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Exploring the Role of Neighborhood Collective Efficacy on Resident Health and Well-Being:
Implications for Public Health Research and Practice

By

Carly Elizabeth Strouse

A dissertation submitted in partial satisfaction
of the requirements for the degree of
Doctor in Public Health
in the
Graduate Division
of the
University of California, Berkeley

Doctoral Committee:

Professor Mahasin Mujahid, Chair
Professor Carolina Reid
Professor Jason Corburn

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Abstract

Exploring the Role of Neighborhood Collective Efficacy on Resident Health and Well-Being: Implications for Public Health Research and Practice

By

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The adverse health effects of living in under resourced neighborhoods has been well documented. While structural factors, such as concentrated poverty, have received the most investigation, research points to neighborhood social dynamics as a potential mechanism that influences health. Collective efficacy is one such social dynamic considered for its association with individual health outcomes. Collective efficacy refers to the social cohesion among residents and shared expectations that residents will come together for the good of the neighborhood. As the link between neighborhoods and health has become more established, place-based strategies are being employed to improve the health status of residents living in under-resourced neighborhoods. Collective efficacy's unique feature of mobilizing residents to achieve neighborhood goals may be an important component of neighborhood quality and opportunity for neighborhood change.

Much of the empirical evidence on collective efficacy comes from cross-sectional studies, therefore we do not know if collective efficacy can change and whether this change leads to improved health. In addition, we lack an understanding of how community change initiatives are attempting to promote and enhance collective efficacy as a strategy to mobilize residents toward community change. This dissertation aims to address these gaps in knowledge.

This dissertation uses multiple methods to deepen our understanding of the role of neighborhood collective efficacy on the health and well-being of residents. The first paper is a systematic, interdisciplinary review of the literature on collective efficacy and health and is one of the first to synthesize this literature. The review aims to assess the evidence of a link between collective efficacy and health, and to provide areas for future research. The second paper is a multi-level longitudinal analysis exploring whether collective efficacy changes over time in low income communities in seven U.S. cities. This paper takes advantage of a unique data set from the Annie E Casey Foundation's Making Connections Initiative that surveyed residents across three waves over eight years. The third paper explores how community change initiatives are promoting collective efficacy among residents in their target neighborhoods, and how residents experience this work. The research employs a case study approach with semi structured interviews and observations to illuminate the role of collective efficacy as a strategy to promote neighborhood change.

Dedication

This dissertation is dedicated to:

My children, Gus, Marlow, and Clyde
Whose laughter and good times were the perfect antidote to the struggles of finishing
this project.

You three are the light of my life, thank you!

My husband, Ben, my friend and life partner
Without your constant love and support this dream would never have come true.

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This dissertation would not have been possible without the support, guidance, advice and collaboration of the following people.

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I would like to thank Dr. Mahasin Mujahid, my committee chair, who not only provided excellent and critical feedback, but shared in the joys of motherhood and the challenges of being a professional working mother. I am indebted to her for her time and space to think critically about my work and for her couch and good ear, which propped me up when I needed it. I want to thank committee member Dr. Carolina Reid for her calm presence, unwavering support and continued interest in this project over three years. Carolina listened for months as I tested out ideas for this project, I would not be here without all her sage advice, feedback and critical eye. Her commitment to this work made this dissertation possible. I would like to thank Dr. Jason Corburn for his time, thoughtful comments and advice. Our discussions about place-based work and participatory processes inspired me to keep working on this project and think critically about the larger landscape of neighborhood based interventions. I would also like to thank the Annie E Casey Foundation for the use of the *Making Connections* data.

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Finally, I am forever indebted to my husband, and our three children, to whom this dissertation is dedicated. You four truly are the light of my eyes. Every time I wanted to quit you cheered me on, and every time I thought I couldn't do it there was a cuddle pile waiting to hold me close. I am so happy to walk away from the computer and fully back into your lives.

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Introduction

The adverse health effects of living in low-income neighborhoods has been well documented. (Diez-Roux, et al., 2001; Gwatkin, 2007) African American's and Latino's are almost three times as likely to live in poverty compared to whites contributing to significant racial and socio economic disparities in health outcomes. (U.S. Census Bureau) Research has uncovered potential pathways between neighborhoods and health-related outcomes including structural factors such concentrated poverty, institutional capacity and resources, access to well performing schools, and safe and available places for recreation. (Brooks-Gunn, 1997; Diez-Roux, 2001) Additionally, researchers have investigated social processes that exist within communities, and their influence on health. The quality and quantity of neighborhood social relationships affect mental health, health behavior, physical health and mortality risk. (Sampson et al., 2002) In disadvantaged neighborhoods, social relationships can be difficult to sustain where home ownership is low, residential mobility is high and there are a lack of opportunities for social engagement due to fewer organizations and institutions serving the neighborhood. (Jenks & Mayer, 1990)

Neighborhood social dynamics such as social capital, social networks and collective efficacy have been investigated for their potential to modify the effects of structural disadvantage on health outcomes. (Caughy, et al., 2001; Cattell, 2001; Kawachi, 1999; Smith & Christakis, 2008) Their definitions and measurements often overlap in the literature, as all involve trust and relationship building between people as core elements. (Macinko & Starfield, 2001) Social networks, defined as the social relationships between people, such as close friends and family, membership in a religious group or other formal associations, have been linked to health. (Seeman, 1996.) Berkman and Syme (1979) in a study on Alameda County residents showed that people who lacked social and community ties had an increased risk of early mortality in the nine year follow-up period compared to those with more extensive networks. In the early 1990's researchers examined how individuals used social networks, noting people often used them for resources such as job opportunities and access to services. This social process, termed "social capital", is defined as "the ability of actors to secure benefits by virtue of membership in social networks and other social structures." (Portes, 1998) Thus, when one belongs to a social network, that individual may obtain benefits and resources that would otherwise not be available in the absence of the network. Collective efficacy builds upon these two processes by encompassing not only relationship building, but mobilizing together for the greater good of the community. Collective efficacy is defined as "the process of activating or converting social ties among neighborhood residents in order to achieve collective goals, such as public order or crime reduction." (Sampson, et al., 1997) This ability of residents to mobilize to action separates collective efficacy from the other neighborhood social processes and may be an important component of neighborhood quality and opportunity for neighborhood change.

Collective efficacy expands on Albert Bandura's theory of self-efficacy, referring to an individual's belief in his or her capacity to achieve a desired goal. (Bandura, 1994) Collective efficacy reflects these beliefs among a defined group of people. Conceptualized in neighborhoods as the linkage between social cohesion and trust among neighbors, as well as their willingness to intervene for the greater good of the neighborhood, collective efficacy was developed in neighborhood research to understand the distribution of crime and disorder.

(Sampson, et al. 1997) Sampson and colleagues asked a series of questions to residents living in some of the lowest income neighborhoods in Chicago.

The questions measured the level of neighborhood social cohesion among residents as well as informal social control, that is, whether neighbors were willing to intervene if they witnessed behavior outside the accepted social norms. Answers revealed that collective efficacy didn't require deep social ties or relationships, instead it focused on the everyday interactions between residents as an important component of setting social norms and shared goals in a neighborhood. They found that neighborhoods with higher levels of collective efficacy had reduced incidence of crime, violence and adolescent delinquency. Additional studies have supported the positive association between collective efficacy and reduced crime and violence. (Morenoff et al. 2001; Ahern et al, 2013; Maimon & Browning 2010)

An increasing number of studies have investigated the relationship between collective efficacy and health, as neighborhoods with higher crime often have a disproportionate burden of poor health outcomes such as infant mortality, low birth weight, and premature mortality. (Diez-Roux & Mair, 2010) These studies have explored a range of health outcomes among adults as well as adolescents and children, with a majority of these studies being cross-sectional. (Ahern & Galea, 2011; Browning & Cagney, 2002; Browning, et al., 2008; Cohen, et al., 2006; Maimon & Browning, 2010) Researchers have proposed a number of potential pathways for how collective efficacy may influence individual health including the role of stress, social support and resources, social control through the promotion of positive social norms and increased political will. (Sampson, 1997; Cohen, et al. 2006) In neighborhoods with violence and crime, such as drug dealing and gun violence, residents may have a heightened sense of fear and lack of safety that leads to an increase in daily stress. Heightened and prolonged stress response has been linked to a number of poor health outcomes including premature mortality, chronic disease, low birth weight and preterm delivery. (McEwen & Stellar, 1993; Mujahid et al., 2011; Lu & Halfon, 2003) Neighborhoods with infrastructure to support outdoor activities with safe and walkable streets, places for residents to come together and develop informal social support and social norms reinforce healthy lifestyles, such as access to healthy food, exercise and less smoking. (Cockerman, 2005; Phelan, et al., 2010) These social norms promote health and, in theory, control deviance and unhealthy behaviors. Evidence suggests neighborhoods with high collective efficacy may have reduced violence, crime and adolescent delinquency, coupled with more social support, reducing overall stress in resident's daily lives. (Sampson, et al., 1997; Sampson, et al., 1999) A lingering question is whether collective efficacy can be enhanced and whether in practice it leads to sustained improvements in community conditions to promote resident health and well-being.

As the link between neighborhoods and health has become more established, neighborhood community change strategies are being employed to improve the health status of residents, with a number of initiatives such as Hope VI, Harlem Children's Zone and Building Healthy Communities, focused on improving social processes among residents to mobilize them toward collective action for neighborhood change. Community Change Initiatives (CCIs) work across sectors concentrating resources within defined geographic boundaries focusing on social, economic, and educational investment in order to improve the infrastructure in disinvested neighborhoods. (Kubisch, et al., 2010) While CCIs employ numerous strategies to address their

specific program goals, a unifying factor is their focus on strengthening the connections between neighborhood residents and community systems and supports while engaging residents in the process of community change.

This strategy links directly to the theory of collective efficacy and its focus on social cohesion and mobilizing residents to achieve community action. In communities where residents lack cooperation and trust, residents are less likely to intervene when they observe behavior outside of expected social norms, or come together to solve neighborhood problems. (Sampson 1997) The underlying assumption is that in neighborhoods with high collective efficacy, residents agree on what is acceptable behavior and will reinforce it with each other. Some researchers argue this distinguishes well-functioning, safe, and healthy neighborhood environments from disorganized and poorly functioning ones. (Sampson, et al., 1997; Sampson & Raudenbush, 1999; Maimon & Browning, 2010) It is reasonable to hypothesize that enhancing the collective efficacy of a neighborhood may work to improve the health of residents through increased social support, reduced crime and increased opportunities for residents to come together, set neighborhood goals and improve neighborhood conditions.

A significant challenge to understanding the role of collective efficacy on health, however, is the heterogeneity in which studies conceptualize the link between collective efficacy and health. Some investigate a main effect, while others test the mediating or moderating effect of collective efficacy on health. To my knowledge there is no systematic review of the multi-disciplinary literature on collective efficacy and health. As place-based initiatives employ building social cohesion and informal social control as a mechanism to improve resident health, it is important to understand the empirical evidence on the association between collective efficacy and health. In addition, much of the empirical evidence on collective efficacy and health is cross-sectional and does not address whether collective efficacy changes over time. It is also unclear how Community Change Initiatives are working to promote and enhance social cohesion and mobilize residents to achieve neighborhood change for positive health and well-being. This dissertation uses multiple methods to deepen our understanding of the role of neighborhood collective efficacy on the health and well-being of residents. The overarching aim of this dissertation is to explore the relevance of collective efficacy in place-based public health interventions, an approach that is increasingly being employed to improve the health of residents in low resourced neighborhoods. Towards this overarching goal, there are three research questions I will address in the three papers listed below:

Paper 1: What is the current body of knowledge on the association of collective efficacy with health outcomes?

The first paper of this dissertation is a systematic review of the literature on collective efficacy and health outcomes in the United States. The aim of this review is to summarize the current body of knowledge on collective efficacy and health outcomes and to assess the strengths and weaknesses of the evidence. I review studies investigating both a main effect between collective efficacy and health as well as studies investigating collective efficacy's mediating effect of various exposures on health outcomes. Key findings are summarized, with an exploration of methodological challenges and opportunities for future research.

Paper 2: Does collective efficacy change over time in urban low income neighborhoods in seven U.S. cities?

This second paper empirically tests whether collective efficacy changes across three waves of data over an eight year period in seven cities across the United States. To do so, I employ multilevel modeling using data from the Annie E Casey Foundation's Making Connections Initiative.

Paper 3: How do community change initiatives promote and enhance collective efficacy in target neighborhoods and how do residents experience this work?

This last paper explores how two community change initiative in Oakland, California are working to build collective efficacy in target neighborhoods and how the residents experience this work. Utilizing a case study approach with semi-structured interviews and observations, I document how initiative staff are working with residents, using two key features of collective efficacy: social cohesion and informal social control, to build a movement toward community change. I discuss the challenges and lessons learned as well as key recommendations for future community change endeavors.

Together these studies provide insight into the relevance and practical application of collective efficacy in public health practice. Investigating the empirical evidence on the association of collective efficacy and health, coupled with the qualitative descriptions of activities and experiences of staff and residents working together toward community change will elucidate opportunities to improve future neighborhood change efforts.

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The Role of Neighborhood Collective Efficacy on Health: A Systematic Review

Introduction

For decades, researchers have explored the causes of racial, ethnic and socio economic disparities in health outcomes. (Adler and Newman, 2002) Neighborhoods have gained prominence as a potential explanation and arena to intervene. (Diez-Roux & Mair, 2010) A number of studies have demonstrated the adverse health consequences of living in distressed neighborhoods. (Diez-Roux et al., 2001; Gwatkin, 2000; Brooks-Gunn et al., 1993; Brooks-Gunn & Duncan, 1997; Shonkoff et al., 2011) African Americans and Latinos are more likely to live in urban neighborhoods of concentrated poverty compared to whites contributing to significant racial and socio economic disparities in health. (U.S. Census Bureau) Research has uncovered potential pathways between neighborhood factors and health-related outcomes including institutional capacity and resources, access to well performing schools, and safe and available places for recreation. (Diez-Roux, 2001) Additionally, researchers have investigated social processes that exist within communities, including social networks, social capital, and collective efficacy and their influence on health. (Sampson et al. 2002) The quality and quantity of neighborhood social relationships affect mental health, health behavior, physical health and mortality risk. (Sampson et al., 2002) In neighborhoods of concentrated poverty, social relationships can be difficult to sustain where home ownership is low, residential mobility is high and there are a lack of opportunities for social engagement due to fewer organizations and institutions serving the neighborhood. (Jenks & Mayer, 1990) Yet there is also evidence that these neighborhood social processes can serve as potential buffers to the ill effects of neighborhood structural factors. (Berkman & Syme 1979; Cattell, 2001; Kawachi, 1999; Smith & Christakis, 2008;) As the link between neighborhoods and health has become more established, place-based strategies are being employed to improve the health status of residents, with a number of initiatives focused on improving social processes among residents to mobilize them toward collective action for neighborhood change. (Kubisch, et al., 2010)

The Theory of Collective Efficacy

Neighborhood collective efficacy is one social process investigated for its potential to influence health. Conceptualized as the linkage between mutual trust and social cohesion among residents and their willingness to intervene on behalf of the good of the neighborhood, collective efficacy was developed in neighborhood research to understand the distribution of crime and disorder. (Sampson, et al. 1997) Sampson and colleagues (1997) found that neighborhoods with higher levels of collective efficacy had reduced incidence of crime and violence. Additional studies support the positive association between collective efficacy and reduced crime and violence. (Morenoff et al. 2001; Ahern et al, 2013; Maimon & Browning 2010) Researchers hypothesize that collective efficacy facilitates social norms and goal setting for the greater good of a neighborhood and acts as a vehicle for collective action. These expectations for collective action are important as no one lives in isolation; problems such as crime, lack of access to safe and affordable housing or public space are shared among members of a community and require people coming together to solve complex social problems.

An increasing number of studies have investigated the relationship between collective efficacy and health, as neighborhoods with higher crime often have a disproportionate burden of poor health outcomes such as infant mortality, low birth weight, and premature mortality. (Diez-Roux

& Mair, 2010) These studies have explored a range of health outcomes among adults as well as adolescents and children, with a majority of these studies being cross-sectional. A significant challenge to understanding the role of collective efficacy on health is the heterogeneity in which these studies conceptualize the link between collective efficacy and health. Some investigate a main effect, while others test the mediating or moderating effect of collective efficacy on health. As place-based initiatives employ building social cohesion and informal social control as a mechanism to improve resident health, it is important to understand the empirical evidence on the association between collective efficacy and health. It is unclear whether this is a promising approach, deepening our understanding and the potential mechanism for how it works is important for the development of future place-based interventions.

To our knowledge no systematic review of the literature on collective efficacy and health has been published, therefore the cumulative results of these studies is unknown. This review aims to fill this gap. The results of this review will help uncover findings from these heterogeneous studies, determine the relative significance of collective efficacy on health and propose specific recommendations for future research.

Objective of the Review

The aim of this review is to summarize the current body of literature on collective efficacy and health outcomes and to assess the strengths and weaknesses of the evidence. We review studies investigating a main effect between collective efficacy and health as well as studies investigating collective efficacy's mediating effect of various exposures on health outcomes. Key findings are summarized, with an exploration of methodological challenges and opportunities for future research.

Methodology

A systematic, interdisciplinary review of the literature was conducted utilizing the PRISMA Statement and guidelines to guide the review.

Inclusion and Exclusion Criteria

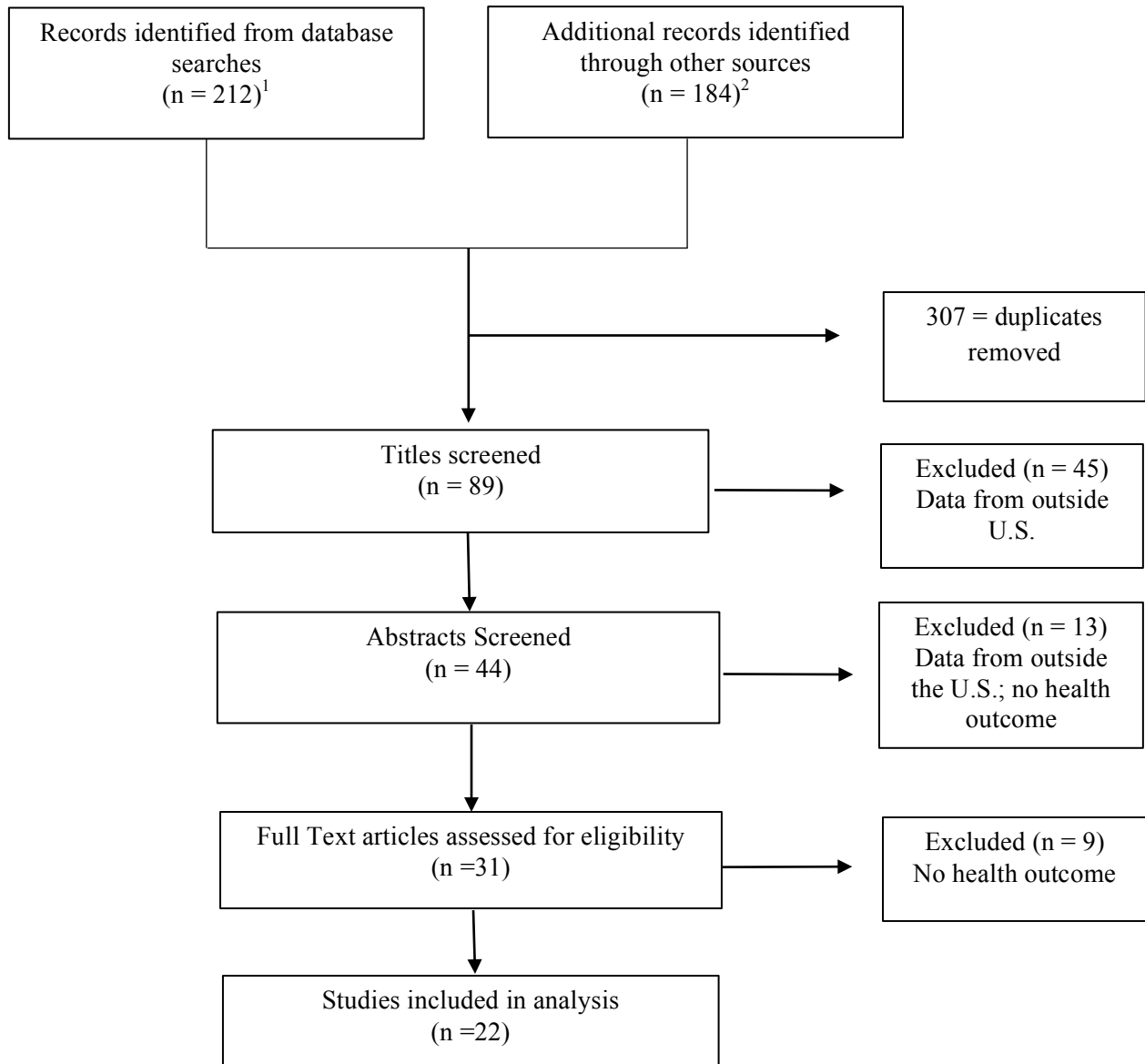
We included quantitative studies published in peer-reviewed journals beginning from 1997, when interest was first sparked on the association of collective efficacy and health, through 2015, using data from the United States. We focused on studies from the U.S. because of the considerable socioeconomic and racial segregation of many urban U.S. cities, which has led to the social and geographic isolation of communities, especially among African Americans, and the well documented health consequences of this isolation. (LaVeist, 2003; Kramer & Hogue 2009) Following the World Health Organization's definition of health, we included articles related to both physical and mental health, physical safety, as well as adolescent behavior and child development. (WHO: principles, 1946)

Search Strategy

We searched the following public health, sociology and psychology databases: PubMed, JSTOR, and Springer Link, for original studies investigating the relationship between collective efficacy and individual health outcomes We searched article titles using the following terms: "collective efficacy" or "collective efficacy and health" or "collective efficacy" and "infant mortality" or "adolescent health" or "child health" or "violence" or "social cohesion". After titles were

screened, abstracts were reviewed by one reviewer. (Exhibit 1, N=212). A Google Scholar search was also conducted to identify any possible articles missed in the initial search, as well as a review of the references of included studies for any additional articles. In cases where it was unclear whether the article met inclusion criteria, the full article was reviewed.

