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Neighborhood risk and protective factors for teenage childbearing and fathering

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NEIGHBORHOOD RISK AND PROTECTIVE FACTORS
FOR TEENAGE CHILDBEARING AND FATHERING

by

JESSICA LEE LUCERO

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

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Approved by:

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Advisor   Date

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Co-Advisor

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DEDICATION

For my Steven and our Avi bird. You are my everything.

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

Study Purpose

Despite the burgeoning literature on neighborhood effects and teenage fertility (Billy, Brewster & Grady, 1994; Brewster et al., 1993; Brewster, 1994a; Browning, Burrington, Leventhal, & Brooks-Gunn, 2008; Browning, Leventhal, & Brooks-Gunn, 2005; Crane, 1991; Harding, 2003; Ku et al., 1993; Lauritsen, 1994; Plotnick and Hoffman, 1999; Ramirez-Valees et al., 1998; Small & Luster, 1994; Sucoff & Upchurch, 1998; Upchurch, Aneschensel, Sucoff, & Levy-Storms, 1999), many studies face methodological challenges, such as selection bias (attributing neighborhood effects to unmeasured individual characteristics). This study addresses these methodological challenges by utilizing data from a unique natural experiment in Denver that overcomes selection bias. Further, these data contain a comprehensive residential history during childhood for study participants which allows for the measurement of neighborhood exposure in terms of duration and timing. Intensity of exposure also is examined in terms of non-linear effects (i.e., a critical threshold of a given neighborhood condition must be met before an effect on teenage childbearing becomes apparent). The overall purpose of this study is to contribute to the neighborhood effects and teenage childbearing literatures by elucidating specific neighborhood risk and protective factors for teenage childbearing as well as to examine these relationships in terms of duration, timing, and threshold effects.

Problem Statement

Public concern about teenage childbearing (defined here as bearing a child between the ages of 15 and 19 years old) rose as the adolescent birth rate began to climb in the 1980's although it had been an issue of policy concern for a couple of decades prior. Prior to the 20th

century, bearing children in adolescence was not unusual (Furstenburg, 2007). However, with key changing patterns in fertility and family formation in the U.S. (i.e., increases in out-of-wedlock pregnancies and subsequent single-headed households), the issue of teenage childbearing became one of policy concern as early as the 1960s (Erickson, 1998; Furstenburg, 2007; Luker, 1996). Although current research on the effects of teenage childbearing no longer supports the notion that bearing children in adolescence is a singular catastrophic event (Hoffman, 1998), there is still compelling reason to believe that teenage childbearing places mothers and their children at a disadvantage relative to their counterparts who delay childbearing (Ashcraft & Lange, 2006; Fletcher & Wolfe, 2009; Hoffman, 1998).

Conceptualizations of teenage childbearing vary ranging from characterizing the phenomenon as a serious social problem to depicting is as a sensationalized public health crisis (Luker, 1996). In the last decade, there has been a shift in the empirical research literature from one of a certain and emphatic causal relationship between teenage childbearing and deleterious outcomes in educational, social and economic attainment (Maynard, 1996; Hotz, McElroy, & Sanders, 1997), to one that lacks scholarly consensus in part due to the methodological biases typically left unaddressed in prior studies (Ashcraft & Lange, 2006; Fletcher & Wolfe, 2009; Hoffman, Foster, & Furstenberg, 1993; Hoffman, 1998; Geronimus & Korenman, 1993; Hotz, McElroy, & Sanders, 2005). Despite the lack of consensus regarding the causal relationship between teenage childbearing and various outcomes, the issue has remained one of great interest for policy-makers and scholars.

Empirical work on teenage childbearing also has evolved from only considering individual-level characteristics (Hofferth, 1987; Moore & Waite, 1977; Mott & Marsiglio, 1985) to considering family influences (Miller, Benson, & Galbraith, 2001) to including more

methodologically sophisticated individual-level studies that approach quasi-experimental designs (Ashcraft & Lange, 2006; Fletcher & Wolfe, 2009; Geronimus & Korenman, 1993; Hoffman, 1998; Hoffman, Foster, & Furstenberg, 1993; Hotz, McElroy, & Sanders, 2005) to most recently assessing the neighborhood context of teenage childbearing (Billy et al., 1994; Brewster et al., 1993; Brewster, 1994a; Crane, 1991; Harding, 2003; Ku et al., 1993; Lauritsen, 1994; Plotnick and Hoffman, 1999; Ramirez-Valles et al., 1998; Small & Luster, 1994; Sucoff & Upchurch, 1998; Upchurch, Aneschensel, Sucoff, & Levy-Storms, 1999). As this scholarship on teenage fertility outcomes has evolved, greater attention has been paid to variations by ethnicity (Santelli, Lindberg, Abma, McNeely, & Resnick, 2000; Santelli, Lowry, Brener, & Robin, 2000; South & Baumer, 2000), gender (Bunting & McCauley, 2004; Hernandez, 2002; Mirandé, 1997), and socioeconomic status (Hardwick & Patychuck, 1999; Singh, Darroch & Frost, 2001).

As researchers began to acknowledge the influence of socioeconomic status on teenage childbearing risk, the literature evolved from largely looking at Black teenage mothers to examining the intersection between class and race and the complexity that neighborhood residence added to this intersection (Brewster, 1994a; Colen, Geronimus & Phipps, 2006; Crane, 1991; Hogan & Kitigawa, 1985; South & Crowder, 1999; Spence & Eberstein, 2009; Stevens, 1996; Wilson, 1987). Although this intersection between class and race is obscured when one simply looks at national trends, past studies have found that young women with lower socioeconomic status are at greater risk for becoming pregnant in their teen years (Hardwick & Patychuck, 1999; Singh, Darroch & Frost, 2001; South & Baumer, 2001). Inasmuch as lower socioeconomic status youth tend to live in geographic spaces which are likewise disadvantaged, these youth tend to be disproportionately Black and Latino (South & Baumer, 2001). It logically

follows then that the overall birth rates for Black and Latino adolescents are higher than those of their White counterparts.

