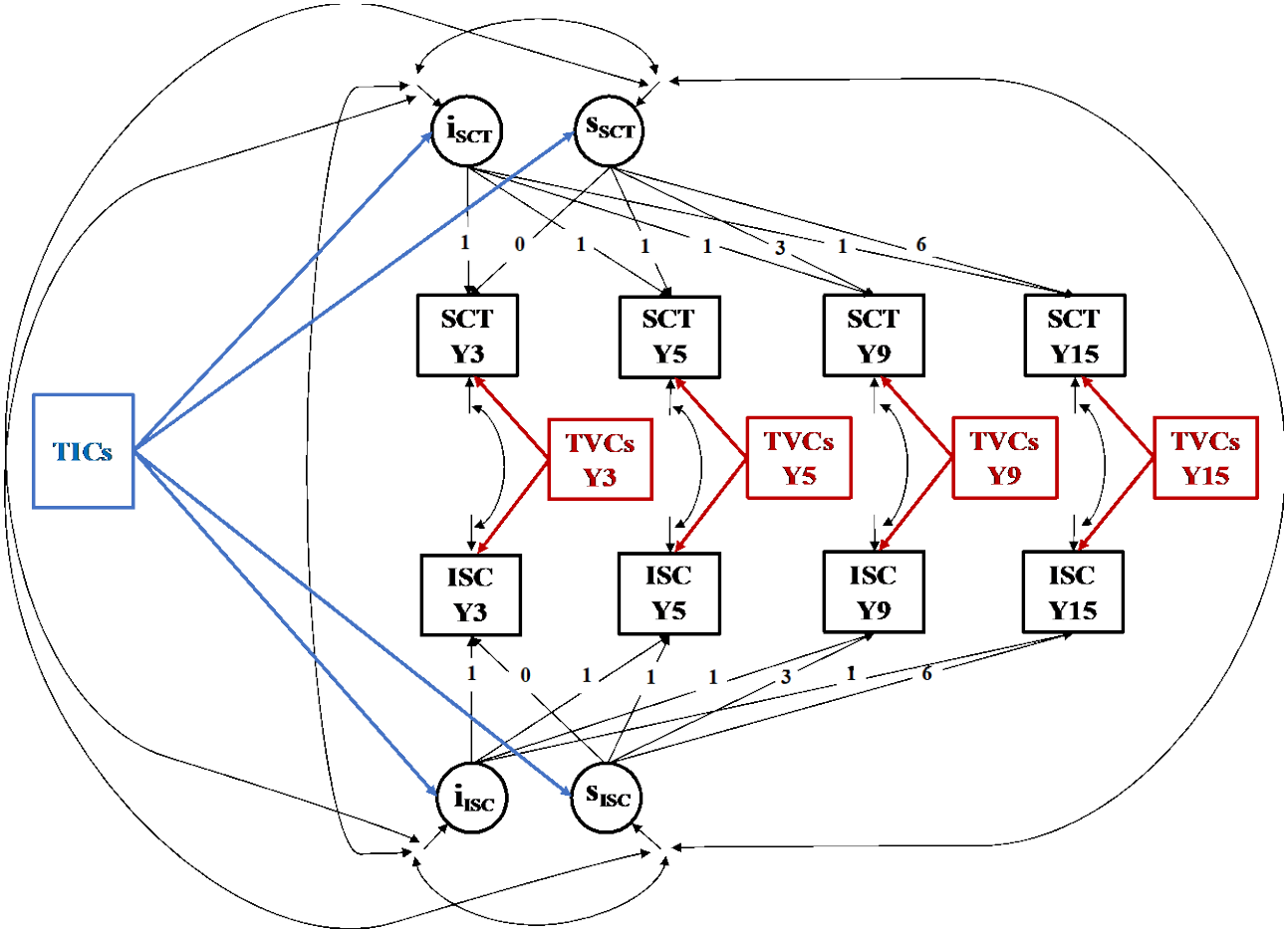


**Figure 2**

*A Parallel-Process Latent Growth Curve Model of Neighborhood Characteristics Predicting Neighborhood Collective Efficacy*