Exhibit 1: Selection Process for Identification of Studies, 1997-2015.



1. Data sources include PubMed, JSTOR, and SpringerLink.
2. Includes Google Scholar and additional articles found from reference list of retrieved articles.

Data Extraction

Data was abstracted from each article and then put into a matrix display. Abstraction categories included: author, year; data source; sample size; health outcome; covariates included in statistical

analysis; measurement of collective efficacy; main findings related to outcome of interest and measurement of collective efficacy.

Quality Assessment

We assessed study quality using three criteria based on previous reviews of neighborhood social processes and the neighborhood effects literature: 1) included a definition of collective efficacy along with the questions used to develop measurement scale; 2) used a validated scale for collective efficacy or validated the scale used in the paper; 3) for longitudinal studies, whether changes in the neighborhood were taken into consideration when exploring change over time. Additionally, there has been much discussion in the literature as to whether including neighborhood measures in statistical analysis over controls the relationship between collective efficacy and health, since factors such as neighborhood SES and residential stability may influence the ability to create collective efficacy. We therefore did not include this as a measurement of study quality but do include a column as to whether the study included individual and neighborhood measures to explore the range of variables included in models. Quality criteria were not used in the inclusion or exclusion criteria of eligible studies.

Results

We separated the studies first by age, looking at results for adults (18 years or older) and children 18 years or younger. We then divided the studies by two general categories: well-being including violence and safety; and health including physical, mental and behavioral health. Some of the adolescent studies overlapped, addressing aspects of mental health, crime, and bullying, delinquent and/or violent behavior within the same study. Due to the heterogeneity of exposure, sample age ranges and study design it was not possible to perform a meta-analysis. Additionally, publication often favors articles with significant findings, this publication bias may affect the number of studies we found with null findings. Findings, however, are synthesized by outcome with significant findings highlighted.

A total of 396 studies were found in our initial search (Exhibit 1). Three hundred and seven were removed for duplication. Titles were then screened for eligibility and 44 abstracts were reviewed, with a total of 31 articles reviewed in full. The main reasons for study exclusion included no health outcome or data from outside the United States. As shown in Table 1, 22 studies fit the search criteria and were included in the analysis. Data from these studies represented a number of cities; nine studies took advantage of the same data set from Chicago neighborhoods, three studies used data from New York, while three employed data from Los Angeles. The final seven studies used data from neighborhoods or schools in Colorado, North Carolina, Iowa, Georgia, or the cities of Philadelphia, Boston, or San Antonio.

The population size of the studies ranged from smaller samples N=199 to larger samples N=8,782. Nine studies examined adults aged 18 and over, 12 studies explored issues related to adolescents ranging in age from 10 to 20 years old and one study examined elementary school children. Neighborhoods were defined in varying ways with 16 studies measuring neighborhoods by census tract, or a combination of tracts. Established by the Bureau of Census, census tracts represent relatively contiguous areas comprising approximately 4,000 people. (Census Bureau) Three studies defined neighborhoods by community districts which were delineated by a resident consultative process and encompass 50,000-200,000 residents. (New York City Department of City Planning) The size of these units ranged from N=59 up to N=343

neighborhood units. Two studies use school classrooms or after school programs as the second level of analysis.

A number of health outcomes were explored ranging from sexual risk taking, mental health, and obesity risk, as well as violent behavior among adolescents. Study outcomes with adult populations included perpetration of intimate partner violence, depression, smoking cessation and self-reported health.

Definition of Collective Efficacy

All studies were informed by the collective efficacy scale developed by Sampson and colleagues (1997) from the PHDCN study, except one that was informed by Sampson and the earlier work of Chavis and colleagues measuring respondent's sense of community. (Sampson, et al., 1997; Chavis, et al., 1986) Further studies have helped establish the reliability of the PHDCN scale. (Sampson, et al, 1999; Sampson, et al. 2003; Browning, et al. 2005) Items are rated on a 5 point Likert scale ranging from 1-5 ("Strongly Disagree" to "Strongly Agree") and address the two dimensions of collective efficacy: social cohesion and informal social control.(Table 3) Eight studies used this exact scale, while 14 studies modified the scale to adapt to the particular study population or outcome of interest. For instance, one study, looking at the role of collective efficacy in afterschool programs, changed questions to reflect the young study population, such as "I feel like I am a part of my afterschool program". In addition, three studies exploring the role of collective efficacy and children included a scale developed by Sampson et al. (1999) related to intergenerational closure.²³ Intergenerational closure addresses whether and how strongly adults are connected to children in their neighborhood, even if they themselves do not have children.

Neighborhood Structural Disadvantage

Studies considered a range of covariates as a proxy of neighborhood disadvantage, defined in various ways based on a combination of neighborhood socio-economic indicators. Such indicators included percent of households living below the federal poverty line, on public assistance, female headed households, and the unemployment rate to construct a measure representing concentrated poverty. Other neighborhood covariates included immigrant concentration, defined as percent Latino and percent foreign born, and residential stability, defined as percent living in the same house since five years prior or Census year and percent of housing occupied by owners.

Methodological Considerations

Twenty one studies observed individuals nested within these neighborhood or school units and therefore employed some form of multi-level modeling or generalized estimating equation approaches because of the nested structure of the data. One study did not include neighborhood level covariate, using each individual level response to collective efficacy with individual demographic variables in regression analysis. In addition, three studies utilized a longitudinal design, with the other nineteen employing a cross sectional design.

Adults

Violence and Safety

Five studies focused on the relationship between collective efficacy and violence or physical safety among people 18 years or older. (Sampson, et al. 1997; Lindbald, et al., 2013; Ahern, et al. 2013; Browning, 2002; Emery et al., 2011) All five studies used self-report of varying experiences of crime, violence or violent victimization, with two of the studies combining survey responses with crime records. Three studies found neighborhoods with high levels of collective efficacy had lower levels of perceived violence and violent victimization or a reduced prevalence of violent victimization. (Sampson et al 1997; Lindbald, et al. 2013; Ahern, et al. 2013). Looking to understand why some neighborhoods had higher levels of violent crime than similar neighborhoods on a number of structural factors, Sampson and colleagues (1997) investigated whether residents were able to control unwanted behavior. The authors hypothesized that features of social disorganization theory such as residential tenure, immigrant concentration, and concentrated disadvantage would be associated with violent crime and that collective efficacy would potentially mediate the pathway between neighborhood social composition and violent crime. The authors found higher levels of collective efficacy predicted lower levels of crime including perceived violence, homicide, and violent victimization. Similar to Sampson's findings, Lindblad et al. (2013) found neighborhoods with high structural disadvantage had higher perceived crime and disorder and collective efficacy mediated these relationships. Neighborhoods with higher collective efficacy had lower perceptions of crime and disorder. Ahern, et al. (2013) investigating various statistical models to test individual and neighborhood covariates on the relationships between collective efficacy and violence found neighborhoods with high collective efficacy had a reduced prevalence of violent victimization.

The final two studies investigating violence and safety explored collective efficacy and intimate partner violence. Browning (2002) found reduced likelihood of intimate partner violence against women in neighborhoods with high collective efficacy. The study author found neighborhoods with high levels of collective efficacy offered more social support and shelter to women as well as social pressure against men who engaged in partner abuse. Emery et al. (2011), however, did not find an association between collective efficacy and intimate partner violence desistance.

Overall, four out of the five studies found a positive effect of collective efficacy on exposure to violence and violent victimization. One study found a main effect between collective efficacy and violence while three others found collective efficacy mediated the relationship between neighborhood structural disadvantage and violence.

Mental and Physical Health

Four studies examined collective efficacy and adult mental and physical health.(Browning & Cagney, 2002; Hughes Halbert, et al., 2014; Karasek, et al., 2012; Ahern & Galea, 2011) Two studies found significant associations with health, (Browning & Cagney; Ahern & Galea) while two had marginal or null findings. (Hughes Halbert, et al; Karasek, et al.) Browning and Cagney (2002) found collective efficacy mediated the relationship between structural disadvantage and health such that residents living in structurally disadvantaged neighborhoods with high collective efficacy had better self-reported health scores compared to people in neighborhoods with low collective efficacy. Hughes Halbert, et al. (2014) conducted a study to assess whether collective efficacy was associated with obesity-related behaviors among a sample of African American adults living in urban Philadelphia neighborhoods. Higher reported collective efficacy was associated with a higher likelihood of meeting recommended daily fruit intake guidelines,

however it was not associated with other obesity related behaviors such as meeting vegetable intake guidelines or recommended physical activity. Karasek et al. (2012) did not find an association between neighborhood collective efficacy and smoking cessation. Similarly, Ahern and Galea (2011) did not find an association between major depression and collective efficacy across their study population of residents 18 years and over living in New York City. However, in analysis stratified by age, they found for residents 65 years or older, living in a high collective efficacy neighborhood reduced the prevalence of major depression compared to living in a neighborhood with low collective efficacy.

Of the studies exploring collective efficacy and health in adult populations, one found collective efficacy mediated the relationship between structural disadvantage and self-reported health and one found a main effect between collective efficacy and depression in older adults. The other two studies had marginal or null findings.

Adolescents

Physical, Mental and Behavioral Health

Nine studies investigated the role of collective efficacy on adolescent physical, behavioral and mental health. Findings were mixed across the wide array of studies, with 8 studies exploring the association between collective efficacy and health or both the main or moderating effect of collective efficacy on adolescent health. Cohen, et al. (2006), in the only article to examine physical health, explored the role of collective efficacy and risk for overweight and obesity among youth. The authors found positive health effects, such that adolescents living in neighborhoods with high collective efficacy had reduced risk for high body mass index, overweight and overweight status.

Five studies explored mental health outcomes among adolescents with mixed results. Maimon, et al. (2010) found, after controlling for individual sociodemographic factors, mental health predictors, and neighborhood structural disadvantage, the effect of collective efficacy was not significant on adolescent suicide attempts. However, the authors added an interaction between collective efficacy and family attachment and support, two protective factors for suicide attempts, revealing as collective efficacy increased, the protective effects of family attachment increased. Exploring youth bullying perpetration, Williams and Guerra (2011) found that as perceptions of collective efficacy increased, self-reported involvement in bullying behavior decreased. Bullying behavior, both perpetrating and receiving bullying treatment has been linked to aggressive behavior and poor mental health respectively. (Centers for Disease Control and Prevention) The authors used a longitudinal design looking at how bullying behavior changed over the fall and spring semesters, after an intervention aimed at increasing classroom collective efficacy to deter bullying behavior. Smith et al. (2013), was the only study to investigate elementary school children, exploring whether self-report of collective efficacy among children participating in afterschool programs was associated with behavioral outcomes. The authors found informal social control was related to reductions in problem behavior and that social cohesion led to a more positive social environment among participating elementary school children. Children who reported feeling connected to their afterschool peers reported positive behavior and less symptoms of negative internalizing behaviors. In accordance with other

studies, the authors found differences by gender, with girls reporting higher levels of collective efficacy and fewer problem behaviors, such as cheating, vandalism and drinking or smoking.

Browning et al. (2014) hypothesized that collective efficacy would buff the effect of exposure to community violence on adolescent mental health outcomes. The authors explored both internalizing problems (e.g. anxiety and depression), as well as externalizing problems (e.g. aggression and delinquency) with mixed results. In neighborhoods with low collective efficacy, exposure to life threatening violence led to an increase in both internalizing and externalizing problems for girls, however there was no evidence of an association between exposure to life threatening violence and mental health problems in boys, regardless of the collective efficacy of their neighborhood. Interestingly, in neighborhoods with high collective efficacy, there was no significant association with reduced mental health problems and exposure to life threatening violence. The authors posit that girls, more than boys, may have a heightened sense of fear about their safety around life threatening victimization such as sexual assault.

Sexual risk taking, such as having more than one sexual partner at a young age has implications to health, most importantly the transmission of sexually transmitted infections. Three articles looked at a range of sexual behavior including adolescent childbearing and sexual risk taking. Evidence of an association was mixed, with stratification of study results revealing differences across gender and racial/ethnic categories. Browning et al. (2008) investigated the determinants of number of sexual partners among 12-16 year olds living in Chicago neighborhoods, finding collective efficacy had a significant association with the number of sexual partners. High collective efficacy decreased the probability of reporting two or more sexual partners (compared to one) by almost 40 percent, after controlling for socio demographic and neighborhood structural characteristics, but did not have an effect on adolescents deciding to initiate sex. A cross-level interaction between collective efficacy and age revealed significant associations for adolescents (13-16), but not for younger adolescents (11-12 years old). Way, et al. (2006) investigated the role of collective efficacy on the married and unmarried teen birth rate, testing the moderating effect of Hispanic concentration on the relationship. The authors found a decrease in the unmarried teen birth rate in neighborhoods with high collective efficacy and less than 50% Hispanic population but did not find statistically significant differences in the unmarried teen birth rate in high collective efficacy neighborhoods with a high Hispanic population. Kim (2010) examined the association between collective efficacy and lifetime sexual intercourse with marginal findings. Differences, however, were found by gender, finding protective effects of ever having had sex for boys but not for girls in neighborhoods with high collective efficacy. And, those protective effects were significant only among boys who did not participate in out of school activities.

Violence and Delinquency

Four studies examined the association of collective efficacy with substance use, delinquency and perpetration of violence in adolescence, looking at main effects and the ability of collective efficacy to buffer the effects of concentrated disadvantage or exposure to violence. (Simons et al., 2005; Maimon & Browning, 2010; Fagan et al., 2014; Schnurr & Lohman, 2013) In communities reporting high levels of collective efficacy, Simons et al. (2005) found adolescents were less likely to engage in delinquent behavior and hang out with peers engaging in delinquency compared to neighborhoods with lower levels of collective efficacy and parental

authority. In addition they found neighborhoods high in collective efficacy led to an increase in authoritative parenting, which has been strongly associated with deterring adolescent delinquent behavior. Similar to the findings in Simons study, Maimon and Browning (2010) found adolescents living in concentrated poverty neighborhoods engaged in less violent crime in neighborhoods with high levels of collective efficacy compared to teens living in similar neighborhoods with lower levels of collective efficacy. The authors found a significant relationship between collective efficacy and unstructured socializing, such that even when adolescents participated in unstructured time with peers, which has been shown to increase adolescent violence, living in a high collective efficacy neighborhood buffered the probability of violent offending.

Fagan et al. (2014) investigated the role of collective efficacy in moderating substance use and violent behavior in adolescents exposed to violence. In accordance with previous research, the authors found an increase in substance use and perpetration of violence among adolescents who were exposed to violence, after controlling for a number of individual level factors and concentrated disadvantage. The authors found with increasing exposure to violence, substance use increased, however that relationship was strongest for adolescents living in neighborhoods with low collective efficacy and weakest among adolescents living in neighborhoods with high collective efficacy.

Schnurr and Lohman (2013), investigated whether neighborhood collective efficacy buffered exposure to risk factors among middle school youth on dating violence perpetration in later adolescence. In all, 14 risk factors were assessed, at the individual, family and neighborhood levels, for perpetration of dating violence, with collective efficacy as a potential buffer. Mother's perceptions of the neighborhood were used to measure collective efficacy. The authors did not find collective efficacy buffered the effects of risk factors across the total sample population. However, difference emerged when stratified by race and gender, such that among Hispanic males with early academic challenges, living in high collective efficacy neighborhoods buffered the effects on later perpetration of dating violence.

Discussion

Evidence of an association between collective efficacy and health are mixed. Study findings range from statistically significant associations to marginal or null findings, varying by outcome, and revealing differences by age, gender and race or ethnicity. The range of studies investigated in this review also vary in their exploration of collective efficacy as a main effect on health outcomes or its ability to buffer the exposure of neighborhood disadvantage or exposure to violence on various health outcomes. Studies found positive associations of collective efficacy buffering the effects of neighborhood structural disadvantage and reduced crime and violence. In addition, a number of studies found positive relationships between collective efficacy and physical and mental health outcomes for adolescents.

Socially cohesive neighborhoods, with residents that support one another may provide a more nurturing and supportive environment. This may be especially important among children who rely on family members and adults to provide safe, positive environments to learn, grow and thrive. (Browning et al., 2014) Overall thirteen studies explored the role of collective efficacy on children's mental, physical and behavioral health, and many of them point to the importance of

social cohesion and trust among residents as important for health. In addition, studies found collective efficacy enhanced other important factors in children's health such as family attachment. Maimon et al. (2010) found collective efficacy regulated the risk of adolescent suicidal behaviors by enhancing the attachment of social ties between parents and youth. Williams and Guerra (2010) found more important than whether teachers reported a sense of informal social control, was the importance of trust and social cohesion between students as important factors to reduce the frequency of self-reported bullying.

Informal social control has been explored with adolescent populations in relation to crime, delinquency and violence as well as adult populations and the perpetration of violence. Studies hypothesize that in neighborhoods with informal social control, residents may conform to positive social norms, which may improve health status. Maimon and Browning (2010) found teens living in neighborhoods where residents monitor adolescent behavior was a deterrent to engage in criminal activity even when engaging in unstructured social time. While findings of an association between collective efficacy and intimate partner violence differed across two studies, both studies concluded neighborhood social norms may be an important mechanism of informal social control. (Fagan, et al.; Simons, et al. 2005) Karasek, et al. (2012) did not find collective efficacy to be associated with smoking cessation, they did however find in neighborhoods where smoking was socially unacceptable more residents reported quitting. Way, et al. explored the role of collective efficacy on married and unmarried teen birth rate in neighborhoods with high or low concentrations of Hispanic residents. Their study revealed differences depending on ethnic concentration. Teen childbearing may be subject to social and cultural norms as well as the influence of neighborhood cohesion and control. In addition, Schnurr and Lohman found neighborhoods with high collective efficacy and high domestic violence, adolescents were more likely to engage in dating violence, suggesting perhaps a social acceptance of intimate partner violence. While results from these studies strongly support the importance of social context on health, findings also reveal social norms may influence health promoting behaviors, such as a reduction in smoking, substance use, or sexual risk taking, in potentially different ways than informal social control. Future research should focus on disentangling aspects of social norms and informal social control to understand in what ways these processes work differently and in unison to impact health outcomes.

Researchers have proposed a number of potential pathways for how collective efficacy may influence individual health including the role of stress, social support and resources, social control through the promotion of positive social norms and increased political will. In neighborhoods with violence and crime, such as drug dealing, prostitution and gun violence, residents may have a heightened sense of fear and lack of safety that leads to an increase in daily stress. Heightened and prolonged stress response has been linked to a number of poor health outcomes including premature mortality, chronic disease, low birth weight and preterm delivery. (McEwen & Stellar, 1993; Mujahid et al., 2011; Lu & Halfon, 2003) Evidence suggests neighborhoods with high collective efficacy may have reduced violence, crime and adolescent delinquency, coupled with more social support, reducing overall stress in resident's daily lives. The role collective efficacy plays in promoting or obstructing stressful neighborhood environments is an area of future inquiry.

Most studies reviewed use census level data to gather information about a specific neighborhood, and rely on survey data for individual level responses to neighborhood social conditions. Census tracts may not reflect the lived experience of residents and what they define as their “neighborhood”. Schools, however, provide specific boundaries with regular and consistent contact among students, teachers and administrators. Two studies in this review found positive effects of student collective efficacy among school children on bullying behavior and reducing problem behavior in afterschool programs. (Williams & Guerra; Simons, et al.) Additional research in education has found positive associations between teacher collective efficacy and student achievement outcomes. (Goddard, et al. 2000). Measuring collective efficacy within the school or classroom setting, which has a set boundary and repeated social interactions with the same characters may provide opportunities to understand the mechanisms of how collective efficacy contributes to improved outcomes. In addition, most neighborhood surveys interview adults at least 18 years or older. Their responses are then used to investigate child or adolescent outcomes. While an adult may perceive a neighborhood has high collective efficacy that does not mean a child or adolescent experiences it in the same way. One of the studies in this review combined adult and youth responses, although did not report differences in collective efficacy scores. (Simons, et al., 2005) Future research may want to test both child and adult perceptions to uncover in what ways they are similar or different. Additionally, surveys of children in schools may provide a more accurate description of perceptions of collective efficacy in their day-to-day lives and deserves focused attention.