Rather than simply citing race and class differences as the most influential predictors of teenage childbearing, it is important to understand the varying and complex neighborhood-level risk factors. If risk factors are conceptualized only at the individual level, then potentially equally important neighborhood factors may be ignored and thus intervention efforts may be misguided. For example, Latino immigrant youth use contraceptives at lower rates than their acculturated Latino counterparts (Sterling & Sadler, 2009; The National Campaign to Prevent Teen and Unplanned Pregnancy, 2008) and thus tend to have higher birth rates. However, it is useful to consider neighborhood-level factors, such as social capital or social control, which may be driving some of these differences in predominantly immigrant neighborhoods. In this case, individual-level intervention efforts may focus on decreasing birth rates through offering behaviorally-based interventions that focus on contraceptive use. However, if various neighborhood factors are actually at play here, there may be alternate routes for intervention (i.e., building neighborhood social capital for less acculturated Latino youth which may protect them from earlier sexual initiation rates).

What are "Neighborhood Effects?"

Neighborhood effects have been generally understood as the independently causal effect of neighborhood residence on individual outcomes. Dietz (2002) defines neighborhood effects as "community influences on individual social or economic outcomes (p. 539)," and describes pertinent outcomes such as labor force activity, child psychosocial and health outcomes, criminal behavior, and other socioeconomic phenomena. Neighborhood effects on teenage childbearing may be positive (e.g., as neighborhood poverty increases, the probability of teenage childbearing

increases) negative (e.g., as proportion of affluent neighbors increases, the probability of teenage childbearing decreases) or mediating (e.g., as neighborhood social capital increases, the effect of concentrated disadvantage on teenage childbearing is attenuated).

Defining Neighborhoods

Downs (1981) defines neighborhoods as "geographic units within which certain social relationships exist" (p. 15). Emerging from a socioecological perspective, Galster (2001) defines neighborhood as a "bundle of spatially based attributes associated with clusters of residences, sometimes in conjunction with other land uses" (p. 212). Within the neighborhood effects literature, neighborhoods tend to be operationalized as geographically defined clusters set forth by the U.S. Census Bureau (e.g. Census tracts and block groups) or administrative data sources (e.g., state police data, school district data, agency catchment area, etc.) (Sampson, Morenoff, & Gannon-Rowley, 2002).

Building on the theoretical work of the Chicago School of Sociology, Suttles (1972) proposed a definition which acknowledged the hierarchy of communities and suggested that definitions may be imposed on residents. For example, jurisdictional boundaries may not have any socially significant meaning to neighborhood residents, yet these residents' neighborhoods are defined in this manner. Suttles argued that meaningful clusters exist at multiple levels (e.g., immediate neighborhood residence, school catchment area, local jurisdiction, etc.). This theoretically-based definition of neighborhoods as complex, multidimensional constructs may be meaningful; however, the actual use of such definitions in research is fairly rare.

Grannis (1998) proposed that two important and separate aspects comprise neighborhood definitions: (1) physical (geographic position, street patterns, spatial dynamics, etc), and (2) social (social capital, neighbor interactions, etc.). Social interaction necessarily takes place in a

physical setting. Grannis asks "what does it mean to be neighbors? Does it mean to live next door to each other, across the street from each other, or within some specified distance?" (p. 1530-1531). The emerging consensus in the field of neighborhood effects has been to measure these two aspects of neighborhoods as dynamically interacting with one another. Thus, a definition that encompasses both physical and social dimensions is more useful for a comprehensive quantification of neighborhood effects. If neighborhoods are defined by geographical units that more closely approximates neighborhood residents' perception of neighborhood boundaries, then the social interactive mechanisms that occur within neighborhoods may more accurately estimate neighborhood effects.

Methodological Challenges

One of the most formidable methodological challenges that many "ecologically grounded" studies on teen pregnancy and childbearing face when trying to quantify the neighborhood's causal impact is that of geographic selection bias. Essentially, geographic selection bias refers to the very real possibility that individuals may self-select into neighborhoods based on unmeasured personal characteristics that also affect the outcome being investigated (Bergstrom & van Ham, 2010). As a result, the independent effects of neighborhoods cannot be accurately estimated due to the lack of adequate control variables. For example, parents who closely monitor their teenage daughters' behaviors may move to neighborhoods where they expect to find teen peers who will reinforce the behaviors they wish their daughters to emulate. Without knowing who such parents are, the investigator cannot be sure if the observed behaviors are a function of neighborhood peers or unmeasured, uncontrolled parental characteristics. The data used in this study offers an unparalleled opportunity to

overcome this geographic selection bias by exploiting a natural experiment that minimizes this bias.

In addition to the paramount problem of selection bias, many leading scholars have identified additional methodological challenges (Galster, 2008; Jencks & Mayer, 1990; Leventhal & Brooks-Gunn; 2000; Sampson, 1992). An inherent barrier to establishing the validity of neighborhood effects stems from the difficulty in determining causality. Galster (2008) suggests there are six paramount issues that researchers must deal with in order to appropriately decipher the independent causal effects of neighborhoods on individual behavior: (1) defining the scale of the neighborhood; (2) identifying the mechanisms generating the neighborhood effect; (3) measuring appropriate neighborhood characteristics; (4) measuring exposure to neighborhood; (5) measuring appropriate individual characteristics; and (6) endogeneity (the mutually causal relationship between neighborhood residence and individual behavior).

Moreover, there are a number of theoretical considerations that overlap with issues of measurement and design. For example, Jencks and Mayer (1990) suggest that there are four schools of thought on how neighborhoods affect behaviors: (1) disadvantaged neighbors are a disadvantage; (2) advantaged neighbors are a disadvantage; (3) disadvantaged neighbors are irrelevant; and (4) neighbors do not matter, but neighborhoods do. Clearly the manner by which neighborhoods are thought to operate will have a bearing on how neighborhood effects are operationalized, modeled, and quantified. If one assumes that neighbors do not matter (disregarding theories of collective socialization or social contagion) but neighborhoods do (i.e., access to institutional resources and public services), then actual neighborhood effects may be underestimated because other plausible effect mechanisms may be ignored or left unmeasured.