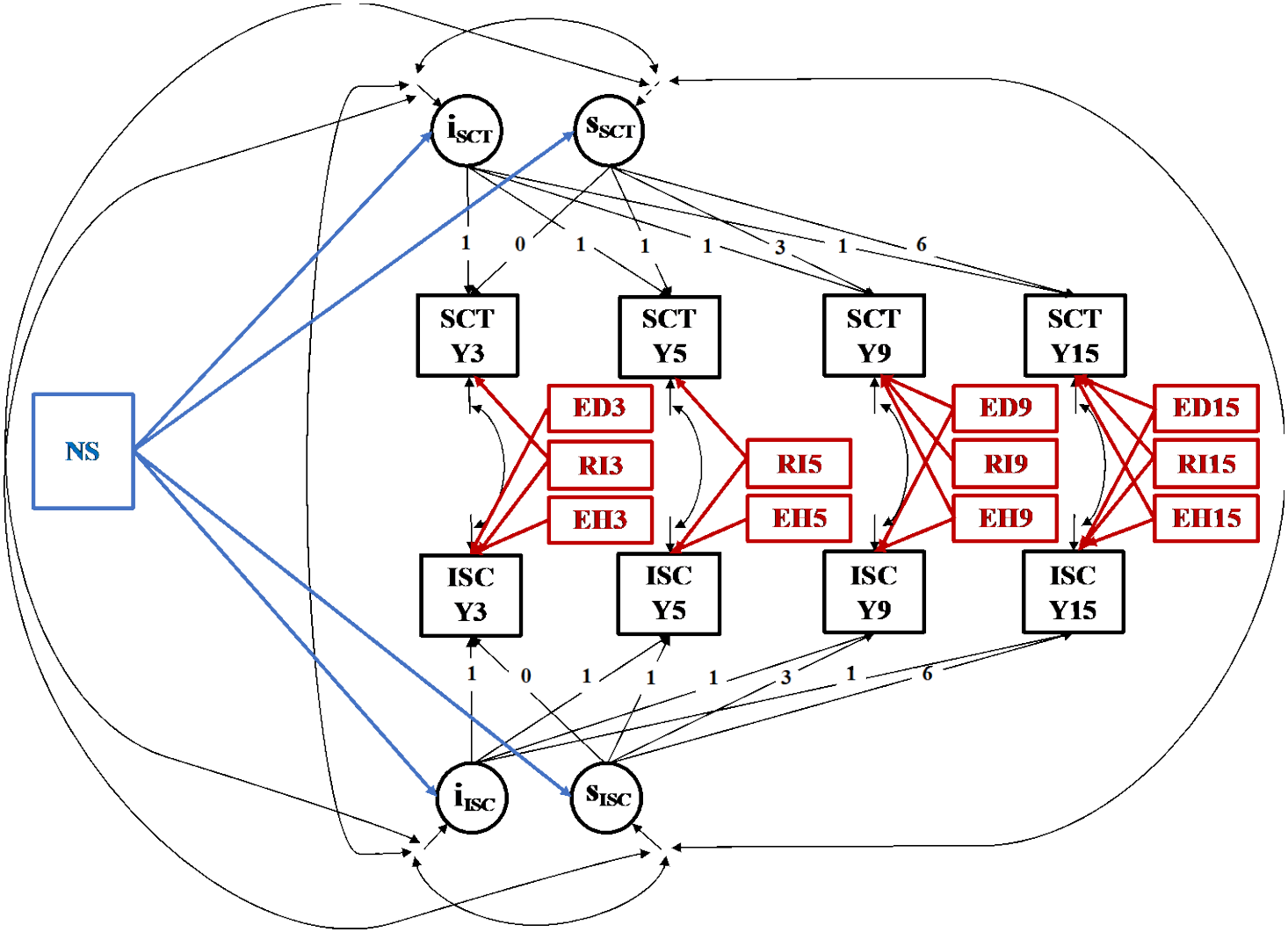



*Note.* SCT = social cohesion and trust; ISC = informal social control; i = random intercept; s = random linear slope; TICs = time-invariant covariates; TVCs = time-varying covariates; Y3/5/9/15 = child aged 3/5/9/15 years old, respectively. Single-headed arrows connecting latent/measured variables denote regression paths; double-headed arrows denote covariances. TICs (all measured at wave

1) included participant race (three dichotomous variables representing White, Black, and Hispanic coded as 1 while others coded as 0), gender (male = 1, female = 0), age, level of education, and marital status (married = 1, not married = 0), as well as neighborhood safety level. TVCs included poverty level, depression diagnosis (yes = 1, no = 0), economic disadvantage, residential instability, ethnic heterogeneity, and whether participant moved since the last wave (yes = 1, no = 0). Intercept weights were fixed at 1 across all waves; slope weights were fixed at 0, 1, 3, and 6 for wave 3 (Y3), 4 (Y5), 5 (Y9), and 6 (Y15), respectively, based on the actual time difference between each pair of adjacent waves. Heteroscedastic residuals (omitted from the diagram and represented with vertical single-headed arrows) were specified for both outcomes. Within-wave residual covariance was constrained to be equal across four waves.

**Figure 3**

*Key Results from the Model of Neighborhood Characteristics Predicting Neighborhood Collective Efficacy*



*Note.* SCT = social cohesion and trust; ISC = informal social control; i = random intercept; s = random linear slope; TICs = time-invariant covariates; TVCs = time-varying covariates; Y3/5/9/15 = child aged 3/5/9/15 years old, respectively; NS = neighborhood safety; ED = economic disadvantage; RI = residential instability; EH = ethnic heterogeneity. Single-headed arrows connecting latent/measured variables denote regression paths; double-headed arrows denote covariances.