Collective efficacy may be an important moderating factor for certain populations more than others. Older adult populations may rely heavily on local city services and stay in close proximity to their homes for social interaction. (Schnurr & Lohman, 2013) Children, who rely heavily on their parents and school friendships for social support and development of behavior norms, may also benefit from neighborhood and classroom collective efficacy. Given the explosion of social media and online social networks, it is important to explore the relevance of collective efficacy for different groups. Adolescents may have a different context for collective efficacy, where measuring it at the neighborhood or even classroom level may not be as important as across virtual social networks. Research shows adolescents seek information on line and create virtual communities that shape social norms and establish peer informal social control. (Starling, et al 2016) Exploring the role of technology and collective efficacy among online communities is an important area of future inquiry.

It is also important for survey data to reflect the growing diversity of urban U.S. cities. Much of the existing survey data examines differences between Whites, African Americans and Hispanics (which includes a broad category of central and South Americans). Racism, income inequality, and lack of access to goods and resources may make building collective efficacy difficult across diverse populations. We need a more nuanced understanding of how collective efficacy works in racially, ethnically and linguistically diverse neighborhoods. Legacies of disenfranchisement for certain groups and social policies aimed at segregation and exclusion have created neighborhoods of mistrust, discontent and conflict. This exclusion and segregation may lead to feelings of powerlessness and directly affect a community’s sense of control. It is unclear how these feelings may effect building collective efficacy in diverse neighborhoods.

Some studies in this review consider the role of collective efficacy in affluent neighborhoods. Residential stability, ethnic homogeneity and increased homeownership are more prevalent in affluent neighborhoods, potentially facilitating social cohesion among residents and a strong sense of community. (Long & Perkins, 2007) These, in turn, may influence health and well-being. Lindblad, et al. found higher levels of collective efficacy in neighborhoods with concentrated affluence and were racially and ethnically homogenous. In addition, concentrated affluence may procure political will and ensure high quality services such as health care, recreational facilities, and open space. (Browning & Cagney, 2003) Studies comparing collective efficacy across a spectrum of affluence and deprivation may help uncover potential mechanisms of how collective efficacy influence health.

It is unclear if collective efficacy in a neighborhood can change. All but three studies covered in this review used cross-sectional data, and of the studies that incorporated a longitudinal design, none assessed whether collective efficacy changed over time. Two studies not covered in this review found collective efficacy remained stable over 4 and 7 year time periods. (Schmidt et al., 2014; Sampson, 2012) Few interventions have focused efforts to increase the collective efficacy of a neighborhood, although place-based initiatives are beginning to. Additional research is needed to uncover whether interventions aimed at increasing collective efficacy are effective and if this change has any lasting effects on the health and well-being of participants.

Conclusion

The overarching question of this review is whether collective efficacy plays an important role in shaping individual health. While the results of the review do not entirely answer this question, the wide-array of studies reveal important insights into the complex interplay of social context with individual level outcomes. Evidence suggests neighborhoods with high collective efficacy have lower levels of violence, exert social control over adolescent behavior and have residents with a higher probability of better health on some measures. In some instances collective efficacy strengthens other factors related to positive health. These are promising results and we believe it should be an area of continued inquiry. Future research needs to explore interventions aimed at increasing social cohesion among residents and if and how informal social control changes as a result. Longitudinal studies would enhance our understanding of collective efficacy's change over time, and whether successful efforts to increase collective efficacy has lasting health effects.

Table 1: Neighborhood and school studies of collective efficacy and health outcomes, 1997-2015.

Author & Year	Data Source and Sample Size	Outcome	Covariates	Measurement of Collective Efficacy	Main Findings
Ahern, et al. 2013	<ul style="list-style-type: none"> New York Social Environment Study 2000 Census N=4,000 59 community districts 18+ years old 	<ul style="list-style-type: none"> Experience of violent victimization for respondent or anyone in household in the past year 	<ul style="list-style-type: none"> Socio demographic: age, race/ethnicity, sex, marital status, place of birth, education, income, residential tenure, interview language Neighborhood structural factors: concentrated poverty, African American non-immigrant, immigrant, residential stability 	<ul style="list-style-type: none"> 5 item Likert scale for social cohesion 5 item Likert scale for informal social control 	<ul style="list-style-type: none"> Reduced prevalence of violent victimization in neighborhoods with high collective efficacy
Ahern & Galea. 2011	<ul style="list-style-type: none"> New York Social Environment Study 18+ years old 59 community districts 	<ul style="list-style-type: none"> Depression assessed with Patient Health Questionnaire-9 	<ul style="list-style-type: none"> Socio demographic: age, gender, race, marital status, place of birth, educational level, income, employment status, illness or injury in last 12 mo, financial problems in last 12 mo, years lived in current neighborhood, survey language 	<ul style="list-style-type: none"> 5 item Likert scale for social cohesion 5 item Likert scale for informal social control 	<ul style="list-style-type: none"> No significant effects of depression prevalence when living in neighborhood with high collective efficacy versus low collective efficacy Positive protective effect for depression among adults 65 years and older; high collective efficacy neighborhood estimated depression prevalence at 2% compared to 8.2% in neighborhoods with low collective efficacy
Browning. 2002	<ul style="list-style-type: none"> PHDCN 1990 Census Block & Block homicide data 1993 	<ul style="list-style-type: none"> IPV by type experienced including homicide and nonlethal severe harm 	<ul style="list-style-type: none"> Socio demographic: age, race, income, hx of sexual trauma, education, marital status, residential tenure, relationship conflict, sources of support 	<ul style="list-style-type: none"> 5 item Likert scale for social cohesion 5 item Likert scale for informal social control 	<ul style="list-style-type: none"> 1 SD increase in collective efficacy associated with a 47% reduction in odds in # of intimate partner homicides Collective efficacy mediated the relationship between concentrated disadvantage and IP homicide

Chicago Health and Social Life Survey	Neighborhood structural factors: concentrated disadvantage, residential stability, immigrant concentration	• The + association of collective efficacy on IPV is reduced in neighborhoods with higher levels of nonintervention norms for IPV
• N=199		
• 77 neighborhood clusters		
• Females 18-59 years old		
• PHDCN		
• 1990 Census		
• N=768		
• 80 neighborhood clusters		
Browning, et al. 2008	<ul style="list-style-type: none"> • Socio demographic: age, race/ethnicity, immigrant generation, annual household income, education of primary caregiver, occupation of primary caregiver, two biological parents, family size. • Family processes • Individual behavior: peer deviance; pubertal development, prior problem behavior, sociability. • Neighborhood structural factors: concentrated poverty, residential stability, immigrant concentration 	<ul style="list-style-type: none"> • CE significantly associated with negative effects on reporting 2+ sexual partners vs 1 partner structural controls • As age increases the regulatory effect of CE increases, but no statistically sig effect of CE for pre adolescents For 15 yo 1 SD increase in CE reduced the odds of two or more sexual partners by 56%
	<ul style="list-style-type: none"> • 5 item Likert scale for social cohesion • Combined intergenerational closure and informal social control into 5 item scale 	
Browning and Cagney. 2002	<ul style="list-style-type: none"> • Socio demographic: gender, race/ethnicity, age, income, education, marital status, residential tenure, foreign born, type of insurance coverage, health behavior, 	<ul style="list-style-type: none"> • Individuals in higher collective efficacy neighborhoods report better health • Education was associated with self-rated health in high collective efficacy neighborhoods
	<ul style="list-style-type: none"> • Self-reported physical health in the last 30 days 	
	<ul style="list-style-type: none"> • PHDCN • 1990 Census • 1991-2000 Metropolitan Chicago Information Center Survey • N= 2,218 	

<ul style="list-style-type: none"> ● 333 neighborhood clusters ● 18+ years old 	<p>experience of specific medical conditions</p> <ul style="list-style-type: none"> ● Neighborhood structural factors: concentrated disadvantage, residential stability, immigrant concentration ● Neighborhood measure of ever experienced violent victimization in neighborhood ● Aggregate measure of self-rated health for each neighborhood 	<p>and “you can count on adults in this neighborhood to watch out that children are safe and don’t get into trouble”</p> <ul style="list-style-type: none"> ● One additional question for informal social control 	<ul style="list-style-type: none"> ● Low collective efficacy neighborhoods education doesn’t appear to have much impact on health.
<p>Browning, et al. 2014</p> <ul style="list-style-type: none"> ● PHDCN data ● 1990 Census ● N=1227 ● 80 neighborhood clusters 	<ul style="list-style-type: none"> ● Youth internalizing and externalizing behavior measured by the Child Behavior Checklist ● Primary caregiver responses to survey 	<ul style="list-style-type: none"> ● Socio demographic: gender, age, race/ethnicity, immigrant generation, parental income, education and employment status ● Primary caregiver demographic: marital status, employment status, household size, residential tenure, family hx of mental illness ● Family processes ● Neighborhood structural factors: concentrated disadvantage (% residents below FPL, % on public assistance, % unemployed, % female headed households), immigrant concentration, residential stability 	<ul style="list-style-type: none"> ● 5 item Likert scale for social cohesion ● 5 item Likert scale for informal social control
<p>Browning, et al. 2014</p>	<ul style="list-style-type: none"> ● As collective efficacy increases the negative impact of exposure to severe violence on internalizing and externalizing behavior decreases for girls ● No significant interactions for exposure to violence and collective efficacy among boys ● No main effect of collective efficacy on girls mental health 		

Cohen, et al. 2006	<ul style="list-style-type: none"> Los Angeles Family and Neighborhood Survey (LAFANS) 1990 & 2000 Census N=807 12-17 year olds 65 census tract clusters N=3558 for responses to collective efficacy 	<ul style="list-style-type: none"> BMI: self-report of height and weight 	<ul style="list-style-type: none"> Socio demographic: age, sex, race/ethnicity, nativity of parents Primary caregiver demographic: marital status, education, income, employment status, health insurance, BMI Neighborhood structural factors: poor families, public assistance, female headed households, male unemployment 	<ul style="list-style-type: none"> 9 item scale of social cohesion and informal social control 	<ul style="list-style-type: none"> Higher levels of collective efficacy associated with lower BMI Higher collective efficacy lower risk for being overweight Higher collective efficacy reduced likelihood of being overweight as a child
Emery, et al. 2011	<ul style="list-style-type: none"> PHDCN 1990 Census N=1,023 77 neighborhood clusters 	<ul style="list-style-type: none"> Self-report of intimate partner violence measured by Conflict Tactics Scale 	<ul style="list-style-type: none"> Socio demographic: race, education, # of children in household, type of IPV recorded Neighborhood structural factors: concentrated disadvantage, ethnic heterogeneity, residential instability 	<ul style="list-style-type: none"> 5 item Likert scale for social cohesion 5 item Likert scale for informal social control 	<ul style="list-style-type: none"> Collective efficacy was not related to intimate partner violence desistance
Fagan, et al. 2014	<ul style="list-style-type: none"> PHDCN 1990 Census N=1,718 79 Neighborhood units 	<ul style="list-style-type: none"> Any tobacco, alcohol, marijuana (TAM) in the past month; any violence in the past year; variety of TAM in the past month; variety of violence in the past year 	<ul style="list-style-type: none"> Socio demographic: age, male, race/ethnicity, SES, low self-control, routine activities, curfew, family social support, peer social support, peer drug use, perceptions of drug harmfulness, any prior TAM use, peer delinquency, any prior violence 	<ul style="list-style-type: none"> 5 item Likert scale for social cohesion 5 item Likert scale for informal social control 	<ul style="list-style-type: none"> Higher violence exposure associated with greater TAM use, perpetration of violence Victimization related to greater variety of substance use and violent behaviors CE moderates effect on variety of substance abuse → higher CE leads to weaker relationship between victimization and substance use for youth

Hughes Halbert, et al. 2014	<ul style="list-style-type: none"> • Telephone Survey • African American men and women • 18-75 years old • N=338 	<ul style="list-style-type: none"> • Assessed obesity related behaviors based on the health information National Trends Survey: daily fruit and vegetable intake; physical activity within the past month 	<ul style="list-style-type: none"> • Neighborhood structural factors: % residents below FPL, % receiving public assistance, % unemployed • Socio demographic: gender, age, marital status, education level, employment status, income, health insurance, source of medical care • Individual behavior: last medical check-up, participation in community organization 	<ul style="list-style-type: none"> • 8 item Likert scale 	<ul style="list-style-type: none"> • Higher collective efficacy related to higher fruit intake • Higher collective efficacy not associated with increased vegetable intake • Collective efficacy not associated with physical activity
Karasek, et al. 2012	<ul style="list-style-type: none"> • New York Social Environment Study • 18+ years old • 59 community districts • N=4,000 for neighborhood measures • N=863 eligible for outcome 	<ul style="list-style-type: none"> • Incidence of smoking cessation assessed using the World Mental Health Comprehensive International Diagnostic Interview tobacco module 	<ul style="list-style-type: none"> • Socio demographic: gender, age, race/ethnicity, income, marital status, education, place of birth, employment, years lived in current neighborhood • Individual behavior: individual responses to acceptability of smoking 	<ul style="list-style-type: none"> • 5 item Likert scale for social cohesion • 5 item Likert scale for informal social control 	<ul style="list-style-type: none"> • No significant association between collective efficacy and smoking cessation • No combined relationship between collective efficacy and social norms on smoking cessation • Significant association between smoking cessation and neighborhood smoking norms; higher cessation in neighborhoods with low acceptance for smoking
Kim J. 2010	<ul style="list-style-type: none"> • LAFANS • Census 2000 • N=859 • 12-17 year olds • N=2,671 for the collective efficacy measure 	<ul style="list-style-type: none"> • Ever had sex (Y/N) 	<ul style="list-style-type: none"> • Socio demographic: age, gender, race/ethnicity, parental monitoring, activity participation, family composition, family income • Neighborhood structural factors: 	<ul style="list-style-type: none"> • 6 item Likert scale for social cohesion • 3 item Likert scale for informal social control 	<ul style="list-style-type: none"> • No effect on entire study population • Collective efficacy protective for ever having had sex among males who did not participate in out of school activities

- 65 neighborhood units
- Lindblad, et al. 2013
- Community Advantage Panel Survey
 - Census
 - N=1,902
- Survey response to perceptions of neighborhood crime and disorder
- Socio demographic: homeownership, age, education, employment, household income, race/ethnicity, gender, partner status, children in household, individual efficacy, region in U.S., cost of living index
 - Neighborhood structural factors: residential tenure, concentrated affluence, housing cost to rent ratio, house value, immigrant concentration, income/household, income/person, minority, neighborhood disadvantage, homes owned, population density, median rent, % with children, neighborhood homogeneity of: education, employment, household size, income, marital status, occupation and race/ethnicity
- 12 “sense of community” items measuring social cohesion and informal social control
 - Neighborhood collective efficacy associated with less perceived crime and disorder
 - Higher reported collective efficacy among residents 51+ years old
 - Higher collective efficacy in concentrated affluence neighborhoods
 - Higher collective efficacy in racially homogeneous neighborhoods
- Maimon & Browning. 2010
- PHDCN
 - Census 1990
 - 8-18 years old
 - N=842
- Unstructured socializing with peers
 - Violent offending
- Socio demographic: gender, age, race, parental marital status, family SES, impulsivity, family attachment, parental
- 5 item Likert scale for social cohesion
 - Combined intergenerational closure and informal
 - Collective efficacy positively associated with unstructured socializing
 - Unstructured socializing with peers increases probability of

<ul style="list-style-type: none"> ● 78 neighborhoods 	<p>supervision, deviant peers, unstructured socializing, violent behavior</p> <ul style="list-style-type: none"> ● Neighborhood structural factors: concentrated disadvantage, immigrant concentration, residential stability 	<p>social control into 5 item scale</p>	<p>violent offending in low collective efficacy neighborhoods</p>
<p>Maimon, et al. 2010</p>	<ul style="list-style-type: none"> ● PHDCN ● N=990 ● 12-15 year olds ● 78 neighborhood units 	<ul style="list-style-type: none"> ● Self-report of suicide attempts 	<ul style="list-style-type: none"> ● Girls, older age, Latino ethnicity, depression + correlate with increased prevalence of suicide attempt ● Length of family residence – associated with suicide attempts ● Collective efficacy not significantly associated with suicide attempts ● Neighborhoods with high collective efficacy (1 SD above the mean) coupled with strong family attachment were protective against adolescent suicide attempts
<p>O'Brien, Kauffman. 2013</p>	<ul style="list-style-type: none"> ● Binghamton Neighborhood Project (BNP) 2011 ● built environment assessment 2009 ● American Community Survey (ACS) ● 9-12th grade students 	<ul style="list-style-type: none"> ● Prosociality: behavior that benefits society as a whole as well as obeying rules or conforming to socially accepted norms measured by the Developmental Assets Profile 	<ul style="list-style-type: none"> ● Higher collective efficacy predicted higher prosociality in adolescents

- N=642
 - 59 Census block neighborhoods
 - Project on Human Development in Chicago Neighborhoods (PHDCN)
 - 1990 Census
 - N=8782
 - 343 neighborhood clusters 18+ years old
 - Socio demographic: gender, age, race/ethnicity, marital status, education, homeowner, residential tenure, SES
 - Neighborhood structural factors: concentrated disadvantage (below poverty line, public assistance, female-headed households, unemployed, below 18 yrs, African American); immigrant concentration; residential stability
 - 5 item Likert scale for social cohesion
 - 5 item Likert scale for informal social control
 - Collective efficacy associated with reduced neighborhood violence
 - 2 SD increase in collective efficacy associated with 30% reduced odds of violent victimization
 - 2 SD increase in collective efficacy associated with 39% reduction in expected homicide rate
- Sampson, et al. 1997
- Neighborhood violence
 - Violent victimization
 - Homicide incidents
- Welfare, Children, and Families: A Three City Study survey (1999)
- 2000 Census
 - N=765
 - Adolescents' perpetration of dating violence: modified version of the Revised Conflict Tactics Scale
 - Adolescent risks: drug and alcohol use, anxiety, depressive symptoms, externalizing behavior problems
 - Family: domestic violence, mother/father-child hostility, low monitoring
 - School: academic difficulties, low involvement with school, antisocial peer involvement
 - Neighborhood: racial segregation, concentrated economic disadvantage,
- Schnurr & Lohman. 2013
- 9 item Likert scale; 5 questions related to informal social control & 4 items to social cohesion
 - Males and African American males high collective efficacy associated with increase in dating violence
 - High CE neighborhoods with high DV associated with higher perpetration of dating violence
 - Perceived neighborhood CE buffered relationship between early academic difficulties and later perpetration of dating violence for Hispanic males

Simons, et al. 2005	<p>residential instability, neighborhood crime</p> <ul style="list-style-type: none"> • Socio demographic: sex, household structure • Caregiver demographic: household income, education level • Neighborhood structural factors: % residents unemployed, % below FPL, % receiving public assistance, % female headed households, % African American, residential stability 	<ul style="list-style-type: none"> • Delinquency measured by the Diagnostic Interview Schedule for Children Version 4 (conduct disorder section) • Affiliation with deviant peers measured using instrument adapted by National Youth Survey 	<ul style="list-style-type: none"> • Family and Community Health Study • 1990 Census • 36 community clusters • Family had one child in 5th grade at recruitment • N=633 children and caregivers • 10-12 years old 	<ul style="list-style-type: none"> • 15 item scale (5 items from Sampson et al. scale) additional 10 to measure social cohesion e.g. "People do favors for each other" • 8 item scale to measure informal social control • Caregiver and child reports were summed to assess collective efficacy <ul style="list-style-type: none"> • Authoritative parenting reduces interaction with deviant peers, effect is stronger in neighborhoods with high collective efficacy • Higher reported collective efficacy in neighborhoods of higher residential stability • Lower reported collective efficacy in neighborhoods of concentrated disadvantage
Smith, et al. 2013	<ul style="list-style-type: none"> • Socio demographic: gender, race/ethnicity, grade (2nd, 3rd, 4th, 5th) 	<ul style="list-style-type: none"> • Behavior outcomes • Group cohesion 	<ul style="list-style-type: none"> • Leading, Educating, Guiding, A Community of Youth Together Afterschool survey • 2nd – 5th grade children • N=227 • 3 school districts 	<ul style="list-style-type: none"> • Developed 12 item 3 point scale specific to young children • Social cohesion e.g. "I feel like I am a part of my afterschool program" • Informal social control e.g. "If children in this program are misbehaving, other children remind them to do their best." <ul style="list-style-type: none"> • Gender variation in response with girls reporting higher collective efficacy than boys • Child perception of willingness of group to intervene found to be related to less problem behavior • Informal social control related to reduced problem behavior • Social cohesion led to + social environment • Children who reported feeling connected to their afterschool peers reported more + behavior
Way, et al. 2006	<ul style="list-style-type: none"> • Socio demographic: age, race/ethnicity • Neighborhood Structural factors: % African American, % Hispanic, % 	<ul style="list-style-type: none"> • Married and unmarried teen birth rate 	<ul style="list-style-type: none"> • LAFANS • 2000 Census • 65 census tracts • 10-19 year olds 	<ul style="list-style-type: none"> • 6 item scale for social cohesion • 3 item scale for informal social control <ul style="list-style-type: none"> • Collective efficacy associated with lower unmarried teen birth rate in neighborhoods with less than 50% Hispanic concentration

- N=2600 responses for collective efficacy
- Census tracts with less than 50% Hispanic residents and higher levels of collective efficacy had the lowest mean birthrates
- Census tracts with more than a 50% Hispanic population 1-SD increase in collective efficacy was not associated with unmarried birth rates
- Census tracts with + 50% Hispanic population & 1 SD increase in collective efficacy associated with a 3.43 births per 1000 increase in the married teen birth rate

foreign born Hispanic, Households on public assistance, female headed households, households living in poverty, male unemployment

Williams & Guerra. 2011

- Responses to part of bullying prevention initiative in Colorado
- N=7,299
- 78 school/communitiy center clusters
- Self-report of bully perpetration based on answers to nine questions e.g. "I pushed, shoved, tripped, or picked fights with students I know are weaker than me".
- Socio demographic: age, gender, ethnicity (white or ethnic minority)
- 7 item scale for social control e.g. "students in my school can be trusted"
- 8 item informal social control scale e.g. "students (teachers) in your school would help out if a student is spreading rumors and lies about another student behind their back"
- As perceptions of school level collective efficacy increased involvement in bullying perpetration decreased
- Social cohesion and trust among peers significantly associated with reducing bullying perpetration

Table 2: Quality Assessment Rankings for Articles on Neighborhood Collective Efficacy and Health, Published, 1997-2015.