Neighborhood Effects and Teenage Childbearing

From the 1990's through the present, there has been a proliferation of studies on neighborhood effects—enough to constitute several systematic reviews (Booth & Crouter, 2001; Furstenberg, Cook, Eccles, Elder & Sameroff, 1999; Dietz, 2002; Leventhal & Brooks-Gunn, 2000; Galster, 2008; Sampson, Morenoff, & Gannon-Rowley, 2002). Despite the burgeoning literature base that offers evidence for the relationship between concentrated neighborhood disadvantage and other neighborhood conditions on deleterious outcomes for children and adolescents, there are many theoretical and methodological gaps. A small but emerging body of literature exists that comprehensively elucidates the varied, yet specific mechanisms and pathways by which neighborhoods influence individuals. Relative to teenage childbearing, neighborhoods may operate through collective socialization processes wherein teens observe and act according to their perceived neighborhood norms (Cater & Coleman, 2006). Data from a number of notable studies such as the Los Angeles Family and Neighborhoods Study (Sastry, Ghosh-Dastidar, Adams, & Pebley, 2006; Way, Finch, & Cohen, 2006) and the Project on Human Development in Chicago Neighborhoods (Browning, Burrington, Leventhal, & Brooks-Gunn, 2007; Browning, Leventhal, & Brooks-Gunn, 2005) have considered early initiation of sex, use of contraceptives, and pregnancy/childbearing as individual-level outcomes. Teen fertility outcomes have been related to a number of structural neighborhood characteristics, such as concentrated poverty, residential instability, neighborhood affluence, female employment, and racial/ethnic heterogeneity (Brewster, 1994a; Browning, Leventhal, & Brooks-Gunn, 2005; Crane, 1991; Hogan & Kitigawa, 1985).

As early as 1985, Hogan and Kitagawa concluded that the lack of neighborhood social controls and parental monitoring in concentrated poverty neighborhoods significantly increased

the risk for teen pregnancy among Black adolescents. Sucoff and Upchurch (1998) examined the intersection of racial segregation and concentrated poverty as it relates to increased risk for teenage childbearing. The authors found that living in a highly segregated neighborhood was associated with increased risk for teenage childbearing regardless of the economic status of the neighborhood. In other words, racial segregation was shown to be a more prominent predictor of teenage childbearing risk than was neighborhood economic status. Essentially the authors found support for theoretical suppositions such that racial segregation and resulting concentrated poverty results in decreased access to social and economic opportunities. The decreased opportunity structure then makes teenage childbearing a viable and normative option.

There has been a great deal of qualitative research which confirms these quantitative suppositions. For example, Edin and Kefalas (2005) detailed the various choice patterns of low-income women to bear children out of wedlock. These authors found that unlike Wilson's (1987) suggestion that there were fewer marriageable men (a result of racial segregation and decreased employment opportunities for men), women in low-income neighborhoods simply have higher standards for marriage partners than they may have had in the past. Whether it be higher standards for marriage partners or the more generally agreed upon notion of fewer marriageable men, out of wedlock teenage childbearing may be seen as a logical choice for women who have opportunity structures unlike those of more advantaged, White, middle class women.

Although a number of studies have uncovered significant neighborhood predictors of teenage childbearing (e.g. concentrated poverty, residential instability, employment, affluence) it is still unclear if or how these neighborhood features actually *cause* teenage childbearing. There are three primary mechanisms by which neighborhoods have been thought to affect teenage

sexuality and fertility: (1) social contagion (see Crane, 1991); (2) collective socialization (see Brewster, 1994a); and (3) social cohesion and control (see Way, Finch, & Cohen, 2009).

In a study that examined the relation between neighborhood residence and sexual risk taking, youth attitudes about sexual behavior were measured and aggregated to the neighborhood-level (Warner, Giordano, Manning, & Longmore, 2011). These aggregations represented a normative climate that predicted individual sexual behavior. In theory, norms regarding sex were being observed in the neighborhood and conformed to in individual practice, a process characterized as collective socialization. Browning and colleagues (2008) found evidence for the protective nature of ethnic enclaves as they relate to risky sexual behavior. Their study examined the neighborhood contexts associated with adolescent sexual risk behavior in Chicago neighborhoods and found that immigrant concentration (measured by a combination of percent Latino and percent foreign born in the neighborhood) was found to be nonlinearly related to number of sexual partners an adolescent had (Browning, et al., 2008). The authors theorize that ethnic enclaves may provide specific benefits that arise from higher levels of social homogeneity and thus greater cohesion regarding traditional sexual behavior norms. Ethnic enclaves may provide the neighborhood "ingredients" that foster protective neighborhood effect mechanisms such as collective socialization and social cohesion and control.

The Present Study

Despite the expanding body of literature, many of the previous studies which have attempted to quantify the neighborhood-level risk factors for teenage childbearing have fallen short methodologically. It is the purpose of this study to overcome a number of these methodological challenges in an attempt to appropriately quantify the neighborhood risk and protective factors for teenage childbearing and fathering among low-income minority

adolescents. Further, this study navigates the methodological challenges inherent in neighborhood effect studies by uniquely overcoming the issue of selection bias. Using data from the *Denver Child Study*, this study uses multilevel modeling to examine neighborhood-level risk and protective factors for teenage childbearing and fathering while controlling for relevant individual- and family-level variables.

Denver Context

In addition to several of the aforementioned methodological shortcomings of previous studies, the issue of geographic generalizability in neighborhood effects studies on teenage childbearing may be cause for concern. A number of major studies on teenage childbearing and fertility have utilized Chicago-based data to quantify neighborhood effects (Browning et al., 2008; Crane, 1991; Hogan & Kitigawa, 1985). Marios Smalls (2007) notes Chicago's South Side neighborhoods do not accurately reflect poor, Black neighborhoods in other major U.S. cities. He cautions "a case study that makes no attempt at conceptual generalizability leaves the reader not knowing what to do with its findings and even drawing unwarranted conclusions." (p. 18). Therefore, it is important to note that there are several features specific to Denver that may influence my study's findings and the generalizability to the neighborhood effects literature.

Between 1990 and 2000, there was a large influx of Latinos in Denver County. Of the new population growth between these decennial years, 79% was accounted for by Latino growth (70,000 of 87,000 new residents). Most of this growth occurred in the city of Denver as compared to the suburbs (Piton Foundation, 2004). By 2000, there were 21 distinct Latino neighborhoods with percentages exceeding 50% (see Figure 1.1).

Figure 1.1 Racial/Ethnic Concentration in Denver Neighborhoods
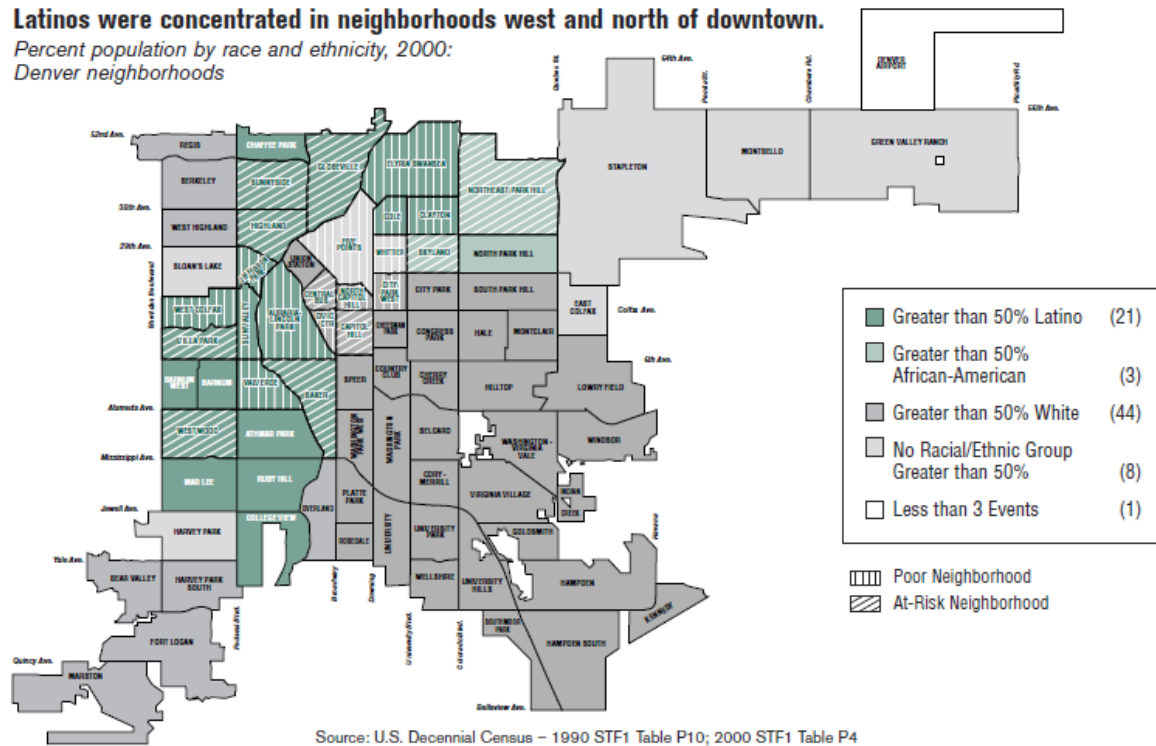
Figure 1.1 visually describes the concentration of racial/ethnic populations in Denver using 2000 Census data. Notably, there are 21 neighborhoods with Latino populations exceeding 50% (denoted in dark green). Adapted from "Neighborhood Facts: A Data Book on the Status of Denver Neighborhoods from Census 2000" by The Piton Foundation, 2004, retrieved from pitonfoundation.org on February 11, 2012.

While the majority of White Non-Latino households in Denver were non-family households (59%), the majority of Latino households were comprised of families with children (53%) or families without children (21%) (Piton Foundation, 2004)[1]. Among Black households, 22% were families without children and 37% were families with children. Between the two minority groups in Denver, Latinos tended to be living in households with children more often than Blacks (Piton Foundation, 2004). Essentially, with the growing proportion of Latinos, there was also a growing share of households comprised of families in key Denver neighborhoods.

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[1] In this instance non-family households were defined as "[…] a single person living alone or two or more unrelated persons living together (Piton Foundation, 2004, p. 27).

Although just over half of all Denver households were non-family households by 2000, the
households with children tended to be more densely located in at-risk neighborhoods that were
also predominantly Latino (see Figure 1.2 for reference).

Figure 1.2 Concentration of Households with Children in Denver
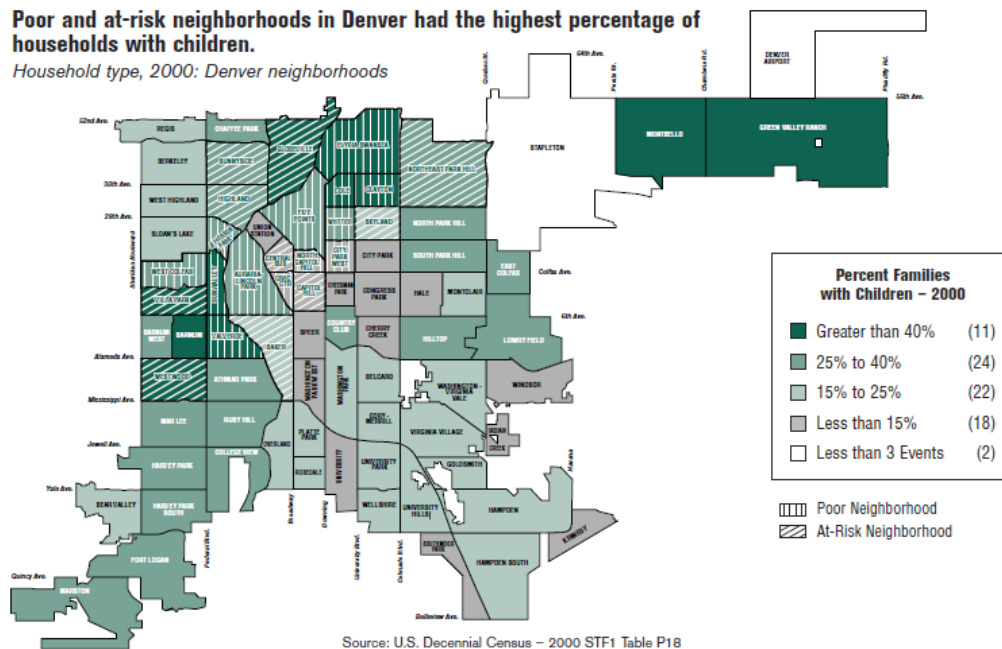
Figure 1.2 describes the concentration of families with children in the household in Denver using
2000 Census Data. Note that the more concentrated family household neighborhoods overlay
with the dominant Latino neighborhoods from Figure C.1. Adapted from "Neighborhood Facts:
A Data Book on the Status of Denver Neighborhoods from Census 2000" by The Piton
Foundation, 2004, retrieved from pitonfoundation.org on February 11, 2012.