Author & Year	Individual & Neighborhood Measures	Neighborhood Changes for Longitudinal Analysis	Validated Scale or Used Study to Validate
Ahern, et al. 2013	No	N/A	Yes
Ahern & Galea. 2011	No	N/A	Yes
Browning. 2002	Yes	N/A	Yes
Browning, et al. 2008	Yes	N/A	Yes
Browning, et al. 2014	Yes	N/A*	Yes
Browning and Cagney. 2002	Yes	N/A	Yes
Cohen, et al. 2006	Yes	N/A	Yes
Emery, Jolley & Wu. 2011	Yes	N/A	Yes
Fagan, Wright, Pinchevsky. 2014	Yes	N/A	Yes
Hughes Halbert C, et al. 2014	No	N/A	Yes
Karasek, et al. 2012	No	N/A	Yes
Kim J. 2010	No	N/A	Yes
Lindblad, Manturuk & Quercia. 2013	Yes	N/A	Yes
Maimon & Browning. 2010	Yes	Yes	Yes
Maimon, Browning & Brooks-Gunn. 2010	Yes	N/A	Yes
O'Brien & Kauffman. 2013	Yes	N/A	Yes
Sampson, Raudenbush & Earls. 1997	Yes	N/A	Yes
Schnurr & Lohman. 2013	Yes	N/A	Yes
Simons, Gordon Simons, Burt, et al. 2005	Yes	No	Yes
Smith, et al. 2013	N/A	N/A	Based on scale developed by Sampson, et al (1997), adapted for children in afterschool programs. 12 questions assess informal social control
Way, Finch & Cohen. 2006	Yes	N/A	Yes
Williams & Guerra. 2011	Students nested in schools, no measures used for diff across schools	No, single year fall to spring changes for eligible students	Yes

Table 3 Collective Efficacy Scale Items

Scale Questions				
Author and Year	No of Scale Items	Social Cohesion	No of Scale Items	Informal Social Control
Ahern, et al. 2013	5	<ol style="list-style-type: none"> 1. People around here are willing to help their neighbors 2. This is a close knit neighborhood 3. People in this neighborhood can be trusted 4. People in this neighborhood generally don't get along with each other 5. People in this neighborhood do not share the same values 	5	<p>Likelihood if neighbors would intervene if:</p> <ol style="list-style-type: none"> 1. Children were skipping school and hanging out on a street corner 2. Children were spray painting graffiti on a local building 3. Children were showing disrespect to an adult 4. A fight broke out in front of their house 5. The fire station closest to their home was threatened with budget cuts
Ahern & Galea. 2011	5	<ol style="list-style-type: none"> 1. People around here are willing to help their neighbors 2. This is a close knit neighborhood 3. People in this neighborhood can be trusted 4. People in this neighborhood generally don't get along with each other 5. People in this neighborhood do not share the same values 	5	<p>Likelihood if neighbors would intervene if:</p> <ol style="list-style-type: none"> 1. Children were skipping school and hanging out on a street corner 2. Children were spray painting graffiti on a local building 3. Children were showing disrespect to an adult 4. A fight broke out in front of their house 5. The fire station closest to their home was threatened with budget cuts
Browning. 2002	5	<ol style="list-style-type: none"> 1. People around here are willing to help their neighbors 2. This is a close knit neighborhood 3. People in this neighborhood can be trusted 4. People in this neighborhood generally don't get along with each other 5. People in this neighborhood do not share the same values 	5	<p>Likelihood if neighbors would intervene if:</p> <ol style="list-style-type: none"> 1. Children were skipping school and hanging out on a street corner 2. Children were spray painting graffiti on a local building 3. Children were showing disrespect to an adult 4. A fight broke out in front of your house and someone was being beaten or threatened 5. Because of budget cuts the fire station near your home was going to be closed down by the city
Browning, et al. 2008	5	<ol style="list-style-type: none"> 1. People around here are willing to help their neighbors 2. This is a close knit neighborhood 3. People in this neighborhood can be trusted 4. People in this neighborhood generally don't get along with each other 5. People in this neighborhood do not share the same values 	5	<p>Combination of intergenerational closure and informal social control:</p> <ol style="list-style-type: none"> 1. Parents in this neighborhood know their children's friends 2. Adults in this neighborhood know who the local children are 3. There are adults in this neighborhood that children can

	5	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close knit neighborhood</p> <p>3. People in this neighborhood can be trusted</p> <p>4. People in this neighborhood generally don't get along with each other</p> <p>5. People in this neighborhood do not share the same values</p>	5	<p>look up to</p> <p>4. Parents in this neighborhood generally know each other</p> <p>5. You can count on adults in this neighborhood to watch out that children are safe and don't get in trouble</p> <p>Likelihood if neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of your house and someone was being beaten or threatened</p> <p>5. Because of budget cuts the fire station near your home was going to be closed down by the city</p>
Browning and Cagney. 2002	5	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close knit neighborhood</p> <p>3. People in this neighborhood can be trusted</p> <p>4. People in this neighborhood generally don't get along with each other</p> <p>5. People in this neighborhood do not share the same values</p>	5	<p>Likelihood if neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of your house and someone was being beaten or threatened</p> <p>5. Because of budget cuts the fire station near your home was going to be closed down by the city</p>
Cohen, et al. 2006	5	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close knit neighborhood</p> <p>3. There are adults that kids look up to</p> <p>4. People in this neighborhood generally don't get along</p> <p>5. People in this neighborhood don't share the same values</p>	5	<p>1. Adults watch out that kids are safe</p> <p>2. Neighbors will do something if a kid is hanging out</p> <p>3. Children were spray painting graffiti on a local building</p> <p>4. Neighbors would scold child who is showing disrespect to an adult</p> <p>Their neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of their house</p> <p>5. The fire station closest to their home was threatened with budget cuts</p>
Emery, et al. 2011	6	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close knit neighborhood</p> <p>3. People in this neighborhood generally don't get along with each other</p> <p>5. People in this neighborhood do not share the same values</p>	5	<p>Their neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of their house</p> <p>5. The fire station closest to their home was threatened with budget cuts</p>
Fagan, et	5	<p>1. People around here are willing to help their neighbors</p>	5	<p>Their neighbors would intervene if:</p>

al. 2014		<p>2. This is a close knit neighborhood</p> <p>3. People in this neighborhood can be trusted</p> <p>4. People in this neighborhood generally don't get along with each other</p> <p>6. People in this neighborhood do not share the same values</p>		<p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of their house</p> <p>5. The fire station closest to their home was threatened with budget cuts</p>
Hughes Halbert, et al. 2014	8	8 item scale used; questions not included in article		
Karasek, et al. 2012	5	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close knit neighborhood</p> <p>3. People in this neighborhood can be trusted</p> <p>4. People in this neighborhood generally don't get along with each other</p> <p>5. People in this neighborhood do not share the same values</p>	5	<p>Their neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of their house</p> <p>5. The fire station closest to their home was threatened with budget cuts</p>
Kim J. 2010	6	<p>1. This is a close knit neighborhood</p> <p>2. People don't generally get along</p> <p>3. People are willing to help neighbors</p> <p>4. People do not share the same values</p> <p>5. Adults watch out for kids' safety</p> <p>6. There are adults children can look up to</p>	3	<p>1. Neighbors would do something if kids were having out</p> <p>2. Neighbors would do something if kids were doing graffiti</p> <p>3. Neighbors would scold if kids showed disrespect</p>
Lindblad, et al. 2013	8	<p>1. I think my neighborhood is a good place to live</p> <p>2. My neighbors and I want the same thing from the neighborhood</p> <p>3. I can recognize most of the people that live in my neighborhood</p> <p>4. I feel at home in my neighborhood</p> <p>5. I care what my neighbors think of my actions</p> <p>6. If there is a problem in my neighborhood people who live here can get it solved</p> <p>7. It is very important to me to live in this particular neighborhood</p> <p>8. I expect to live in this neighborhood for a long time</p>	3	<p>1. If a fight broke out in front of your house</p> <p>2. If a child were showing disrespect to an adult</p> <p>3. If children were spray-painting graffiti on a local building</p>

Maimon & Browning. 2010	5	<p>1. This is a close knit neighborhood</p> <p>2. People in this neighborhood don't generally get along</p> <p>3. People around here are willing to help neighbors</p> <p>4. People do not share the same values</p> <p>5. People in this neighborhood can be trusted</p>	5	<p>Combination of intergenerational closure and informal social control:</p> <p>1. Parents in this neighborhood know their children's friends</p> <p>2. Adults in this neighborhood know who the local children are</p> <p>3. There are adults in this neighborhood that children can look up to</p> <p>4. Parents in this neighborhood generally know each other</p> <p>5. You can count on adults in this neighborhood to watch out that children are safe and don't get in trouble</p>
Maimon, et al. 2010	5	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close knit neighborhood</p> <p>3. People in this neighborhood can be trusted</p> <p>4. People in this neighborhood generally don't get along with each other</p> <p>5. People in this neighborhood do not share the same values</p>	5	<p>Combination of intergenerational closure and informal social control:</p> <p>1. Parents in this neighborhood know their children's friends</p> <p>2. Adults in this neighborhood know who the local children are</p> <p>3. There are adults in this neighborhood that children can look up to</p> <p>4. Parents in this neighborhood generally know each other</p> <p>5. You can count on adults in this neighborhood to watch out that children are safe and don't get in trouble</p>
O'Brien, Kauffman. 2013	3	<p>Three questions asked, only one question included in paper:</p> <p>1. People in my neighborhood are willing to help each other</p>	3	<p>Three questions asked, one included in paper:</p> <p>1. I have a safe neighborhood</p>
Sampson, et al. 1997	5	<p>1. People around here are willing to help their neighbors</p> <p>2. This is a close-knit neighborhood</p> <p>3. People in this neighborhood can be trusted</p> <p>4. People in this neighborhood generally don't get along with each other</p> <p>5. People in this neighborhood do not share the same values</p>	5	<p>Their neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of their house</p> <p>5. The fire station closest to their home was threatened with budget cuts</p>
Schnurr & Lohman. 2013	4	<p>1. This neighborhood is a good place to raise my kids</p> <p>2. People around here are willing to help their neighbors</p> <p>3. This is a close knit neighborhood</p>	5	<p>Their neighbors would intervene if:</p> <p>1. Children were skipping school and hanging out on a street corner</p>

		4. People around here can be trusted		<p>2. Children were spray painting graffiti on a local building</p> <p>3. Children were showing disrespect to an adult</p> <p>4. A fight broke out in front of their house</p> <p>5. The fire station closest to their home was threatened with budget cuts</p>
Simons, et al. 2005*	10	<p>1. Neighbors get together to deal with local problems</p> <p>2. The neighborhood is close-knit</p> <p>3. There are adults in the neighborhood children can look up to</p> <p>4. People are willing the help their neighbors</p> <p>5. People do not get along</p> <p>6. People provide social support to each other</p> <p>7. People share the same values</p> <p>8. People can be trusted</p> <p>9. People do favors for each other</p> <p>10. People watch over each other's property while they are away</p>	4	<p>Primary caregivers responded to:</p> <p>1. Adults in the neighborhood know the parents and children who live in the area</p> <p>2. Notify parents, the school, or police when they see children misbehaving</p> <p>3. Attempt to correct unruly children</p> <p>4. Scold children who show disrespect to adults</p> <p>Target children responded to the probability that neighborhood residents would do something about:</p> <p>1. Children spray painted graffiti on a building</p> <p>2. Showed disrespect to an adult</p> <p>3. Skipped school and were hanging out on a street corner</p>
Smith, et al. 2013**	8	<p>1. I feel close to people at my afterschool program</p> <p>2. I feel like I am part of my afterschool program</p> <p>3. I am happy to be at my afterschool program</p> <p>4. The staff in my afterschool program treats children fairly?</p> <p>5. I have trouble getting along with the staff in my afterschool program</p> <p>6. I feel that my afterschool program staff cares about me.</p> <p>7. I feel safe in my afterschool program.</p> <p>8. I like the children in my afterschool program.</p>	12	<p>1. If children in this program are misbehaving, other children remind them to act their best.</p> <p>2. If other children start to say bad things to each other, children in this program remind them to say something good to each other.</p> <p>3. In this program, if we see one child hurting another child, we would tell them to stop.</p> <p>4. In our program, we can be leaders and help other children do well in our program.</p> <p>5. In this program, I feel like other children listen to me when I have something to say.</p> <p>6. The children in our program know how to stick up for a child who is being hurt or treated badly</p> <p>7. The children in our program know how to do our work and not let other children get us in trouble.</p> <p>8. At my afterschool program, if some other kids are going to do something bad, I tell someone who can help</p>

				<p>9. In this program, we help each other when we have problems</p> <p>10. If a child is teasing another child because they are not good at sports or exercise, other children tell him or her to stop</p> <p>11. In this program, if a kid was going to do something to hurt another kid, one of the other kids would tell someone who can help.</p> <p>12. If I was asked by another student at this program to do something that I shouldn't do, one of the kids in my afterschool program would tell me not to do it.</p>
Way, et al. 2006	6	<p>1. This is a close knit neighborhood</p> <p>2. There are adults children can look up to</p> <p>3. People are willing to help their neighbors</p> <p>4. Neighbors generally do not get along with each other</p> <p>5. You can count on adults to watch out that children are safe and do not get in trouble</p> <p>6. Neighbors do not share the same values</p>	3	<p>Estimate the likelihood that neighbors would do something if:</p> <p>1. Neighborhood children were skipping school and hanging out on the street corner</p> <p>2. Children were spray painting graffiti on a local building</p> <p>3. A child was showing disrespect to an adult</p>
Williams & Guerra. 2011	7	<p>1. Students in my school can be trusted</p> <p>2. Students in my school generally get along with each other</p> <p>3. Students in my school generally feel the same way about things</p> <p>4. Teachers in my school can be trusted</p> <p>5. Teachers in my school generally get along with students</p> <p>6. Teachers in my school generally feel the same way about things</p> <p>7. This is a pretty close-knit school where everyone looks out for each other.</p>	4	<p>Four situations were asked about students and then about teachers yielding an 8 item scale</p> <p>1. Students (teachers) in your school would help out to stop bullying if a student is making fun of and teasing another student who is obviously weaker</p> <p>2. A student is spreading rumors and lies about another student behind their back</p> <p>3. A student is telling lies or making fun of another student who gets picked on a lot using the Internet</p> <p>4. A student or group of students is pushing, shoving, or trying to pick a fight with a weaker student</p>

Note: All items were based on a 5 point Likert Scale (1 = Strongly disagree to 5 = Strongly agree) except where * denotes a 4 point Likert scale (1 = very likely to 4 = very unlikely) and ** denotes a 3 point Likert scale (1 = not true, 2 = sometimes true, and 3 = very true).

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Do Neighborhood Social Dynamics Change Over Eight Years? A Longitudinal Analysis of Collective Efficacy in Low-Income Urban Neighborhoods

Introduction

Disparities in health outcomes exist between people living in low resourced neighborhoods compared to their counterparts living in more affluent neighborhoods. (Diez-Roux & Mair, 2010) African American and Hispanic residents are more likely to live in high poverty urban neighborhoods compared to whites, which may contribute to racial and ethnic disparities in health outcomes. (U.S. Census Bureau) For decades researchers have attempted to uncover how neighborhoods influence health, evidenced by the vast literature under the umbrella term “neighborhood effects”. (Sampson, et al. 2002; Diez-Roux, 2001) Several factors have emerged as possible explanations including neighborhood poverty, chronic stress, exposure to environmental toxins, lack of access to high quality goods and services as well as individual and familial health behaviors. (Diez Roux, 2001; Macintyre et al., 2002; Mujahid et al. 2008; Cubbin, et al. 2001; Diez-Roux et al. 1999; Morello-Frosch, et al. 2011) In addition, research shows that an individual’s physical and mental health are dependent on a range of interconnected social characteristics that impact the environment where people live. (Kawachi, 1999; Sampson et al, 2002; Lochner, et al. 2003)

Collective efficacy is one neighborhood social dynamic investigated for its role in health. Collective efficacy refers to the social cohesion among residents and their ability to mobilize together for the greater good of the community. (Sampson et al., 1997) The concept was first developed to explain differences in neighborhood rates of crime and violence. (Sampson, et al. 1997) Research by Sampson et al. (1997) found that less crime and delinquent behavior appeared in neighborhoods where residents reported a sense of cohesion as well as a willingness to intervene if delinquent behavior was observed. They found, unlike other social processes, collective efficacy did not require deep bonds, rather it was the informal everyday interactions between residents that acted as a vehicle to establish social norms and informal monitoring of behavior. Research has found that neighborhoods with high collective efficacy are associated with positive outcomes among children and adolescents such as reduced risk for obesity, sexual risk taking, and reduction in suicide attempts. (Maimon, et al. 2010; Cohen et al. 2006; Kim 2010) Additional studies have shown higher perceived collective efficacy is associated with higher birth weight, improved self-reported health among adults and a reduced prevalence of depression in older adult populations. (Buka et al 2003; Browning & Cagney 2002; Ahern & Galea 2011) Conversely, other studies have found weak to no association between collective efficacy and various mental and physical health outcomes. Hughes Halbert, et al. (2014) did not find an association between higher collective efficacy and reduced risk of obesity measured by physical activity and vegetable intake. Karasek, et al. (2012) found no significant associations between neighborhood collective efficacy and smoking cessation. Browning, et al. (2014) exploring whether collective efficacy moderated the effect of youth exposure to violence on externalizing behaviors among youth found protective effects for girls, but no effects for boys. While results from these studies are mixed, policy and intervention efforts have focused on increasing social cohesion as one mechanism to improve health outcomes among residents in disadvantaged neighborhoods.

Neighborhood collective efficacy theorizes that social cohesion and informal social control lead to collective action and the belief among residents that they can come together and achieve neighborhood goals. Place-based neighborhood change efforts have focused on building social cohesion and mutual trust as a mechanism to mobilize residents toward collective action. (Chaskin, 2001) For example, federally funded programs such as Promise Neighborhoods and Hope VI aim to improve the economic, educational and social conditions so children and families can thrive in target neighborhoods while developing a platform to build social cohesion, community connections, and neighborhood support systems among residents. For the most part however, these place-based efforts employ untested assumptions about the malleability of collective efficacy in neighborhoods and therefore its relevance in public health interventions. Experimental studies suggests that efficacy beliefs at the individual level can and do change with intervention. (Bandura, 1990; Atkin, 2010; Kadden & Litt, 2011) Increasing an individual's self-efficacy has been a successful tool used in public health to change and maintain positive health behavior. (Stretcher, et al., 1986). We lack empirical evidence that efficacy beliefs at the neighborhood level changes in similar ways, and whether this change is associated with improved health.

There are several limitations to our current knowledge on neighborhood collective efficacy and its association with individual health outcomes. First, most analyses are cross-sectional and do not provide information on whether collective efficacy changes over time. To our knowledge there are only two published studies examining neighborhood collective efficacy and change over time. Sampson (2012) used two waves of data exploring a pre and post-test design over a seven year period. Schmidt, et al. (2014) used three waves of data over a four year period. (Sampson, 2012; Schmidt, et al., 2014) Secondly, a majority of the existing literature on neighborhood collective efficacy uses data on neighborhoods from only one city, with a majority of these studies exploring Chicago neighborhoods. As public health practice engages local neighborhood efforts towards community change it is important to understand whether neighborhood collective efficacy is malleable and can change over time.

The aim of this paper is to examine 8 year changes in collective efficacy across and within seven cities within the United States and to examine the individual and neighborhood-level predictors of collective efficacy. Taking advantage of a unique data set, we additionally explore whether neighborhood and individual level factors are predictors of change in collective efficacy. Given the research on the association of collective efficacy and neighborhood structural factors, we hypothesize that individual socio-demographic and neighborhood structural factors will predict change in collective efficacy.

Methods

Data Source

Data utilized for this study include responses to household surveys conducted by the Annie E Casey Foundation for their *Making Connections* (MC) Initiative. The survey was one component of a ten-year commitment by the Annie E Casey Foundation to support a community change initiative in low income neighborhoods in ten U.S. cities. The goal of the initiative was to improve economic, educational and social conditions and build supportive communities where children and families could thrive. (mcstudy.norc.org) The survey was a collaboration with

researchers at the National Opinion Research Corporation at the University of Chicago, Local Management Entities and the Urban Institute. All ten cities were involved at survey baseline, however three cities did not participate in all three waves of data collection; because we took advantage of the longitudinal nature of the data we only included those cities that participated in all three waves (Denver CO; Des Moines, IA; Indianapolis, IN; Louisville, KY, Providence, RI, San Antonio, TX; and White Center, Washington). The survey covered five broad topic areas including: neighborhood connections; services and amenities; organizations and volunteerism; family hardship; and income and assets. All neighborhoods were low income and situated within larger metropolitan areas. The survey was administered approximately every three years with baseline data, Wave 1, gathered in 2002-2004; Wave 2 (2005-2007) and Wave 3 (2008-2011). Interviews were conducted in-person and by telephone. Surveys were translated and administered in languages other than English in neighborhoods where over 10% of the population spoke another language. This study was approved by the Committee for the Protection of Human Subjects at the University of California, Berkeley.

Study Sample

The *Making Connections* study protocol followed residents who remained in the same household over the study follow-up, moved to a household within the same neighborhood, or moved out of the neighborhood for households with children less than 18 years old over approximately eight years. A probability sampling technique was used to randomly select households from all addresses within each of the MC target neighborhoods. Approximately 800 residents were interviewed within target neighborhoods for each city. A total of 5,401 households participated in Wave 1 of the MC survey across seven cities. Mobility was high in the *Making Connections* neighborhoods with more than half of households moving between Wave 1 & Wave 2, of those who participated in Wave 1 3,186 either moved outside of the area or were lost to follow-up. (Coulton, et al., 2009) Of the 2,215 households that participated in Wave 1 & 2, 986 households either moved or were lost to follow-up between Waves 2 & 3. Due to Annie E Casey Foundation's explicit focus on children and families, they did not follow households that moved without children. Because we could not track those households that moved, our sample was restricted to respondents who resided in the same household, or a household in the same neighborhood over all three waves yielding a sample of N=1,229, across eighty two neighborhood units (census block groups) within seven cities. Probability weights were used in all analyses to account for the study design. Over 92 percent of interviews were conducted in English, 6.1 percent conducted in Spanish and 1.7 percent conducted in Vietnamese.

Measures

Collective efficacy was measured based on a scale developed and validated in previous research by Sampson, Raudenbush and Earls (1997) using The Project on Human Development in Chicago Neighborhoods. The scale reflected two features of collective efficacy related to social cohesion and informal social control. Each was based on a 5-item Likert scale, measuring respondent's agreements to a series of questions. Table 1 lists the questions for each scale and coding. Responses of "Refused" or "Did Not Respond" were recoded as missing. Those who responded "Don't Know" were coded as "Neither Agree nor Disagree". Responses ranged from 1 – 5 (higher scores indicate high collective efficacy), with a mean response of 3.46. Cronbach's alpha, performed across all three waves, had high internal consistency at 0.89

Table 1: Collective Efficacy Scale and Scale Items: Making Connections Cross-Site Survey

Scale	Number of Items in Scale	Cronbach's Alpha Across all Waves	Items	Rating Scale
Social Cohesion	5	0.84	1) I live in a close know neighborhood; People in my neighborhood: 2) are willing to help their neighbors; 3) generally don't get along*; 4) do not share the same values*; 5) can be trusted	5 = strongly agree to 1 = strongly disagree *reverse coded
Informal Social Control	5	0.83	How likely is it that your neighbors would do something if: 1) a child was showing disrespect to an adult, or acting out of line; 2)if a group of neighborhood children were skipping school and having out on a street corner; 3) if some children were spray painting graffiti on a local building; 4) if a fight broke out in front of their house; 5) if the fire station closest to their house was threatened by budget cuts.	5 = very likely to 1 = very unlikely
Collective Efficacy	10	0.89	Combined scales of social cohesion and informal social control	

Individual Measures

We included survey respondent's age, gender (male/female), race/ethnicity, marital status (married/partnered), level of education, income, current home ownership (yes/no), employment status, use of food stamps in the last 12 months, and country of birth. Age was used as a continuous variable; all respondents were at least 18 years of age, with age top coded at 75 years to protect the identities of older respondents. Race/ethnicity was categorized into five initial categories: White, African American, Hispanic, Asian Pacific Islander (API), or Other. Because of the small number of API respondents in some neighborhoods, respondents who identified as API were included in the "Other" category for multi-level analyses. Respondent's highest level of education had five categories: 8th grade or less, less than a high school diploma, a high school diploma or the General Education Development (GED), some college, and college graduate or more. For descriptive statistics we used a categorical variable for annual household income, beginning with \$0-\$9,999, adding increments of \$10,000, with \$30,000+ as our top category. In multi-level analyses we created a dichotomous variable with \$30,000+ and < \$30,000. Additionally we included years in current neighborhood as a continuous variable.

Neighborhood Measures

Neighborhood deprivation has been associated with collective efficacy in previous research therefore we include measures of neighborhood disadvantage using census data at the block group level from the 2000 U.S. Census. (Jenks & Mayer, 1990; Sampson, et al., 1997; Sampson, et al., 2002; Diez-Roux, 2004) Block groups are the smallest geographical unit for which the Census bureau measures and encompasses approximately 600-3,000 people. In accordance with other studies on collective efficacy and health we included six covariates for each census block group including percent living below the federal poverty level, percent of female headed households, percent unemployed, percent of housing owner occupied, percent moved, and percent foreign born.

Analytic Strategy

We employed multiple methods to test whether neighborhood collective efficacy changed over time. Bivariate analysis between neighborhood collective efficacy and all covariates were assessed using chi 2 tests. We then compared difference in mean collective efficacy scores across each wave by the entire population and by each city. The nested structure of the *Making Connections* survey design was addressed by employing hierarchical linear models (HLM) that accounted for the non-independence of individuals nested within neighborhoods. (Raudenbush & Byrk, 2002) The use of HLM permitted the estimation of the within individual level variation, as well as within and between neighborhood variation with change in collective efficacy over time. For all models, we employed a three level model with time (level 1) over the three waves, with individuals (level 2) nested within neighborhoods (level 3). Each model includes a variance component for a random intercept at the individual and neighborhood level. The first model was a fully unconditional model, exploring change in collective efficacy over the three waves. This model was used to assess changes in collective efficacy that partitions the variance to within and between individuals and within and between neighborhoods. In order to employ the random effects model, which assumes the random intercept is normally distributed and that unobserved heterogeneity is uncorrelated with other variables in the model, we tested functional form and normality and found no evidence of violation of these assumptions.

Model 1

The collective efficacy score Y_{ijk} at wave i for individual k in neighborhood j is modeled as

$$Y_{ijk} = \pi_{0jk} + \varepsilon_{ijk}$$

With an individual specific intercept π_{0jk} , and a residual error term ε_{ijk} with a mean zero and variance σ^2 .

$$\pi_{0jk} = \beta_{00k} + \beta_{01}B_{jk} + \beta_{02}C_{jk} + \beta_{03}y_{0jk} + r_{0jk}$$

The intercept, scale response at baseline, is regressed on dummy variables B_{jk} and C_{jk} for scale response at wave 2 (B) and wave 3 (C), and baseline response y_{0jk} with a neighborhood specific intercept β_{00k} , constant coefficients of β_{01} and β_{02} of the wave dummies and β_{03} of baseline scale score and a level 2 random intercept r_{0jk} . The scale response has a neighborhood specific mean β_{10k} and level 2 residual r_{0jk} .

Model 2 describes these same relationships while adjusting for individual level covariates.

$$Y_{ijk} = \pi_{0jk} + \beta'_1 Covariates_i + \varepsilon_{ijk}$$

B'_2 represents the vector of parameter estimates by individual covariates.

Model 3 describes the same relationships as Model 2, but includes neighborhood level factors in the fixed part of the model.

$$Y_{ijk} = \pi_{0jk} + \beta'_2 Covariates_j + \beta'_3 Covariates_k + \varepsilon_{ijk}$$

B'_3 represents the vector of parameter estimates by neighborhood covariates

We calculated the intraclass correlation (ICC) for each of the models. The ICC quantifies the percentage of variability in the change in collective efficacy across the three waves that lies between neighborhoods. (Raudenbush, et al. 1999) The ICC is calculated from the ratio of the variance from between neighborhoods divided by the sum of the between and within neighborhood variance. The ICC has values ranging from 0 to 1, with values close to 1 representing the neighborhood means vary substantially across neighborhoods. All hierarchical models were estimated by maximum likelihood estimation. (Rabe-Hesketh, et al., 2005) Statistical analysis was performed using STATA version 14.

Results

Table 2 displays the unweighted total and weighted percent characteristics of survey respondents in Wave 1. Over sixty six percent of the study population was female, with a mean age of 47 years (SD =15.7). The study population was racially and ethnically mixed with Latinos comprising thirty nine percent of the study sample, non-Hispanic African Americans comprising just over twelve percent and non-Hispanic whites making up twenty eight percent of the sample. Eighteen percent of survey respondents had less than a high school education, while just over sixteen percent had an eighth grade education or less, while twenty six percent had attended some college. Overall the study population was predominantly very low income with just over 66 percent of the population reporting less than \$30,000 in annual household income. Almost half the population was married and 47 percent owned their homes. The mean number of years living in the current neighborhood was fifteen (SD = 15.0), with just over half the residents residing for 11 or more years. Just over forty-five percent of respondents were married and forty five percent of households owned their homes. Age, race/ethnicity and current homeownership were significantly associated with collective efficacy in bivariate analyses. At the neighborhood level percent moved and percent homeownership were significantly associated with collective efficacy ($p < 0.01$). Percent unemployed ($p = 0.05$) and percent foreign born ($p = 0.09$) were also associated with baseline collective efficacy, while percent female headed households was marginally significant ($p = 0.1$).

Table 2: Demographic Characteristics and Bivariate Relationships with Collective Efficacy of Survey Respondents Across all Sites from Wave 1, Making Connections Cross Site Survey (Unweighted frequencies and weighted percentages).

Demographic Characteristics	N=	(%)	Weighted %	Low Collective Efficacy* N=195	Medium Collective Efficacy N=824	High Collective Efficacy* N=210	p value
	1,229						
				Weighted %			
Age** (mean=47.1 years, SD=15.7)							<0.01
<=40	570	(46.4)	45.6	8.0	29.6	8.1	
41+	659	(53.6)	54.4	6.8	35.6	12.0	
Sex							
Male	375	(30.5)	31.3	3.6	21.6	6.1	
Female	770	(62.7)	61.2	9.0	38.9	13.4	
Missing	84	(6.8)	7.5	2.2	4.7	0.6	
Race/Ethnicity							<0.01
Black/African American	303	(24.7)	12.3	1.9	8.4	2.0	
Latino	296	(24.1)	38.8	4.3	24.9	9.6	
White	387	(31.5)	27.8	5.1	18.6	4.1	
Asian & Pacific Islander	57	(4.6)	2.7	0.2	2.3	0.2	
Other***	166	(13.5)	17.3	3.1	10.5	3.6	
Missing	20	(1.6)	1.1	0.2	0.5	0.5	
Education							0.92
8 th Grade or less	138	(11.2)	16.4	2.0	11.4	3.0	
<High School Diploma	217	(17.7)	17.7	2.3	12.0	3.4	
HS Diploma or GED	368	(29.9)	28.1	4.2	17.9	6.1	
Some College	324	(26.4)	25.6	4.6	15.6	5.4	
College Graduate +	162	(13.2)	10.2	1.4	6.9	1.9	
Missing	20	(1.6)	2.0	0.3	1.5	0.2	
Married/Partnered							
Yes	562	(45.7)	48.5	6.5	31.6	10.3	
No	648	(52.7)	49.9	7.8	33.0	9.0	
Missing	19	(1.6)	1.6	0.4	0.6	0.7	
Annual Household Income							0.18
\$1-9,999	220	(17.9)	18.9	3.2	12.3	3.3	
\$10,000-19,999	292	(23.8)	26.0	2.3	17.7	6.1	
\$20,000-29,999	205	(16.7)	17.9	3.4	11.2	3.4	
\$30,000+	369	(30.0)	25.7	4.2	15.8	5.7	
Missing	143	(11.6)	11.5	1.7	8.2	1.5	
Years in Current Neighborhood (mean=15.8 years, SD (15.0))							0.25
<=10 years	609	(49.5)	45.0	7.0	30.3	7.8	
11+ years	620	(50.5)	55.0	7.8	34.9	12.3	
Current Homeownership							0.04
Yes	559	(45.5)	47.1	6.3	29.5	11.3	
No	661	(53.8)	52.3	8.5	35.2	8.5	
Missing	9	(0.7)	0.6	0.0	0.4	0.2	

Food Stamps in the last 12 months							0.43
Yes	243	(19.8)	18.2	3.1	12.3	2.8	
No	979	(79.7)	81.4	11.7	52.6	17.1	
Missing	7	(0.6)	0.4	0.0	0.2	0.2	
Employment Status							0.24
Yes	687	(55.9)	53.9	8.5	35.8	9.6	
No	532	(43.3)	45.8	6.3	29.2	10.3	
Missing	10	(0.8)	0.3	0.0	0.2	0.1	
Country of Birth							0.13
United States	942	(76.7)	75.9	12.1	47.7	16.1	
Other ^a	268	(21.8)	21.8	2.7	15.7	3.4	
Missing	10	(1.5)	2.3		1.7	0.5	
Neighborhood Level ^b							
% in poverty							0.27
Low				0.7	3.0	0.8	
Medium				1.3	10.3	3.8	
High				12.4	51.7	16.0	
% Female Headed Households							0.10
Low				0.7	2.9	1.2	
Medium				2.6	15.4	3.8	
High				12.4	46.6	15.6	
% Unemployed							0.05
Low				2.8	11.9	18.3	
Medium				2.8	15.5	24.4	
High				8.8	37.6	57.3	
% Own Home							<0.01
Low				7.6	30.2	7.2	
Medium				5.8	25.3	8.8	
High				1.0	9.5	4.5	
% Moved							<0.01
Low				5.5	26.6	12.1	
Medium				4.8	20.1	5.7	
High				4.1	18.2	2.8	
% Foreign Born							0.09
Low				1.8	7.6	1.3	
Medium				2.2	10.3	4.9	
High				10.4	47.0	14.4	

*Low collective efficacy is one standard deviation below the mean; high collective efficacy is one standard deviation above the mean; bivariate relationships are assessed using χ^2 test.

**Respondents age was top coded at 75.

***Blacks and Whites identified as Non-Hispanic; Other race/ethnicity includes: Native American, Asian and Pacific Islanders and mixed race.

^aOther country of birth includes individuals born in Puerto Rico.

^bNeighborhood covariates are split into tertiles using χ^2 test to assess bivariate relationships with collective efficacy.

Demographic statistics vary widely across the seven cities as shown in Table 3. Providence and White Center had the youngest mean age of respondents (37.1 years & 36.7 years respectively). White Center had the highest percentage of households making \$30,000 or more per year (62.6%), and along with Denver had the highest percentage of respondents who completed college or more. Just over thirty percent of Louisville residents reported less than \$10,000 in annual household income, and just over half of the respondents were unemployed (51.5%). Just over forty three percent of respondents in San Antonio had less than a high school diploma, and fifty percent of respondents reported \$20,000 or less in annual household income. Denver and Providence had the greatest racial and ethnic diversity, while Louisville had the highest concentration of African American's and San Antonio had the highest percentage of respondents who identified as Hispanic/Latino. San Antonio (20.7 years) and Indianapolis (21.6 years) had the longest mean neighborhood tenure, while Providence had the lowest (9.8 years)

The mean collective efficacy score at Wave 1 was 3.46 (SD=0.02) across the entire study population. (Table 4) In order to account for the survey weights we performed adjusted WALD F tests to assess the mean difference in collective efficacy scores across the three waves. We found a significant difference in mean scores across the three waves, with the mean score decreasing between wave 1 and wave 3. The test showed significant differences in mean collective efficacy scores for White Center (p=0.02) and marginally significant for Des Moines (p=0.1) but did not reach statistical significance for the other cities.

Of the 1,229 participants, 26 were missing data on the study outcome, missing information was less than 2 percent on all other covariates except annual household income (11.6%) and sex (6.8%). Responses with missing data on one or more individual level variables were deleted listwise leaving a final analytic sample of N=877 within 78 neighborhoods with a mean of 10 respondents per neighborhood, with a minimum of 2 and maximum of 87. Table 5 presents results from the random effects models. We did not find statistically significant changes in the fixed effect for year between wave 1 and wave 2 in any of our models. Changes for wave 3 were marginally significant (p=0.08) but the confidence interval crossed the null in all three models suggesting collective efficacy did not change significantly across the three waves. The intra-class correlation coefficient (ICC) indicated 6% of the variation in change in mean collective efficacy was due to characteristics between neighborhoods in our unconditional model.

We also examined associations between individual and neighborhood-level covariates in relation to collective efficacy. At the individual-level, age and Hispanic ethnicity were associated with collective efficacy, such that as age increased collective efficacy increased (0.006 95% CI (0.003, 0.01) p<0.01). Identifying as Hispanic ethnicity, compared to whites, was associated with increased collective efficacy (0.205, 95% CI (0.09, 0.32) p<0.01). Food stamp use in the last 12 months was marginally associated with collective efficacy in a negative direction, such that collective efficacy decreased slightly for households that used food stamps in the last 12 months compared to those that did not (-0.095, 95% CI (-0.20, 0.01) p=0.07) after controlling for other covariates, however the confidence interval crossed the null. Once individual level covariates were added into the model the ICC was 5%.

At the neighborhood level, percent moved was negatively associated with collective efficacy, such that a higher percentage of residents who moved was associated with a decrease in collective efficacy (-0.483, 95% CI (-0.80, -0.17) p=0.03), after controlling for all other

covariates. The percent unemployed was also negatively associated with collective efficacy (-1.189, 95% CI (-2.58, 0.20) $p=0.09$), although marginally and the confidence interval crossed the null. Differences between neighborhoods accounted for only a small portion of the total variance (ICC 0.02) of collective efficacy after controlling for individual and neighborhood level factors.

We also explored whether individual and neighborhood level factors predicted change in collective efficacy, including an interaction term with an indicator for wave and individual level, as well as neighborhood covariates. We did not find any significant associations between our individual covariate and time or neighborhood covariate and time interactions. In sensitivity analyses, we examined a random slope for the time wave, which allows for neighborhood-specific rates of change in collective efficacy that captures differences across neighborhoods. We did not find significance for the random slope for year (coefficient -0.013, 95% CI (-0.04, 0.01) $p=0.26$), revealing no evidence of a time trend. We used the WALD test to test for model fit revealed a p value >0.1 and the confidence intervals on the random slope crossed zero, therefore we did not pursue this model with other covariates.

Discussion

Given our limited understanding of whether neighborhood collective efficacy changes over time, the current study examined 8 year changes in collective efficacy. We also examined individual and neighborhood level covariates and their association with collective efficacy, as well as whether these factors were predictors of change in collective efficacy. We found collective efficacy remained relatively steady across the three waves. In individual covariate adjusted models we found age and being Hispanic ethnicity were positively associated with collective efficacy. At the neighborhood level, living in a neighborhood with higher residential turnover was negatively associated with collective efficacy. We did not find evidence of individual or neighborhood level factors predictors of change in collective efficacy over eight years.

Our current study contributes to the literature on neighborhood collective efficacy in two ways. First, we took advantage of a longitudinal survey design using three waves of data over an eight year period. Second, we used data from low income neighborhoods across seven U.S. cities exploring relationships across the entire study population and between and within these neighborhoods. Our findings are consistent with the two other studies on changes in collective efficacy over time showing collective efficacy remained stable in these neighborhoods. Schmidt, et al. (2014) conducted a study across 38 Boston neighborhoods over a 4 year period, finding collective efficacy remained relatively stable. Sampson (2012), investigated changes in collective efficacy across Chicago neighborhoods over two waves covering seven years and found collective efficacy remained stable. These two studies are important contributions to our growing understanding of collective efficacy in urban neighborhoods, but reflect neighborhoods in only two U.S. cities. Our sample included seven cities across the U.S. providing additional evidence of the stability of this construct.