Parallel to this growing share of Latinos in family households in Denver, there was a

growing portion of foreign born persons moving into Denver neighborhoods (see Figure 1.3).

Between 1990 and 2000, the foreign born population in Denver increased by 71%. By 2000,

there were 13 distinct neighborhoods in Denver where immigrant concentrations were more than

30% (Piton Foundation, 2004). Speaking more broadly, one sixth of Denver's population was

foreign born in 2000, and Mexican immigrants accounted for two thirds of the entire foreign

born population (Piton Foundation, 2004). Denver has been deemed an "important immigrant

gateway" with immigrant populations concentrated in one third of Denver's neighborhoods, most

of which are considered impoverished and at-risk (Piton Foundation, 2004, p. 20).

Figure 1.3 Concentration of Immigrant Population in Denver Neighborhoods
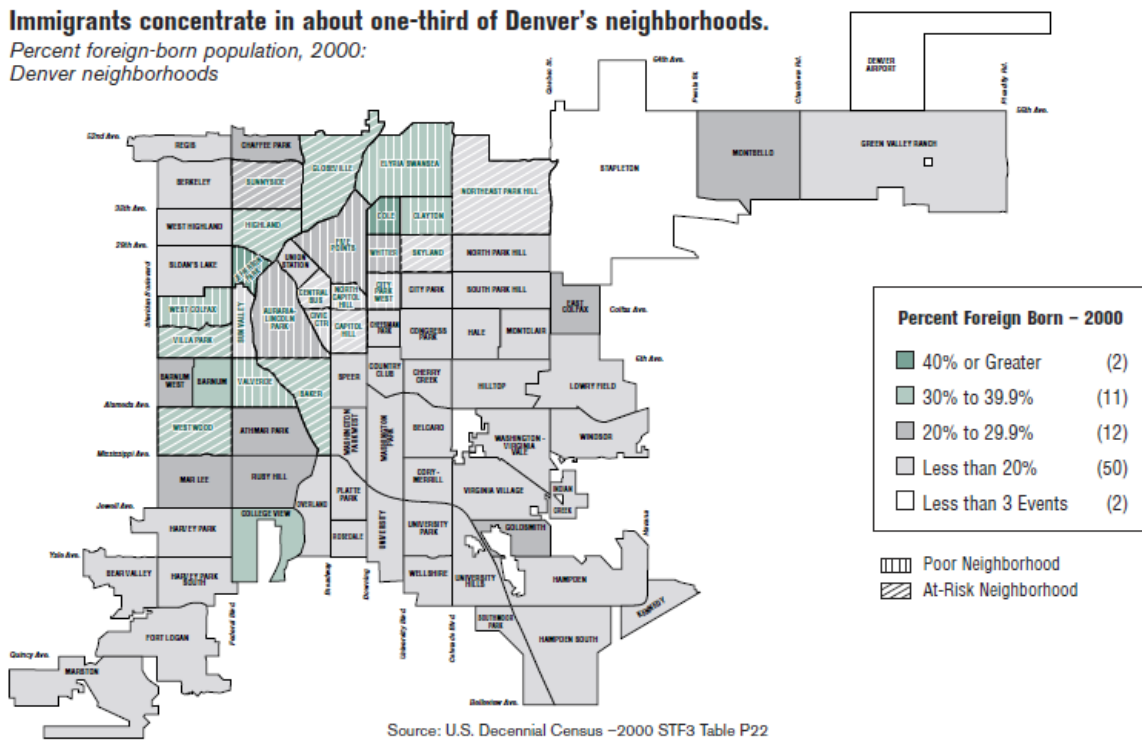
Figure 1.3 describes the spatial concentration of immigrant populations in Denver neighborhoods
using 2000 census data. Note that most concentrated immigrant neighborhoods tend to overlay
the majority of concentrated family household and Latino neighborhoods from figures 1.1 and
1.2. Adapted from "Neighborhood Facts: A Data Book on the Status of Denver Neighborhoods
from Census 2000" by The Piton Foundation, 2004, retrieved from pitonfoundation.org on
February 11, 2012.

The aforementioned changing demographics are relevant to teenage childbearing for a

number of reasons. First, neighborhood disadvantage has been one of the most consistent

neighborhood-level predictors of teenage childbearing (Crane, 1991; Hogan & Kitigawa, 1985;

South & Crowder, 1999). Thus, it is important to understand the extent to which poverty is

concentrated in Denver neighborhoods, especially since the neighborhood demographics in

previous studies may look very different than those in Denver. It is also useful to consider ethnic and immigrant demographic compositions in Denver neighborhoods because these factors may influence a teen's risk for bearing or fathering a child. For example, one study found that collective efficacy was associated with fewer nonmarital teen births in neighborhoods with Latino concentrations below 50% (Way, Finch, and Cohen, 2006). On the other hand, this study found that collective efficacy was associated with higher marital teen births in neighborhoods with Latino concentrations greater than 50%. Their study highlights the varied and important ways that ethnic homogeneity relates to teenage childbearing.

Relevance to Social Work/Policy Implications

By examining the neighborhood-level risk and protective factors for teenage childbearing, this study helps inform prevention and intervention efforts aimed at changing individual behavior influenced by neighborhood-level mechanisms. Past intervention and prevention strategies have commonly focused on sex education efforts emphasizing change in individual-level behaviors such as contraceptive use or family planning choices. Further, by addressing the aforementioned methodological challenges, this study helps inform the field regarding the dynamic interaction between person and environment. For example, if social capital is a valid protective factor for teenage childbearing and fathering, implications for improving neighborhood social controls will be evident. Programs and policies that support community development (e.g. funding for community-based youth development or wraparound services) may increase social capital among neighborhood residents and thereby be an effective prevention strategy.

Conclusion

Framed from an ecological perspective (which posits that children and adolescents are shaped by both proximal and distal influences) and informed by social disorganization and collective efficacy theories, this study investigates the neighborhood contexts associated with teenage childbearing and fathering for Latino and Black adolescents who resided in Denver public housing for a substantial period of time during their childhood. Specifically, this study examines the extent to which teenage childbearing or fathering (occurring between the ages of 15 and 19) are statistically related to various conditions in the neighborhoods in which these youth were raised. The purpose of this study is twofold: (1) to determine if neighborhood effects on teenage childbearing/fathering operate differentially for Black and Latino youth; and (2) to estimate how these effects may vary according to the timing, duration, and intensity of neighborhood exposure. Neighborhood risk and protective factors that expound upon and refine those used in previous neighborhood effects studies are considered in this study. Most importantly, this study utilizes a complete residential history from birth to adolescence in order to parse out the influence of timing, duration, and nonlinearities in the causal relationship between neighborhood residence and teenage childbearing.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter begins with a brief overview of the historical context of teenage childbearing and a synthesis of the scholarly debate regarding the long-term, individual-level outcomes of teenage childbearing. Following this contextual introduction and, in keeping with the evolution of the study of teenage childbearing, individual-, family- and neighborhood-level risk factors for teenage childbearing are discussed. Finally, a review of the neighborhood effects literature on teenage childbearing is undertaken, paying special attention to methodological challenges associated with this research. This review situates the present study within the context of the larger literature and enumerates the methodological issues addressed by the current study.

Historical Context of Teenage Childbearing

Teenage childbearing in the United States has been an issue of great concern for several decades (Furstenberg, 2007; Luker, 1996). Among industrialized countries, the United States has consistently had one of the highest rates of teenage childbearing (Singh & Darroch, 2000). The most recent statistics on teenage pregnancy and childbearing reported by the Guttmacher Institute (2012) indicate that pregnancy rates have declined drastically since the peak in 1990 at 116.9 pregnancies per 1,000 women aged 15 to 19. Despite a slight upswing in 2006, pregnancy rates declined again in 2008 to reach a record low of 67.8 per 1,000 women aged 15 to 19. Among 15 to 19 year olds, pregnancy rates for Black and Latino females (117.0 and 106.6 per 1,000, respectively) are more than double those for Non-Hispanic White females (43.3 per 1,000). Actual birth rates are considerably lower than pregnancy rates with the Black birth rate at 60.1 per 1000, 70.3 per 1000 for Latinos and 26.6 per 1000 for Non-Hispanic Whites

(Guttmacher Institute, 2012).[2] Notably, Latinas have the highest birth rate among racial/ethnic groups. Refer to Figure 2.1 for trends in birth rates by ethnicity in recent decades.

Figure 2.1 Birth Rates for females aged 15 - 19
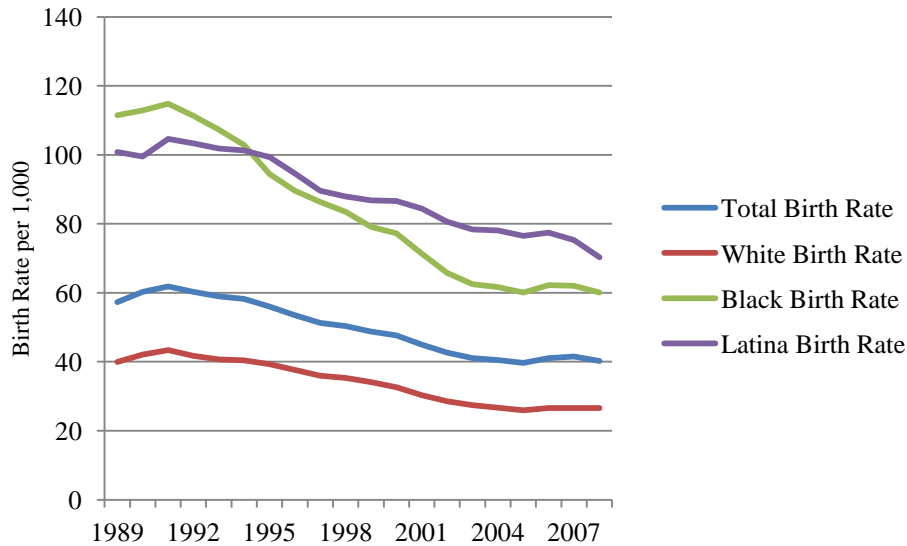
Figure 2.1. Trends in teenage birth rates by race/ethnicity between the years of 1989 and 2008. Births rates are per 1,000 women aged 15 to 19. Adapted from "U.S. Teenage Pregnancies, Births and Abortions, 2008: National Trends by Age, Race and Ethnicity" by Kost, K. & Henshaw, S., February 2012.

The teenage birth rate for males is considerably lower than that for females (See Figure 2.2). This may be due in part to the fact that females have older partners than males, but it may also be due to underreporting on birth certificates (Child Trends, 2010). In 2005, the overall birth rate for males ages 15 to 19 was 16.8, with the Black birth rate (32.2) more than double the male birth rate for White males (14.2) (Child Trends, 2010).

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[2] These estimates were calculated based on data from the National Center for Health Statistics of the U.S. Department of Health and Human Services, the Guttmacher Institute, the U.S. Centers for Disease Control and Prevention, and the Population Estimates Program of the U.S. Bureau of the Census. Refer to Guttmacher (2012) for national-level methodology.

Figure 2.2 Birth Rates for Males ages 15 - 19
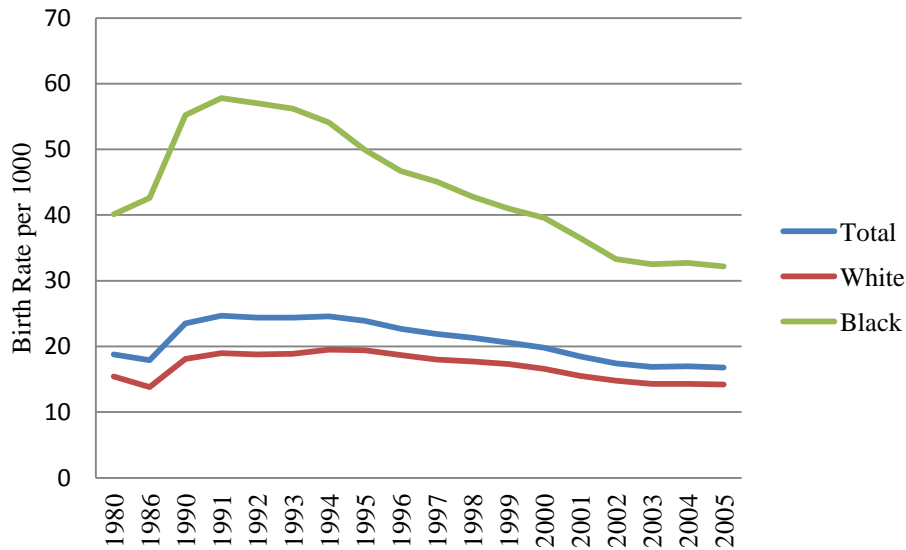
Figure 2.2. Trends in male teenage birth rates by race/ethnicity between the years of 1980 and 2005. Births rates are per 1,000 males aged 15 to 19. Adapted from Child Trends, 2010.