Differences between neighborhoods account for only a small variation (2% - 7%) in change in collective efficacy over time. While this variation is small it is consistent with other studies investigating the between and within neighborhood variation of social processes. (Sampson, et al., 1999; Sampson & Graif, 2009) The reliability of the ICC depends in part on the size of the neighborhood cluster. Although we had 10.4 respondents on average per neighborhood cluster,

the range was highly variable with some clusters including eighty seven respondents while others only two respondents. The small number of respondents in some neighborhoods may mean our collective efficacy measure was unreliable.

We hypothesized that a number of individual level factors would be associated with collective efficacy. While all the covariates operated in the expected direction, given the previous research on collective efficacy, only a few were significantly associated with collective efficacy. (Sampson, et al., 1997; Sampson, et al., 1999; Browning & Cagney, 2002) We found collective efficacy increased as residents age increased. Race and ethnicity were associated with baseline collective efficacy, however we only found being of Hispanic ethnicity, compared to whites, was associated with collective efficacy, after controlling for all other covariates. This may in part be driven by the larger number of respondents in block groups in San Antonio which have a high Hispanic concentration; the larger number of responses may provide more power to detect differences. Current homeownership was also associated with baseline collective efficacy, but was no longer significant once other covariates were added into the model. While annual household income was marginally associated with baseline collective efficacy it was not a statistically significant predictor of collective efficacy, yet use of food stamps in the past twelve months, which is a measure of low income status and the use of public assistance, was marginally associated with collective efficacy after controlling for covariates, however the confidence interval crossed the null. At the neighborhood level, percent moved, percent unemployed and percent homeownership were associated with baseline collective efficacy, and percent foreign born was marginally significant. Only percent moved was associated with collective efficacy after controlling for other covariates. In addition, our individual and neighborhood level covariates were not predictors of change in collective efficacy. These findings suggest three possible explanations. First, our small sample size may have been unable to predict statistically significant associations. Although we did not find statistically significant predictors of collective efficacy for many of our neighborhood structural factors, they did operate in the same direction as previous research. While there is not a generally acceptable lower limit of responses per group in multi-level analysis, small sample sizes at the group level may produce inaccurate estimates. (Maas & Hox, 2005) A second explanation is that there is an empirical assumption that high levels of structural disadvantage affects a community's ability to create collective efficacy. (Sampson, et al., 1997) There is a small, but growing body of research that calls this into question, finding other factors, such as a neighborhood's history of collective action and relationships with formal institutions such as police, are more important for predicting levels of collective efficacy than structural disadvantage or individual characteristics. (Sampson, et al., 2005; Villarreal & Silva, 2005; Further exploration is needed to understand what factors are predictors of collective efficacy.

A third explanation for our findings is that the neighborhoods selected for the *Making Connections* survey may be different from other urban neighborhoods on a set of unmeasured factors, which in turn influences their perceptions of collective efficacy. The *Making Connections* sites were selected based on their identified need as well as their infrastructure and ability to carry-out the mission of the Annie E Casey Foundation to improve conditions for children and families. These neighborhoods may be similar in that they have a measure of cohesion, existence of strong community-based infrastructure and active organizations and institutions. Sampson & Graif (2009) have noted that organizational capacity is a key component

of neighborhood change, as neighborhood social cohesion among residents alone cannot achieve a change in neighborhood conditions. Organizations and institutions have the ability to secure resources for the neighborhood such as health services and quality schools that develops a sense of neighborhood stability. Odgers et al. (2009) has suggested increasing civic engagement and participation in voluntary organizations may enhance collective efficacy. It is possible these features already exist to some extent in the MC neighborhoods, therefore differences in neighborhood variation explained only a small amount of collective efficacy. In addition, exploring change in collective efficacy before and after specific interventions, such as increasing civic participation or the addition of a new park or community garden, may provide additional information on what attributes contribute to the malleability of collective efficacy. (Teig, et al., 2009)

Mean baseline collective efficacy was 3.46 across the study population, which is comparable to a number of other studies, there was however, considerable variation across the seven cities with a high of 3.57 (San Antonio) to 3.21 (Providence). (Sampson, et al., 1997; Cohen, et al., 2008; Schmidt, et al., 2014; Kim, 2010) Scores below 3.35 are at the lower end of the threshold of mean scores across studies. This difference in baseline collective efficacy may in part be due to our focus on low income neighborhoods. Affluent neighborhoods have been shown to report higher levels of social dynamics including collective efficacy. (Brooks-Gunn, et al., 1993; Sampson, et al. 1999; Garnett, 2010) Residential stability and increased homeownership are more prevalent in affluent neighborhoods, potentially facilitating social cohesion among residents and a strong sense of community. (Long & Perkins, 2007) In addition, affluent neighborhoods may facilitate increased opportunity to build collective efficacy through the availability of safe and healthy places for children to play, infrastructural resources such as parks, libraries, full service grocery stores and well-performing schools. (Wen, et al., 2003; Galster, et al., 2008) Much of the research on collective efficacy uses data from a socio-economically diverse set of neighborhoods. Future research should explore in what ways socio-economically diverse neighborhoods, coupled with household poverty and affluence contribute to perceptions of collective efficacy. Most importantly, additional research should explore the relative importance of mixed income neighborhoods on perceptions of collective efficacy.

Our study lends support to findings by many community change efforts that neighborhood change involves long term commitment and eight years may not be enough time to find significant changes to neighborhood social conditions. (Auspos & Kubisch, 2004) Place-based initiatives recognize decades of disinvestment has a lasting toll and the work of changing these conditions may take decades to remediate. While the Annie E Casey Foundation set out to improve community conditions in order to improve child health and family income and assets, they recognize large scale change of this nature takes time, and did not expect these changes to take place during the 10 years of the initiative. Collective efficacy has been associated with a number of structural factors such as the neighborhood physical environment and concentrated disadvantage. (Sampson, et al., 1997; Cohen, et al., 2008). These structural factors do not change over short time spans. Efforts aimed at community change must address these multi-level structures, while simultaneously building social cohesion and developing interventions. The field of community change often refers to a “long term commitment” to the process of community change. While our study used three waves over an eight year period, future research should

address this notion of time and include a longer time lapse to assess changes in collective efficacy as well as changes to structural factors related to the theoretical construct.

While neighborhoods are important places for social interaction, defining neighborhood boundaries for those relationships may be troublesome. For some, neighborhoods encompass a small area around where they live, for others it encompasses where they work, shop, or where their children go to school. Schools, however, have defined geographic boundaries, with regular and repeated interaction with the same students, teachers and administrators. Students spend up to 8 hours per day in school, potentially interacting with the school environment more often than their neighborhood environment. Studies have explored the role of collective efficacy within schools with promising results. (Williams & Guerra, 2011; Smith, et al., 2013). Studies exploring an association between teacher collective efficacy and student achievement found higher collective efficacy among teachers in schools was associated with increased educational achievement. (Goddard, et al., 2000) Children and adolescents are developing during critical and sensitive time periods in the lifecourse, with particular vulnerability to social behavior norms. (Ogders, et al, 2014; Deardorff, et al) Additionally, cross-sectional findings of an association between collective efficacy and various outcomes are generally robust among adolescents, leading researchers to investigate the where and how social interactions influence child and adolescent behavior. (Xue, et al. 2005; Cohen, et al., 2006; Sampson, et al. 1999) Neighborhood boundaries may be too fluid to act as the best measurement of collective efficacy. With increasing time outside the neighborhood or in online communities, the lack of regular social interaction may interfere with an individual's perception of neighborhood collective efficacy. Future research should explore the role of collective efficacy within schools, both between teachers and students as well as among the students themselves. Interventions aimed at changing the collective efficacy in schools may prove a more promising approach.

To our knowledge, this is the first study to explore changes in collective efficacy over three waves and an eight year time span. Notably, much of the current data on neighborhood collective efficacy uses data from one city, this unique data set allowed us to explore variation in collective efficacy across seven cities, adding to our current knowledge of neighborhood collective efficacy. Much of the research on collective efficacy and health outcomes comes from cross-sectional data, making the assumption that collective efficacy is stable. This study provides support for this assumption, and also highlights the need to investigate whether specific interventions aimed at increasing collective efficacy can achieve this goal.

Limitations

This study has several limitations. First, the neighborhoods included in this study were a part of a larger initiative funded by the Annie E Casey Foundation. Sites were selected for participation in the initiative based on a number of factors including the presence of strong institutions and community organizations that were engaged in work consistent with the goals of initiative.(Coulton) These neighborhoods may be different from other low income urban neighborhoods, such as a more robust and active community infrastructure. (Brisson & Usher 2005) The analyses included only low income communities and thus we were unable to explore differences in more affluent neighborhoods. Concentrated affluence may procure political will and ensure high quality services such as health care, recreational facilities, and open space. (Browning & Cagney, 2003) Studies comparing collective efficacy across neighborhoods with a spectrum of affluence

and deprivation may help uncover differences in collective efficacy across a wide range of neighborhoods.

The small sample sizes in some of the block groups may have limited the power to detect statistically significant differences in collective efficacy over the three waves. Theall, et al. (2011) found that datasets with a small number of groups, and the majority of groups have less than 5 respondents may fail to find group level effects. We did not perform these models stratified by city because of the small sample sizes in many cells for covariates in the models. Additional research with larger sample sizes at the individual as well as group level would provide confirmation of our results.

As with other studies of neighborhood effects, we used census data at the block group level for our definition of neighborhood in order to assess neighborhood level disadvantage. The use of census data to understand contextual effects may limit the spillover effects of adjacent tracts or block groups. As well, residents may not find these boundaries useful to their everyday experience, especially in instances when the census block group encompasses a larger area than a resident's perceptions of neighborhood social processes. (Coulton, 2010)

Conclusion

While a number of studies have demonstrated the negative consequences of living in distressed neighborhoods, less is known about what conditions to change in order to improve resident health and well-being. Conceptually, improving the collective efficacy of a neighborhood to increase support, reduce stress and develop positive social norms are plausible mechanisms to positive health and well-being. While our study did not find significant changes over an eight year period it is possible eight years is not enough time for these changes to occur. Collective efficacy is influenced by a number of components including individual and neighborhood structural factors, as well as community systems and infrastructure, changes to these factors may take additional time. Future research must address this and allow for a longer time lapse to test the malleability of collective efficacy. Additionally, studies should investigate interventions aimed at enhancing neighborhood collective efficacy and whether changes are associated with improvements in health and well-being. Our findings, and the results of future analysis that addresses these gaps, will add to our knowledge of social dynamics in neighborhoods and will inform the next generation of place-based efforts to improve resident health and well-being.

Table 3: Demographic Characteristics of Survey Respondents by City of Residence from Wave 1, Making Connections Cross-Site Survey (Weighted percent).

Survey Sites Characteristic	Denver, CO N=157 Weighted %	Des Moines, IA N=182 Weighted %	Indianapolis, IN N=166 Weighted %	Louisville, KY N=110 Weighted %	Providence, RI N=152 Weighted %	San Antonio, TX N=241 Weighted %	White Center, WA N=221 Weighted %
Age* mean (SD)	44.2 (18.5)	45.7 (18.9)	44.0 (23.6)	45.5 (17.0)	37.1 (20.6)	43.1 (20.2)	36.7 (23.3)
Sex							
Male	33.9	32.3	29.3	33.1	27.4	30.5	36.8
Female	57.2	61.1	56.9	64.3	63.8	63.5	54.6
Missing	8.8	6.6	13.8	2.6	8.8	6.0	6.7
Race/Ethnicity**							
Black	11.0	25.3	38.9	77.1	23.8	<10	<10
Latino	24.7	9.4	<10	<10	39.9	63.0	<10
White	35.2	53.4	>50	>10	15.9	>10	60.1
Other	25.7	10.6	<10	<10	18.2	23.7	26.5
Missing	3.4	0.9	0.9	0.9	2.3	0.8	0.9
Education							
< HS grad	23.4	18.9	38.7	24.2	37.2	43.3	11.1
HS diploma/GED	25.5	36.3	34.2	40.3	23.8	26.0	26.8
Some College	23.8	30.8	17.3	24.4	22.5	23.7	39.7
College graduate +	26.2	14.0	8.0	10.3	13.7	4.7	20.6
Missing	1.1	0.0	1.8	0.9	2.7	2.5	1.9
Married/Partnered							
Yes	33.1	44.9	47.6	22.8	46.2	51.2	56.5
No	66.9	54.5	50.7	74.7	51.1	46.6	43.5
Missing	0.0	0.6	1.7	2.5	2.7	2.2	0.0
Annual Income							
0-\$9,999	21.3	12.0	15.4	31.1	22.6	21.8	7.8
\$10,000-\$19,999	21.9	26.5	33.3	30.0	21.2	29.9	9.3
\$20,000-\$29,999	17.4	25.8	16.8	15.3	11.9	20.2	9.5
\$30,000+	32.0	23.9	26.0	16.9	27.5	16.2	62.6
Missing	7.4	11.8	8.5	6.7	16.8	11.9	10.8

Table 4: Difference in Mean and Wald F Test for Collective Efficacy Score Across Entire Study Population and By City, Making Connections Cross-Site Survey.

	WALD F test			F test	p-value
	Mean (SE)				
	Wave 1	Wave 2	Wave 3		
Total Population N=1,213	3.46 (0.02)	3.47 (0.03)	3.43 (0.03)	4.83	0.01
Denver N=156	3.39 (0.06)	3.42 (0.07)	3.42 (0.06)	0.08	0.92
Des Moines N=179	3.39 (0.06)	3.49 (0.06)	3.40 (0.05)	2.29	0.10
Indianapolis N=163	3.35 (0.06)	3.37 (0.07)	3.34 (0.07)	0.67	0.51
Louisville N=110	3.34 (0.07)	3.26 (0.08)	3.35 (0.08)	0.35	0.71
Providence N=150	3.21 (0.06)	3.07 (0.07)	3.16 (0.06)	1.45	0.24
San Antonio N=237	3.58 (0.04)	3.57 (0.05)	3.54 (0.05)	2.17	0.11
White Center N=217	3.45 (0.04)	3.49 (0.04)	3.35 (0.04)	3.94	0.02

Table 5. Estimates for Three Models Predicting Change Over Time in Collective Efficacy, Making Connections Cross-Site Survey. (N=877)

Variable	Model 1		Model 2		Model 3	
	Coefficient	Confidence Interval	Coefficient	Confidence Interval	Coefficient	Confidence Interval
Collective Efficacy						
Wave 1	3.43	(3.37, 3.48)	3.19	(2.99, 3.40)	3.55	(3.27, 3.82)
Wave 2	0.018	(-0.04, 0.08)	0.033	(-0.01, 0.08)	0.002	(-0.06, 0.07)
Wave 3	-0.050***	(-0.10, 0.01)	-0.050***	(-0.11, .01)	-0.056***	(-0.11, 0.01)
Age			0.006*	(0.003, 0.01)	0.006*	(0.00, 0.01)
Sex			-0.044	(-0.10, 0.06)	-0.020	(-0.11, 0.07)
Race/Ethnicity ^a						
White (reference)						
Black/African American			0.032	(-0.08, 0.14)	0.077	(-0.06, 0.21)
Latino			0.205*	(0.09, 0.32)	0.237*	(0.10, 0.37)
Other			0.073	(-0.05, 0.19)	0.098	(-0.4, 0.23)
Education						
<High School Diploma			0.011	(-0.13, 0.16)	0.010	(-0.15, 0.17)
HS Diploma or GED			-0.067	(-0.20, 0.07)	-0.066	(-0.22, 0.09)
Some College			-0.063	(-0.19, 0.07)	-0.120	(-0.26, 0.02)
College + (reference)						
Married/Partnered			-0.022	(-0.10, 0.06)	0.008	(-0.08, 0.09)
Annual Household Income <\$30,000			-0.037	(-0.13, 0.06)	-0.045	(-0.15, 0.06)
Years in Current Neighborhood			0.001	(-0.02, 0.04)	0.001	(-0.004, 0.003)
Current Homeownership			-0.038	(-0.12, 0.05)	-0.004	(-0.14, 0.05)
Food Stamps in the last 12 months			-0.094***	(-0.20, 0.01)	-0.100***	(-0.21, 0.01)
Unemployed			-0.020	(-0.11, 0.07)	-0.011	(-0.10, 0.08)
Country of Birth ^b			-0.075	(-0.19, 0.04)	-0.130	(-0.20, -0.00)
Neighborhood Level						
% below poverty					-0.205	(-0.54, 0.13)
% Female HH					-0.225	(-0.63, 0.18)
% Unemployed					-1.189***	(-2.58, 0.20)
% Foreign Born					-0.169	(-0.55, 0.21)
% Moved					-0.483**	(-0.80, -0.17)
% Own Home					0.297	(-0.02, 0.62)
Variance						
Within Individuals	0.47	(0.44, 0.51)	0.46	(0.43, 0.50)	0.541	(0.51, 0.57)
Within Neighborhoods	0.19	(0.14, 0.26)	0.15	(0.10, 0.23)	0.075	(0.02, 0.25)
Between Neighborhoods	0.07	(0.04, 0.13)	0.05	(0.02, 0.11)	0.02	(0.01, 0.08)
Residuals	0.49	(0.48, 0.51)	0.49	(0.48, 0.51)	0.40	(0.38, 0.43)

*p-value <0.01

**p-value p<0.05

***p-value<0.1

^a White and African American identified as non-Hispanic, Asian and Pacific Islander are included in “Other” as are respondents who identified as more than one racial/ethnic category

^b Other country of birth includes individuals born in Puerto Rico

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Exploring the Role of Community Change Initiatives in Promoting Collective Efficacy for the Health and Well-Being of Neighborhood Residents

Introduction

The adverse health effects of living in socioeconomically disadvantaged neighborhoods have been well documented. (Diez-Roux & Mair 2010; Brooks-Gunn) Over the past 20 years, place-based community change initiatives evolved as a strategy to address the needs of residents living in poor resourced neighborhoods. Community change initiatives (CCIs) use community building principles, focusing on resident engagement and building community capacity to achieve neighborhood revitalization and improve the economic, social and environmental conditions of disinvested neighborhoods. (Chaskin, 2001) Programs such as Harlem Children's Zone, Promise Neighborhoods, and Choice Neighborhoods are examples of place-based CCIs working within defined geographic boundaries to improve community conditions leading to better educational and health outcomes. (Kubisch et al., 2010) While CCIs employ numerous strategies with a range of stakeholders to address concerns of low income communities, a unifying factor is their focus on enhancing social cohesion and engaging residents in the process of community change.

Engaging residents in the process of community change requires trust, relationship building and a measure of social cohesion among residents to move an agenda forward. (Kubisch et al. 2010) Collective efficacy provides a theoretical lens in which to view how social cohesion may lead to lasting community change. Collective efficacy refers to a group's shared belief in their ability to organize and execute a course of action for mutually desirable goals. (Sampson et al., 1997) This theory expands on Albert Bandura's concept of self-efficacy defined as an individual's belief in their capacity to achieve a desired goal. (Bandura, 1987) This perception is important because in part it determines what goals an individual sets and how hard the person will work to achieve those goals. (Bandura, 2004) Collective efficacy in neighborhoods has two distinct features, social cohesion, referring to the mutual trust that exists between residents, and informal social control, the willingness of residents to control observed behavior outside of expected social norms. (Sampson 1997). Sampson and colleagues (1997) hypothesized that the features facilitated social norms and goal setting for the greater good of the neighborhood and acted as a vehicle for collective problem solving and collective action. These expectations for collective action are important as no one lives in isolation, problems such as crime, vacant housing, and environmental degradation are shared and require a number of people coming together to solve complex social problems. Collective efficacy theorizes that local social cohesion constitutes a core social fabric of a neighborhood, offering opportunities for increased social capital, sharing of resources and promotion of positive health behaviors, as well as coming together to achieve collective neighborhood goals.

The theory of collective efficacy has been explored in relation to crime and adolescent misbehavior, with a number of studies showing neighborhoods high in collective efficacy have reduced crime and violence, and improved adolescent behavioral and mental health outcomes. (Sampson et al, 1997; Maimon & Browning, 2010; Maimon et al. 2010; Way et al. 2006; Kim, 2010; Browning 2002) Collective efficacy has been positively associated with a number of health related outcomes such as infant mortality, birth weight, obesity risk, self-rated health, and premature mortality. (Sampson et al., 1999; Buka 2002; Morenoff; Cohen et al., 2006; Cohen, Farley 2003). A number of possible pathways between collective efficacy and health have been hypothesized, including a reduction in daily stress because of reduced crime and violence,

increased social support and social ties in more cohesive neighborhoods and increased physical activity in walkable neighborhoods with recreational activities. (Sampson, et al. 1997; Cohen, et al. 2006).

While the theoretical construct has been studied empirically, there is limited research on its application to public health practice. We lack research on what is involved in building collective efficacy and strategies organizations and institutions employ to achieve it. In addition, we lack an understanding of how residents and community stakeholders perceive the effectiveness of these strategies as a vehicle for community change. It is not clear if focusing on improving the collective efficacy of a neighborhood holds promise for the implementation and sustained work of neighborhood change. Studies have not examined whether improvements in collective efficacy leads to improved health. Most empirical studies use cross-sectional data and longitudinal studies do not assess changes in collective efficacy with changes in outcomes.