The state of Colorado has an average teenage birth rate of 38.1 per 1,000 among 15 to 19 year old females. In contrast the City and County of Denver has a birth rate nearly twice as high at 61.8 per 1000 (Colorado Youth Matter, 2010). According to data from the Piton Foundation (2012), the trend in teenage birth in Denver was parallel to the U.S. at large. Since 1991, there has been a steady decline in teen births as a percentage of all births in Denver. Consistent with U.S. teenage birth rates, teen births in Denver were at a record low in 2008 (refer to Figure 2.3). Despite the steady decline in teenage births in Denver, as recently as 2008, one in ten births were to teenage mothers.

Figure 2.3 Teen Births as a Percentage of All Births in Denver, 1990-2008
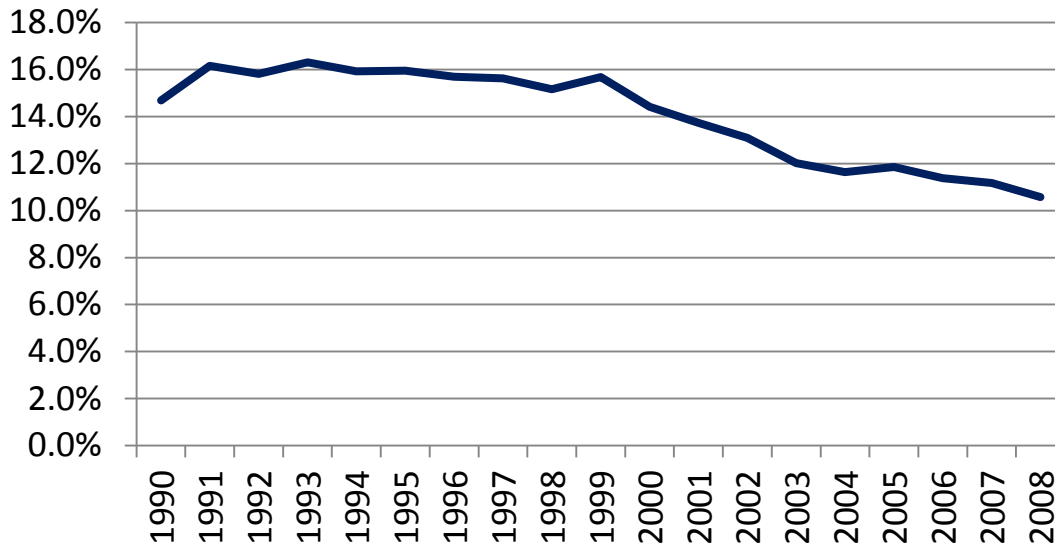
Figure 2.3. Trends in teenage birth as a percentage of all births in Denver between the years of 1990 and 2008. Adapted from "Community Facts" by Piton Foundation, 2012. Retrieved from http://www.piton.org/CommunityFacts.

A visual of this declining trend in teen births by Denver neighborhoods can be observed in Figures 2.4 and 2.5. In 1990, there were nine Denver neighborhoods with percentages of teen births that were greater than 25% of all births; by 2008, there were none (Piton Foundation, 2012).

Figure 2.4 Teen Births in Denver, 1990

Teen Births in Denver as a
Percentage of All Births, 1990

Legend
0%
Less than 5%
5% - 14.9%
15% - 24.9%
25% or Higher
DHA Locations

0   2.5   5   10
Miles

Sources: Data Compiled by the Authors, Piton Foundation Neighborhood Facts Database
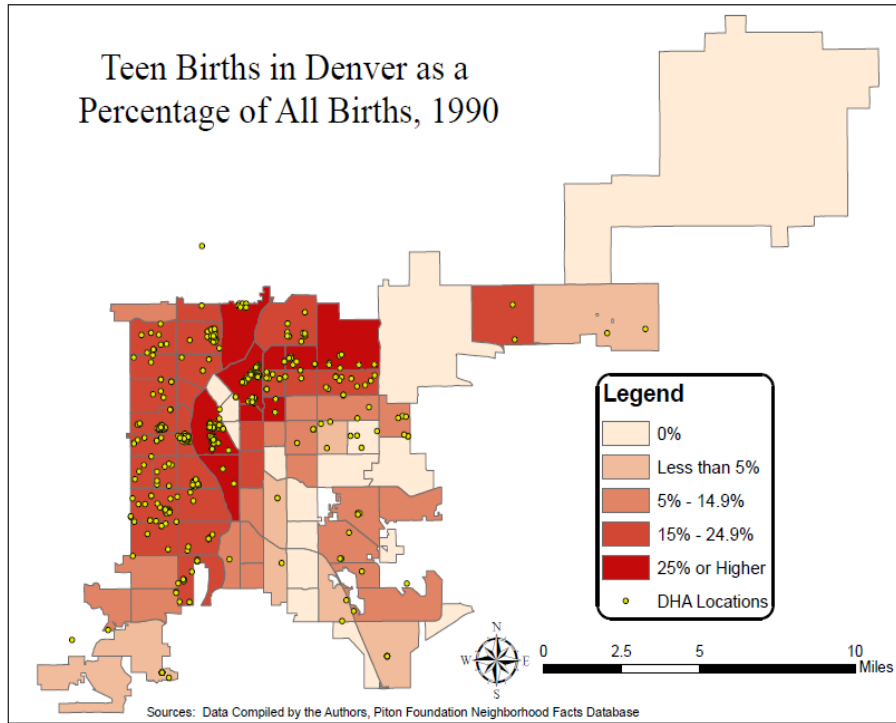
Figure 2.5 Teen Births in Denver, 2008