As a first step to address these gaps in knowledge, we designed an exploratory study of two community change initiatives working in low income neighborhoods in Oakland California. These two initiatives are using a place-based approach to changing the economic, environmental and social conditions in target neighborhoods with the overall goal to improve resident health and well-being. In order to understand the role of collective efficacy in the work of place-based community transformation, we asked residents and staff about the role of social cohesion and informal social control in community change. Our primary research question was: 1) In what ways are community change initiatives promoting collective efficacy among residents in low income urban neighborhoods? We were also interested in the following secondary questions: 2) How do residents experience the work of community change initiatives in building collective efficacy among neighborhood residents? 3) How do residents perceive the effectiveness of building collective efficacy to mobilize residents toward collective action in their neighborhood? While it is not clear if building collective efficacy within a neighborhood will improve community conditions and lead to positive health and well-being among residents, this research will begin to address gaps in the literature and provide insights and novel approaches to building collective efficacy in an urban, low income environment.

Methods

This qualitative investigation used a case study approach consisting of interviews and observations to explore the role of collective efficacy in the work of community change initiatives. The initiatives targeted two low income neighborhoods in Oakland, California, that represent a subset of a cadre of place-based initiatives occurring across Oakland and neighboring cities. We chose these initiatives because they: 1) aim to improve resident health through a process of community change, 2) have explicit goals of resident engagement and community building, and 3) have geographic boundaries that overlap in one neighborhood, thus when talking to residents about the process of community building, residents may have participated in events supported by one or both initiatives.

Semi-structured, in-person interviews with staff and residents living in the target neighborhood were conducted over the spring and summer months of 2016. Semi-structured interviews were employed due to their use of open-ended questions, allowing generation of participant perspectives on the process of relationship building with and between residents. Interviews

explored the history of the neighborhoods, community infrastructure, social dynamics between residents, power relations between residents and staff, the importance of relationships for community change and the ways in which the initiatives facilitated relationship building. In addition to interviews, observations were made of community events sponsored by the CCIs. Observations were used to supplement data from interviews, observing staff and resident interactions at initiative sponsored community events. The names of the organizations and their specific focus areas are excluded from this paper to protect the identities of staff and residents. This study was approved by the Committee for the Protection of Human Subjects at the University of California, Berkeley.

Data Collection

Due to our interest in the role of CCIs in building collective efficacy, we employed a purposive sampling design, interviewing residents who had some knowledge of community events or the initiative itself and staff who either worked with residents directly or were involved in program development. Fliers describing the research were distributed to the offices of the two agencies working on the initiatives and at community events. In addition, information about the study was spread by word of mouth by residents. Interested interviewees contacted the primary researcher (CS) by phone or email. After initial contact was made, a time and location for the interview was scheduled. Interviews were conducted in staff offices as well as local cafes and community centers. A total of sixteen people were interviewed: eight staff members across the two CCIs and eight residents living within the geographic boundaries of the target neighborhoods. Residents received a \$25 Target or Visa gift card for their participation in the study.

Participants received written and oral information about the study before signing a written consent. Interviews consisted of an introduction to the interview protocol, obtaining a written consent to participate, and a list of ten guiding questions. Interviews lasted 45-60 minutes. Interviews were audio recorded (with consent by interviewee), transcribed verbatim and verified by the primary author. A total of 14 interviews were conducted individually and one interview was conducted with two staff members. Data from the interviews were pooled together for the final dataset with a total of 16 participants. In addition, notes and memos from observations of six community events were included in the analysis.

Coding

Data coding and analysis occurred simultaneously with data collection. The interviews were coded using a hybrid coding scheme, conducted over a three step process. (Cite) An initial list of codes were generated deductively based on the peer reviewed published literature on neighborhood collective efficacy.¹ Inductive coding was also used, for a majority of the codes, allowing the interviewees insights and responses to questions determine the data coding. Two independent coders reviewed the transcripts and came together and discussed initial codes. The second cycle of coding grouped initial codes into conceptual themes that emerged from the data. Once no new themes emerged from the transcripts, conceptual saturation was considered reached. The third step involved reducing codes to no more than 5 codes under each theme. All coding and analysis was done using Atlas.ti (Version 7.5.1).

Analysis

The analysis was driven by our primary research questions. Memos were written after each interview and observation, as well as during readings of transcripts. Memos were referred to during the coding and analysis process. After all interviews and observations were coded a conceptual map was designed to highlight major themes. We presented our themes, codes and conceptual map to six of the interviewees, one resident and five staff, to increase the validity of the results. Interviewees suggested three changes that were incorporated into the conceptual map. A matrix display was created and used to analyze the data. Quotes and passages from notes of observations were pasted into the matrix display to highlight commonalities and variants across the data.

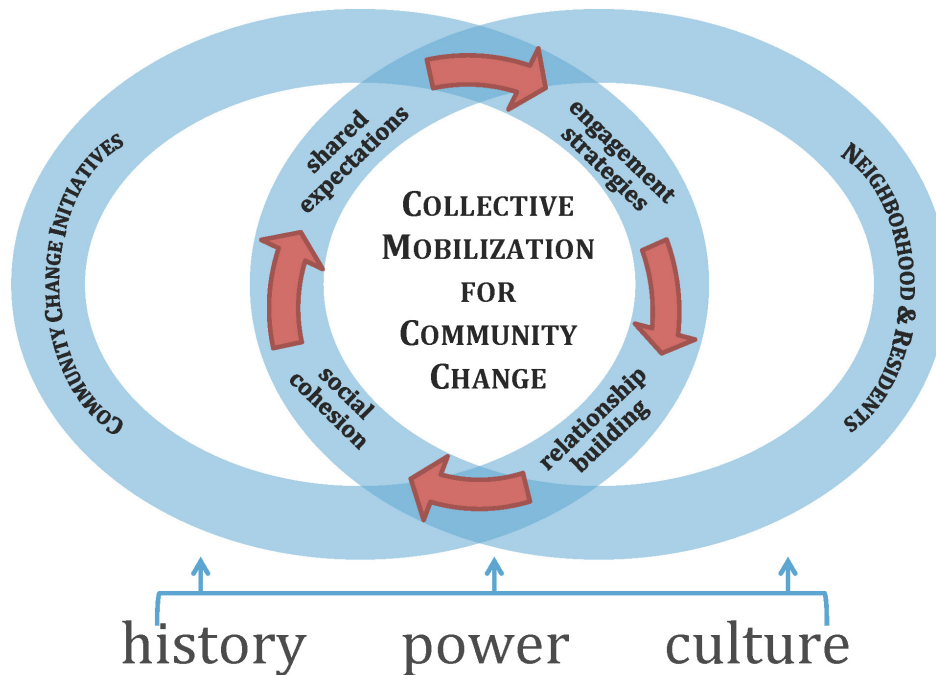
Findings

Demographic Information

Oakland California is situated east of San Francisco, and is known for being one of the most ethnically diverse cities in the country boasting a thriving arts and cultural scene, and political and social justice activism. Like many urban cities, Oakland has a convergence of affluent neighborhoods with well performing schools, safe neighborhoods, recreational opportunities and convenient access to goods and services and lower income neighborhoods with under performing schools, lack of access to full service grocery stores or financial institutions and higher rates of crime and violence. Many of these poorer neighborhoods were once home to middle-class families largely employed by local manufacturing firms. The departure of these large employers over the last 50 years, however, has resulted in communities with high rates of unemployment and poverty. Health data reveal a more than 10 year difference in life expectancy between residents living in the most affluent neighborhoods compared to residents living in the poorest neighborhoods, and people of color are more likely to live in these under resourced communities contributing to significant racial and ethnic disparities in health outcomes.(Alameda County data) Residents in lower income neighborhoods contend with both the immediate impacts of poor health, such as increased hospitalization for asthma, as well as long term consequences of increased morbidity and early mortality.(Alameda County Public Health Department Report, 2015)

In order to explore the themes from interviews we developed a conceptual map that highlights the dynamic processes occurring between residents and staff working to mobilize community change efforts. (Figure 1) We use this map to organize our findings. As the conceptual framework highlights, the history, culture, and power relations influenced the residents, the staff, and their interactions with one another. While some work is happening within the neighborhoods and among the residents themselves, and other work is happening within the initiative and agency, together they are working toward a vision of community change.

Figure 1: Concept Map of Social Processes in the Development of Community Change Efforts



Neighborhood Description

All interviews began with an open-ended question for interviewees to describe the neighborhood. Interviews revealed similarities in the descriptions, including empty store fronts, blight, crime, and lack of access to grocery stores and financial institutions. The neighborhoods were described as “resource poor”, with limited access to overburdened systems such as community health clinics, transportation, quality early care and education, parks and recreation activities as well as exposure to crime, and violence. While interviewees described hardship in the neighborhood, they all also focused on assets, with a particular description of “resilient communities and resilient people”. One interview describes this multi-dimensional aspect of the neighborhoods:

I see it as a resilient neighborhood in the sense that it has, when you look at the city's breakdown of homicide and crimes, it's always the highest, but yet there's still a lot of residents who are you know thinking about their children, or a lot of young people thinking about how to grow for themselves or their communities. There's a strong arts culture in the neighborhood and people are really passionate about that. I think when you take a glance at it you know you see that it's blighted, it's a blighted neighborhood. It has all these issues, you look at the data and it doesn't say anything too positive if you just look at the numbers, but when you actually go to the neighborhood you see that people are walking around with their kids, there are activities for families, people are there, teenagers are willing to do things for other people, there is a vibrancy, things that you just kind of can't see in numbers.

Interviewees discussed residents as strong assets for the community, and as leaders in the movement for community change. Other factors, such as the presence of strong community based programs, an active arts culture, were described as community assets, yet the residents themselves were consistently described across all interviews as the strongest asset to the community.

History of the neighborhood

We asked interviewees about the history of the neighborhood, including who lived there, the quality of life for residents, and their perspectives on how each neighborhood has changed over time. Staff focused on the socio-economic history of the neighborhood, the changing racial and ethnic make-up, and the history of previous organizations attempting to provide services to residents. For staff, the history was important to understanding the neighborhood culture and essential for building relationships. They found the history of the community influenced residents' desire to engage and participate in initiative activities. Staff recognized that residents had seen programs come and go, with decades of unfulfilled promises for more resources or improved infrastructure that never materialized. One interviewee stated:

The neighborhood we are working in is very poor, I mean for many families there is lack of access to basic needs. So here we are pushing residents to “be engaged” (interviewee inserted quotes) in some process some community change process. We want to help people living in these neighborhoods and we want to help change these neighborhoods, right and we want them to be engaged in the process but many of these places have had programs or initiatives like ours before. So you have mistrust, people thinking they have been there and done that with such and such agency and nothing ever changed, and also they are worried about food on the table and they don't think we are really going to change anything.

Long term residents emphasized the need to understand the history because it reflected the culture, values and norms of the neighborhood. These residents reflected on the tight knit, socially cohesive neighborhood they were raised in and how it changed over time, with one stating:

...this (neighborhood) was thriving, as a place where African American families had good jobs that allowed them to raise families, and pass on family values. Then, over the course of a decade crack cocaine came in and hurt our neighborhoods. Plus we lost all these jobs, lost these good blue collar jobs and then we saw the neighborhood decline into disarray and a sense of desperation among some of us.

Residents also talked about the changing racial make-up of the neighborhood and the problems of a tight housing market. Residents all had family members or close friends who lost public housing vouchers and could no longer afford to live in the neighborhood.

Everything is changing. You know at first I was very angry you had these purple haired people with their dogs and smoking their stuff and changing the neighborhood and everything is going up just because the color of their skin. It shouldn't be based on anyone's skin color that can make me now not be able to live where my people have lived for six generations because it is too much money.

The history of the neighborhood was important for understanding the culture and perspectives of residents, as well as their present day concerns. Neighborhood history influenced relationship building and power relations with staff and other residents.

Neighborhood Infrastructure

Community Infrastructure and Partnerships

Both initiatives decided on geographic locations for the initiatives based on a number of factors, including the epidemiological data on morbidity and mortality by neighborhood. Equally

important to this data was the pre-existing infrastructure in neighborhoods, the community based organizations already engaged in community change efforts and their knowledge of resident's desire for community change. In both cases, local surveys had been conducted and staff had worked for other organizations in and around the neighborhoods therefore had a working knowledge of resident concerns. Initiative staff leveraged their partnerships and the knowledge of community based organizations (CBOs) as a way to focus the conversations in early forums with residents.

So we started by compiling tons of information that had already been gathered, because a local CBO had been doing this for a while, a survey had been done in one of the neighborhoods we were considering working in. So we compiled everything, we found violence was a big issue, economic development, lack of money, unemployment, youth development were all issues that were identified. And we had some conversations with organizations engaging with these issues and working with residents. This information really helped us early on in our community forums and focus groups.

With funding and staffing constraints, this early information was vital to choosing neighborhoods that could come together and begin timely development of initiative goals and strategies. In addition, staff knew they did not have the capacity or knowledge to address all the needs of residents. They wanted to build community capacity to address concerns related to housing, economic stability, and community infrastructure and knew they could not do it alone.

I mean the overall goal is to impact upstream components of health. The way to get there is the hard part. So I think the goal right now is to improve school readiness, reduce the incidence of emergency room visits for preventable conditions, increase community partnerships and build leadership, things like this. To do that we need partners who already do parts of this work, we need to work together, and figure out how to coordinate this work. None of us can take this work on alone.

While these partnerships were vital they were not always easily established and there were challenges building partnerships with organizations outside the health sector. For example, issues related to the economy and employment were identified by residents as primary concerns. Staff worked to engage economic development entities and financial institutions in the work of community change, however there were challenges articulating the role of business development in impacting a specified health outcome. One interviewee talked about these challenges particularly when there was not identified funding for programs to do work.

You build this piece by piece right. We find funding for health, but then you realize you want to do more economic development or issues related to early care come up and then you need to find partners. Just lining everything up is hard and you don't necessarily have money for these partners so everyone is stretched and working hard, everybody had to put in energy, and had their stakeholders, and had their audience, and had their other work outside (the neighborhood).

The interviewee went on to say, "I think the economic development work in particular was one area where people got confused. I think rather than focus on a health outcome or improving health we realized it was about communicating that we were working on the well-being of the community and the strength of a community and that was easy for community development and economic development folks to understand."

Building Relationships *Engagement Strategies*

The initiatives employed a number of strategies to engage residents in the process of goal and priority setting and designing community programs. Examples included: focus groups, neighborhood meetings, community cafes, community events, workshops, play groups for children and families as well as neighborhood celebrations. Staff used multiple forums as a way to reach the largest number of residents, knowing some residents would regularly show up while others were more difficult to engage. Staff also noted a range of interest in participation, some residents wanted to attend community gatherings while others wanted to participate in decision-making and programs.

In terms of conducting outreach, one thing we're trying to get better at is reaching more people, we've been working on building that. We recognize that the folks who come to things a lot of times they are already there. We do get folks where this becomes something new, something that they're interested in, and then becomes an outlet and an opportunity and that's, we want more of that. We want to make sure that the spaces we are creating for people to come together are actually viable and useable and of interest to the residents.

Early on staff recognized the need for food and childcare at meetings and events. Especially for parents of younger children, asking them to attend evening meetings required support for childcare so it did not add extra burden. These engagement events provided opportunities to talk about the initiative, learn resident concerns and build cohesion. At many of the earliest events, residents talked about the desire for more opportunities to socialize and spend time in their neighborhood with other residents.

While these early meetings were essential to building relationships, they did not provide answers to the types of programs residents wanted in their neighborhoods. When staff members were asked about resident concerns identified in the first meetings one interviewee responded:

It could be 100 different issues. It felt like people had a lot of different issues and concerns and they didn't necessarily agree. They didn't disagree with each other, people have very reasonable needs, like 'we want trash off the street' and then also very grand scale which is like 'we don't want any more violence in our community.' We needed to figure out how to facilitate these conversations and also help prioritize issues and also be clear on what was reasonable given our scope.

Further questions about working with residents revealed a need to build relationships with residents and allow time for residents to build relationships with one another in order to develop priorities and a vision for the neighborhood.

Building Relationships and Mutual Trust

In order to mobilize residents toward community change, staff detailed the importance of building relationships and developing trust with residents and partners in the neighborhood. To accomplish this, interviewees talked about the importance of "showing up" and being consistent. Building mutual trust was linked to the history of the neighborhood; staff found residents were skeptical the initiative would be different from the other programs they had participated in before. One staff member discussed the importance of going to community meetings, showing up just to meet people, hear about the issues they were working on and build relationships with residents and local CBO staff.

For me and this work, relationships is such a big deal and trust is such a big deal, and people don't even believe you're for real until you've been around for a year. So people have seen me for 3-4 years, so they all like me and talk to me now, but for the first year they blew me up. It's okay, I needed to show people we were in it and that we were committed.

Another staff member talked about the importance of consistency and following through on what they said they would do. While some of the first meetings and events were not always well attended, staff would gather information about how to improve advertising, adjust meeting times or locations to better fit resident's schedules. They made a point of participating in events on weekends or in poor weather, so residents and partners could see their commitment.

I think the difference in getting those residents to participate, to get their feedback, and to incorporate it and to show them that we were going to be there kind of for the long haul was like, we started off really small, and we started off in a way even if it rained at a community event or even if someone was having a meeting that not very many people came to we would show up and do whatever we were going to do, every time. And I think people started to recognize that. And so I think, if you say you are going to do something you have to do it. Even if events weren't well attended we stayed and did them just the way we planned.

Power Relations

Issues of power were discussed in relation to residents and staff, residents themselves, and staff and the larger organization that held the initiatives. Power dynamics involved issues around race, class, opportunity and decision-making. Residents expressed frustration that initiative staff were paid to work on issues in the community while residents were not paid, or received small stipends, and didn't feel they had control over ultimate decision-making. One resident questioned the need to hire full time staff explaining much of the bridge building work with community happened through resident leaders. Another resident noted the racial and ethnic make-up of the staff did not necessarily reflect that of the neighborhood.

A lot of staff is white, and they don't live in the neighborhood and they are making the decisions. I sometimes feel like they want to hear from us but really what do they have that we cannot do for ourselves? Why can't we be paid to do this work?

Another resident discussed skepticism about the broader interest in neighborhood revitalization by a number of different agencies. The interviewee noted the changing racial and ethnic composition of the neighborhood, with white residents moving in, and increasing gentrification. Speaking broadly about a number of organizations serving the neighborhood the resident said:

So now they are here, it is like it is, now the social justice thing is cool. But what, now that white people are here there are all these people who want to see the neighborhood get cleaned up, and be better. When it was just us black people they didn't give a damn, but now that you know there are 20% white people in the neighborhood look everybody cares and everyone wants to see this change. Where was everybody when crack was on our streets?

Staff discussed racial and class dynamics within the community, noting they paid particular attention to bringing people together. Both initiatives worked in multi-racial, cultural and linguistic settings and used interpreters or bilingual staff so people could work together. One initiative talked about working with predominantly African American and Chinese community members. Many of the Chinese residents spoke Mandarin, and there had been some tension between the groups. When they discussed facilitating two meetings, one in English, one in Mandarin, they decided to use interpretation so that the groups could stay together and listen to one another's concerns. Another staff member recounts building a resident leadership program with English and monolingual Spanish speakers saying:

We needed to find a way to include the monolingual Spanish speakers, because if not we were just going to be doing what a whole bunch of other systemic issues have done, which is to

perpetuate a divide and inequity in, ironically, in a way that we are trying to create equity and community transformation.

There were also power dynamics within the larger organizations that held the initiatives. One interviewee talked about the problems of decision-making, funding and trust within the organization. Staff expressed issues of power in terms of who made decisions about programs and funding, and how much influence they had within their organization. One staff member struggled with internal organizational power dynamics.

We didn't know exactly what we were doing in the beginning. So I would like go to all these meetings and people wanted to know what we were doing and how it was going to work in the system of our organization's programs and I just didn't know. There was a lot of contention and a lot of criticism. I had no authority with other programs, no way to direct resources, or get help applying for funding. It was challenging.

Small Wins

Staff talked about the importance of engaging residents early in the process of the initiative and working on early "small win" projects to build momentum and feel a sense of accomplishment. Small win projects were described as projects implemented in a relatively short time frame, did not cost much money and had actionable outcomes. Projects ranged from totally volunteer endeavors to small grant programs in which residents implemented programs for their neighborhood. Small win projects were viewed as vital to developing momentum for the initiative and for residents to participate in a project.

I think the small wins is something that was really important for us. Me and someone else were at a conference we were talking about small wins, and we went and immediately took that and the best example was... we did this seven second campaign. There was a cross walk, where seniors had to cross the street, it was 7 seconds before there was the stop hand, and no senior can cross a five lane street in seven seconds. And it was a blinking stop hand, but it was scary. And so we organized the seniors to do a petition, and interview people on the street, residents did this and then they called the city and presented on it. And then the city did go and change it. And so all of a sudden, the disenfranchised community who said 'nothing ever changes' was like, 'oh, we just did something!' And this was something in front of a building in our neighborhood, all of a sudden from the year of building trust and the half a year trying to train people on leadership and reminding them to do these things, all of a sudden, participation (in programs) increased immediately.

Building Collective Efficacy

Social Cohesion and Social Connection

Interviewees placed a high value on residents coming together, spending time together and building cohesion. It proved so important, one initiative made building social cohesion a stated goal after hearing from residents.

Well everything I know about community building helps the community, right? If people know each other, they build relationships. If people have a positive relationship they support each other. And I've seen that anecdotally. We've had parent cafes and I was doing that and I wanted to see how people felt so I did a survey at the beginning and at the end. And the thing that had changed from week 1 to week 8 was everyone reported that they had a lot more parent friends. And that they felt like they could listen and resolve conflicts. So it wasn't about parenting at all, it was all about each other. They were happier with that, with that relationship they built.

Residents described the importance of social cohesion as a way to build community, support one another and also so that they could develop norms for the neighborhood and an understanding

that they were each looking out for the other. Residents discussed the role of community events in creating this sense of cohesion.

We worked with the initiative to start a playdate. Me and a friend were accompanying each other to be safe, so we could be out with our kids. We wanted to play in our neighborhood but there was only one play structure. So we were able to be a part of an event at the play structure and we brought children's toys so kids from the neighborhood could play. It was nice to see the response from the community. I have connected with families, with older people, even someone from my high school I stopped seeing like more than 15 years ago. And we learned the needs and now we bring food from the food bank and clothing and people do take advantage of it.

Another resident who recently moved to the neighborhood and attended neighborhood events said:

My family and I came here for the school supplies, they are giving away backpacks and school supplies. But it is so good because my kids get to play on the playground, they get to ride bikes and we are seeing families from their school. I didn't even know they lived close to here, it is so different to be out and now be together not just at school for our kids.

Shared Expectations

Study participants talked about the desire and importance of safe places for children to play outside, as a way to develop community, get support and have children learn to play together. Both neighborhoods lacked safe parks and playgrounds for children, and this lack of opportunity effected residents coming together and supporting the development of young children. One resident detailed how the neighborhood did not have any places for families with young children to go on the weekends.

I was told early on that this was the neighborhood where you don't go out. Monday to Friday you go out in the neighborhood because you're walking to school, you're doing these things, but Saturday and Sunday there's nothing else to do in this neighborhood. The one play structure is in an area that closes on the weekend so there is no other place for children—small children—to play. We don't get to play together and see other children play.

Recognizing the need, staff worked with residents and local agencies to have community events at the play structure. After attending events there, one resident noted while they thought there was no change in crime, having people out, playing with their children on the weekends changed their perception, they felt it was safer and wanted to attend more community events.

Residents talked about the importance of play areas for young children and the sense of safety it brought to the neighborhood. One resident talked about a new play structure in the neighborhood:

This playground is used daily, I come by and there might be 7-10 kids playing there. The open space, seeing children play, engaging outside it gives the neighborhood a better feeling. This was an abandoned building, this is so much better, it is really nice and it feels like a great place for the children.

Two other residents reported changes they felt after spending more time at the neighborhood park:

I used to see prostitutes, you know selling, drugs, it was everything out here before when it was abandoned. And now my grandkids can come play, they are meeting the other kids, and there is laughter, you know. They are screaming and running and the kids need that and the parents and the grandparents have a nice place to sit and talk. We could be sitting having coffee.

The importance of outdoor areas to play for children was viewed at community events. Events focused on activities for children and families, and the parks often had 30-40 families with young

children playing on the climbing structure, riding bikes in the park, with lots of adults watching after children. Parents were heard asking each other for resources, talking about developmental stages of their children and connecting with one another about the challenges of parenting.

Resident Leadership

Resident leaders were described as the “glue” between the neighborhood and the initiative. Some residents who were longtime residents were already leaders, connected to community, with established ties to residents and organizations. Two residents participated on a number of volunteer boards in the community and were actively engaged in civic life. Other residents saw themselves as leaders after working with the initiative and becoming engaged in community efforts. One resident said:

So they (initiative) invited us to come and talk about our neighborhood at the community cafes. And then from there I started attending these other events and meetings. I started using the opportunities to do more work. I thought, you know I am creative, I am getting myself into something I like and I wanted to stay with that.

Another resident talked about the work happening among resident leaders and ways in which the initiative could support their work.

I work with other residents because I see them. There are 10 or 15 of us that go everywhere, and we go to all the events. As far as canvassing you know I do canvassing and that is when I interact with all the other residents in that capacity. But in terms of every week or even everyday, I don't interact with people so much, but I would love that, I would want that you know. We've got this island right out here (near the street), I would love it if just every morning people came out there and did some exercise together. If I went out there and started some music and started doing some steps, then we could get a little money for bagels and coffee. We need that.

Resident leaders had ideas about community events, ways to bring community members together and a strong sense of commitment to their neighborhoods. Staff talked about the role this commitment played in advancing an agenda for the neighborhood, these leaders helped bridge the work between the initiative and residents and helped reach out to residents not engaged with the initiative's efforts.

Sense of community

Residents talked about a strong sense of belonging and the importance of helping neighbors and being connected in their community. While residents talked about issues related to gun violence, illicit substance use, prostitution and blight, they talked about the value of staying in their neighborhoods and lifting up the community once again. One resident explains:

I like to travel, but I always, no matter wherever my plane is landing from, when I see Oakland something in my soul just settles down, it is a really good feeling. You could drop me off anywhere 100 miles from here and I can just zone in and find my way back to the people and the place.

Another resident who lived in the neighborhood for less than 15 years emphasized the sense of community among residents and a deep commitment to improving community conditions for children saying:

We all help each other one way or another. I have been able to make friends with people who I don't expect to and they become the best helpers ever. I see collaboration, I see people being real with each other, and I see people being helpful. Just yesterday I stopped by the food bank and picked up food for my family but you know I had room in my car so I picked up fresh bread, vegetables and milk. I picked up milk, tons of milk because we have people in our building with

children. Even though I had never talked to these people I knocked on their door because they would do the same for me. I knocked on three doors of people I had never met but I knew had children and sure enough they were very warm and welcoming. All the neighbors came down and got bread and vegetables and all the kids got milk.”

Initiative Infrastructure

Policy and Advocacy

As staff worked with residents to identify goals and objectives, issues related to improving the infrastructure of the neighborhood were important to many residents. Interviewees noted concerns with local schools, interactions between police and residents, lack of places to buy high quality foods and affordable housing. Staff noted residents wanted information on how these larger systems worked, how decisions were made and how they could advocate for change.

One thing we need to address is issues around how the big institutions work. For instance, the schools and the school district, and the police. Residents want to get involved, already from our work we can see that education is a huge thing and there a lot of parents who have a lot of emotion about the way school district and police and all these other institutions you know work with them and their children. So we are looking at how like, what sort of policy there might be that can help with these issues, like the school district and the city. Then there is also policy around the environmental and housing piece because land use and zoning are big issues. Land may not have originally been slated for residential because of all the old factories and other industry but now it is residential a lot of residential land use, so we need to balance land use and environmental issues and pollution.

Residents discussed a desire to have more advocacy and policy training and wanted initiative staff to understand the larger systems so they could advocate for themselves. Policy agendas were articulated in different ways, with staff members revealing the need for a policy agenda but a lack of skills and knowledge to craft and implement it.

Funding & Sustainability

While much of the staff interviews focused on working with residents, time was spent discussing the infrastructure within the initiative and the challenges of doing place-based community change. One common challenge was finding funding that allowed for adequate time to build relationships. Both initiatives received funding to improve resident health and well-being, much of the funding however was in short cycles, such as three years, and health changes were not going to materialize that quickly. Developing interim measures were important to document the work of building community. Staff referred to the need for “Year 0” funding, just to build and establish relationships, before setting program goals and designing interventions. They also needed a strategy to embed their work in the community. Funding would eventually end, and staff wanted to ensure the work would continue. One staff member noted:

It is an interesting dynamic for our organization to think about how we are going to embed the work, how are we not going to be the holders anymore. I feel like that’s an ongoing struggle.

These initiatives are beginning to address sustainability by embedding the work in the community, hiring residents to do community engagement and lead programs within their organizations.

Flexibility

In addition to funding constraints, the iterative nature of the work required flexibility and adaptability from the initiative and the organizations in which it was housed. Much of staff time was spent attending community events, going to meetings with local stakeholders and resident

groups, and seeking out community partners. Staff often worked irregular hours to attend meetings which was not necessarily the practice of the organization in which the initiative was housed. In addition, while the initiative had to decide on a geographical boundary, staff acknowledged that resident's lives did not always reflect these boundaries and they needed to be flexible with who they worked with.

“People’s lives are betwixt and between this small census tract, so we think about how we work and how we partner in our neighborhood, and then really it can broaden outside our ‘boundary’. We’re partnered with folks who are working all over the place and there’s always a tie to that neighborhood. The programing that we fund is based in that neighborhood, and the people who participate in it aren’t necessarily like “check where they live”... you’re not a resident therefore you’re not okay, you can’t participate. So then I would say there’s lots of places in people’s lives that are important and have influence on their well-being, and therefore are important in relation to our work. We engage with folks who then go off and do outreach in their own schools, which are farther off; we work with folks out of, like, a health clinic which is just outside our neighborhood boundary, we have to be flexible.”

Both initiatives explored other place-based initiatives to learn about emerging and best practices when investigating potential programs. While much of this information gathering proved fruitful for idea generation, one staff member also acknowledged the importance of tailoring programs to meet the needs of their target neighborhood.

“...we look at the best practices and then we want to replicate them, but you can’t replicate them because cities and neighborhoods look different and people have different lived experiences as well; as this neighborhood has a different lived experience of something happening in California to Detroit to New York, or wherever.”

Flexibility was vital to the early success of relationship building and small wins. Developing a knowledge base of programs and interventions that worked in other communities helped inform early conversations but did not drive decisions around program development, tailoring programs to the local context and desires. While the initiatives were targeting investment and resources in specific geographic boundaries partners and residents outside those boundaries were equally important to program success.

Discussion

Resident and staff interviews provided in-depth knowledge of the process of building collective efficacy in place-based community transformation efforts. This study highlights the strategies, challenges, and successes of building collective efficacy as a first step toward mobilizing residents for collective action. The experiences and activities described by staff and residents illustrate a number of dynamic processes occurring while building collective efficacy in target neighborhoods. Our conceptual framework provided a helpful visual aid to the overlapping processes that occurred. CCI staff emphasized relationship building, establishing mutual trust, creating opportunities to build social cohesion and determining shared expectations to mobilize for collective action. These factors were influenced by each neighborhood’s history, power relations, cultural attitudes and beliefs. This finding is consistent with the work done by Pursley (1996) and others emphasizing the importance of trust, respect, and honesty when building community capacity especially in politically and socio-economically disenfranchised communities. (Roe, et al. 1995) Research shows socially cohesive communities have many benefits including increased social support, improved mental health as well as increased capacity to engage in collective action. (Anderson and Milligan). Interviewees discussed the importance of social cohesion to build social support and create opportunities for shared expectations.

Focusing early work on building social cohesion is a promising practice toward program success. Identifying funding for this work is a crucial step in the development of sustainable community change efforts.

Another finding was the importance of a strong sense of community detailed by residents in their interviews. Longer term residents talked about the history of their neighborhood, memories of thriving communities and a deep sense of connection to the neighborhood. This sense of community is often described as a key component of community building and may be important for long term community change. (Royal and Rossi, 1996) Efficacy beliefs are related to how hard a person will try to achieve their desired goals, residents with a strong sense of community may be more motivated to work toward community change. (Bandura, 2002) Residents in our study who discussed a strong sense of community were very active in civic life, attending community events, school board meetings, and housing authority meetings. Resident leaders with a strong sense of community may be a key to actualizing neighborhood change.

The work of relationship building takes time and sustained commitment. Staff discussed the unrealistic expectations of meeting program goals by year three, when the first year was focused on building relationships, understanding the dynamics of organizations and bringing residents together to build social cohesion. Efforts such as community parties, movie nights and “small win” approaches built momentum and harnessed energy for collective action. In addition, partnerships proved vital to the identification and development of relationships with residents. Given the constraints of time and funding, the CCIs sought to embed their work in neighborhoods with strong CBOs, well respected by community residents. In this way the initiatives added to and helped with the coordination of services rather than starting from the ground up. Other CCIs have adopted similar approaches focusing efforts in communities with local infrastructure and desire for community change. The Annie E Casey Foundation’s Making Connections Initiative was a ten-year commitment to support community change in low income neighborhoods. They explicitly sought neighborhoods with well-established community organizations already working with residents to improve local neighborhood conditions. Other place-based programs, such as Promise Neighborhoods and Choice Neighborhoods, have adapted similar policies, with initial requests for proposals requiring applicants to identify existing infrastructure and partnerships in target neighborhoods.

This study found relational dynamics such as race, class, lack of clear decision-making processes and equity influenced community change efforts as well as historical and cultural factors. While these initiatives were not conducting research, adopting a community based participatory research (CBPR) approach to community change may provide a framework to address these concerns. CBPR has been defined as “systematic inquiry, with the participation of those affected by the issue being studied, for the purposes of education and taking action or effecting change.” (Green, et al. 1994) CBPR shares a set of core principles that recognizes the community as a unity of identity, involves empowering and power-sharing processes, fosters co-learning and capacity building opportunities, involves all partners in the process of disseminating results, is action-oriented for the benefit of all partners and has a long term process and commitment to sustainability. (Minkler and Wallerstein, 2003; Cornwall and Jewkes, 1995) This action-oriented research approach, when instituted appropriately, facilitates relationships, and equitable partnerships, establishes trust, and builds community capacity. CBPR has been employed with

residents and academics working together to address neighborhood challenges such as environmental degradation and resident health. (Corburn 2002; Morello-Frosch, et al.; Horowitz, 3003; Petersen, 2007) CCI already implement many CBPR approaches, yet, interviews with residents talked about a parallel dynamic with staff, unclear about their role in decision-making, and power imbalances with staff paid to work on neighborhood issues without clear pathways for resident participation. A CBPR approach may provide a framework to develop a governing structure, address issues of power and privilege, facilitate conversations about knowledge generation, and collective decision-making. This co-production of learning and problem solving may be crucial to the long term success of any place-based intervention. Corburn, 2006)

The target neighborhoods face challenges of high poverty, under performing schools, unemployment, low and inadequate housing and environmental degradation. Changing these conditions requires more than residents coming together for collective action. CCI must adopt comprehensive policy agendas, so as residents engage in collective action there are mechanisms to address larger policy issues. Lacking from our initial conceptual map was a pathway to advocacy and policy work. Policy agendas were articulated in different ways during interviews with staff, revealing a lack of clear policy agenda for both initiatives. While policy and advocacy agendas should not be set prior to working with community residents, staff felt they did not have the time or the skills to advance a policy agenda. Partnering with local policy and advocacy groups may help advance the community change agenda. Successful partnerships between residents, local CBOs, and advocacy groups have been successful for decades, recent research explored the success of these partnerships with researchers and scientists, finding positive changes to local environmental health issues. (Corburn 2002; Balazs & Morello-Frosch, 2013; Gonzalez, et al. 2011) Future community change endeavors must address this need for policy and advocacy partners and incorporate co-production processes along with their program goals. Figure 2 details this new framework. Developing a policy platform along with co-production processes work in concert to create a long term vision for the neighborhood that addresses issues of relational power while influencing the systems and structures that serve the community.

Figure 2: Concept Map of Social Processes in the Development of Community Change Efforts



Limitations and Implications for Future Research

A case study approach was used to understand the role of collective efficacy on community change efforts. While this study provided important information on how these two initiatives approached this work, it was limited to two neighborhoods in one city. Given the importance of the historical, geographic, and cultural make-up of the neighborhood and surrounding city a multi-site, multi-city case study design would provide additional evidence and a wider context for this work. This approach is advantageous as the evidence is gathered across a more diverse set of neighborhoods, histories and people. (Yin 2014) The purposive sampling design and limited sample size reflected residents who participated in or knew about the CCIs and did not reflect a more diverse range of perspectives. Additional research with residents who have not participated in community events would help uncover perspectives on the experience and importance of social cohesion and informal social control for neighborhood change.

The limited number of longitudinal studies on collective efficacy have explored whether it changes over time, yet do not investigate whether health outcomes change as collective efficacy changes. Additional research is needed to understand whether this approach is successful in improving health. A particular focus on how much time is needed to achieve collective mobilization and implementation of neighborhood change may help the development of future place-based endeavors. The neighborhoods in this study cope with decades of disinvestment; a three or five year funding cycle will not undue the health consequences of this disinvestment. We must develop a long term vision of community change, one that provides time to build relationships, develop participatory processes, determine action plans and implement programs. Incremental measurement of community change is necessary to track the progress of and learn from early mobilization efforts.

Conclusion

CCIs are characterized by the idea that creating sustainable community change must come from the community members themselves. This participatory process requires a level of trust, social cohesion, and sense of community to mobilize for community change. Building the collective efficacy of a neighborhood is an important first step toward catalyzing community change. Politically and socio economically marginalized communities, however, need additional investment in the systems and infrastructure of their neighborhoods. This study reveals the importance of partnering with resident leaders and community organizations as well as the involvement of policy and advocacy organizations collectively working on a resident-driven vision for community change. Using a CBPR framework to develop equitable partnerships among these constituents in all aspects of the initiative may address relational power dynamics and underscore the initiative's commitment to long term investment and sustainable change.

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Conclusion

This dissertation employed a mixed methods approach to examine the association between collective efficacy and health as well as the potential role of collective efficacy in mobilizing residents in community change to improve conditions for positive health and well-being. The first paper, a systematic review, offered the opportunity to review the multi-disciplinary literature on collective efficacy and health, but also to identify gaps in the literature and make key recommendations for future research. The first key recommendation is to disentangle the concepts of social norms and collective efficacy on promoting health among residents. While many of the studies reviewed theorized that social norms and collective efficacy were part of the same construct, three studies specifically looked at both concepts finding social norms were associated with outcomes yet null or marginal findings of an association between collective efficacy and health. This suggests social norms may influence health promoting behaviors, such as a reduction in smoking, or sexual risk taking, in potentially different ways than informal social control. Secondly, collective efficacy may be important for some populations and not as salient for others. Many of the studies reviewed found collective efficacy was related to improved mental and behavioral health for children and adolescents, yet findings were not as robust for adult populations. Children rely heavily on their parents, adult caregivers and friendships for social support and development of positive behavior norms. These repeated interactions develop social cohesion and provide opportunities for social control that may benefit child and adolescent development when behavior patterns and social norms are being established. Future research should tease out different aspects of social norms and collective efficacy to understand in what ways these processes work differently and in unison to impact health outcomes and focus on the role of collective efficacy with child and adolescent populations.

Paper two examined whether collective efficacy changed over time in seven cities across the U.S. Employing data from the Annie E Casey Foundation's Making Connections Initiative, I conducted a longitudinal multilevel analysis exploring changes in collective efficacy in seven low income neighborhoods. Collective efficacy remained stable over the eight year time period. While the seven cities differed on a number of structural measures such as residential tenure, annual household income, racial and ethnic composition, these factors were not significantly associated with change in collective efficacy over time. One explanation for my findings is that the Making Connections neighborhoods may be different than other urban neighborhoods on a set of unmeasured factors which in turn influences perceptions of collective efficacy. The *Making Connections* sites were selected based on their identified need as well as their infrastructure and ability to carry-out the mission of the Foundation to improve conditions for children and families. These neighborhoods may be similar in that they have a measure of cohesion, existence of strong community-based infrastructure, and active organizations and institutions already in existence. In addition, neighborhoods may not provide the optimal geographic boundary to measure collective efficacy and test whether it changes over time. Schools have defined geographic boundaries, with regular and repeated interaction with the same students, teachers and administrators. Neighborhood boundaries are more fluid and with increasing time outside the neighborhood or in online communities, the lack of regular social interaction may interfere with an individual's perception of neighborhood collective efficacy. Future research should explore the role of collective efficacy in schools, specifically evaluating whether interventions can increase collective efficacy within classrooms and within schools.

Paper three explored the role of place-based community change initiatives in promoting collective efficacy as a mechanism to advance community transformation. Using semi-structured interviews and observations, I explored how two community change initiatives were working to build collective efficacy, and how residents experienced this work in their neighborhoods. Findings suggested that social cohesion was important to developing rapport and building trust with residents, and early in the initiative efforts, building collective efficacy was an important first step toward catalyzing community change. These politically and socio economically marginalized communities, however, needed additional investment in the systems and infrastructure of their neighborhoods. This study revealed the importance of partnering with resident leaders and community organizations as well as policy and advocacy organizations to work together on a resident-driven vision for community change. In addition, a community based participatory framework may help establish equitable partnerships among the range of constituents in all aspects of the work, addressing relational power dynamics and underscore the initiative's commitment to long term investment and sustainable change.

Together these studies provide new insight into the relevance and application of collective efficacy in public health practice, while calling attention to important areas of future research. My hope is that it highlights the importance of community change efforts to invest early and often in the residents of target neighborhoods, creating opportunities to build social cohesion while employing a community based participatory framework that co-produces neighborhood goals and neighborhood solutions among a diverse set of stakeholders, with neighborhood residents at the center of defining and creating their neighborhood environments for positive health and well-being.