Teen Births in Denver as a
Percentage of All Births, 2008

Legend
0%
Less than 5%
5% - 14.9%
15% - 24.9%
25% or Higher
DHA Locations

0   2.5   5   10
Miles

Sources: Data Compiled by the Authors, Piton Foundation Neighborhood Facts Database
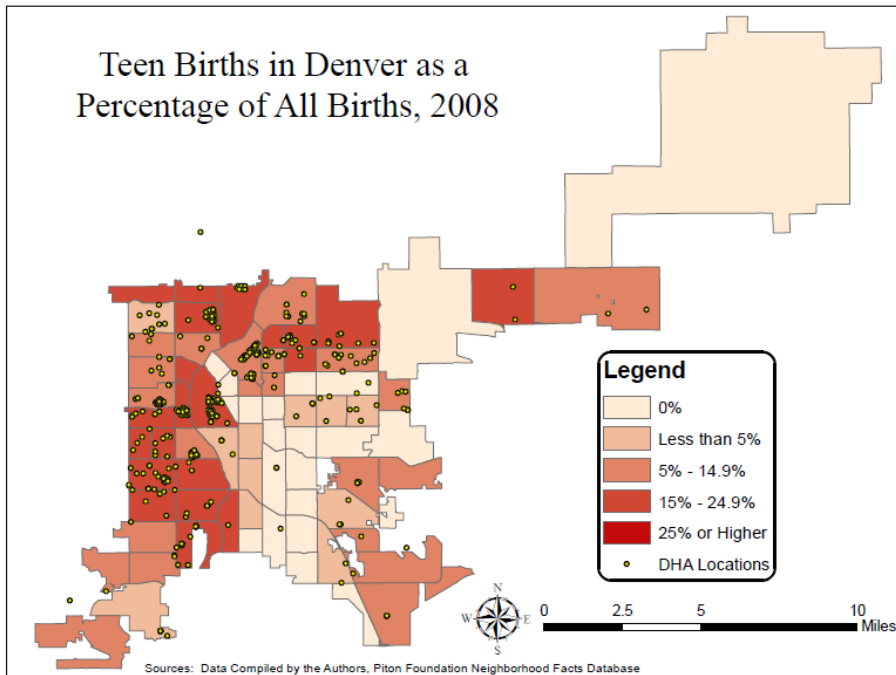
As Luker (1996) notes, the issue of teenage childbearing has been socially constructed as problematic since the 1980s. She questions, why the exclusive focus on adolescents? Why have policymakers neglected the root problem of poverty in the debate? Luker's critical analysis presents an alternative perspective to treating teenage childbearing as the problem of interest. She asserts that it is not teenage childbearing that is problematic *per se*, but the poverty from which young mothers disproportionately originate that produces deleterious effects on mothers and their children. Rather than solely examining racial trends in birth rates, it is important to acknowledge the interaction between race and class. Singh, Darroch, and Frost (2001) found that women from low socioeconomic strata (defined as living below 150% of the federal poverty line) were at greatest risk for bearing children in their teen years. They report that 40% of low socioeconomic status women gave birth before the age of 19 as compared to 20% of middle and 8% of upper socioeconomic status women.

Societal Shifts in Childbearing

Scholars have cited the sexual revolution of the 1960s and 1970s, increases in sexual activity among young people, and shifting family structure patterns (i.e., older marrying ages, increases in out-of-wedlock childbearing) as sociocultural factors related to the social phenomenon of teenage childbearing (Erickson, 1998; Furstenburg, 2007; Luker, 1996). Although teenage childbearing is hardly a new social phenomenon, out-of-wedlock teenage childbearing is. The time period between menarche and eventual childbearing has been referred to as "maidenhood" (Erickson, 1998). In earlier centuries, it was quite common for an adolescent female to marry shortly after her first menstruation, thereby making the potential timeframe for out-of-wedlock childbearing quite brief. Likewise, women gave birth at younger ages soon after menarche.

The mean age of menarche for U.S. girls has been reported to be just over 12 years of age (Anderson & Must, 2005; Chumlea, Schubert, Roche, Julin, Lee, Himes, et al, 2003) while the median age of marriage for women was approximately 26 years old (U.S. Census Bureau, 2010). Age at menarche has steadily declined over the years and average marrying age has increased. In 1990, the median age of first marriage for women was 23.9; just two decades later, the median age increased by 2.2 years (U.S. Census Bureau, 2010). As a result, American females currently experience much longer periods of maidenhood lasting, on average, 14 years. This pattern has changed now that women in the U.S. have much longer periods of maidenhood. This biosocial context is important when one considers the conceptualization of the problem and the prevention or intervention efforts aimed at teenage childbearing. In a post-industrial society, such as the United States, where the socioeconomic ideal of two-parent families endures, it may be prudent to delay childbearing, but biologically speaking, this may be difficult. In lieu of bearing children at younger ages, it is considered to be more advantageous for young women to accumulate wealth and education. While it may be physically adaptive for women to bear children at younger ages, from a purely socioeconomic position, this biological advantage is ignored in policy prescriptions that view teenage childbearing as a social problem that must be prevented.

Evolution of Scholarly Inquiry

Individual consequences of teenage childbearing. Academic inquiry on teenage childbearing has taken a number of major shifts over the last several decades. Because the topic has carried a political and moral agenda, a great deal of academic inquiry has, perhaps erroneously, paralleled the public conceptualization of teenage childbearing as a social problem (Furstenburg, 2007). Numerous U.S. presidents have publicly addressed the topic, and in 1995

President Bill Clinton even suggested that teenage childbearing was "our most serious social problem" (Furstenburg, 2007, p. 1).

Ribar (1994) suggests that the research literature examining the deleterious outcomes of teenage childbearing can be grouped in three distinct generations. The first generation of research simply established the causal effect of teenage childbearing on decreases in female employment and education. However, this body of work was plagued with methodological problems such as inadequate statistical controls and the lack of experimental or quasi-experimental designs (Hofferth, 1987; Mott & Marsiglio, 1985; Moore and Waite, 1977). In these earlier studies, some of the detrimental effects of teenage childbearing were associated with long-term disadvantage without controlling for the essential socioeconomic starting points of those individuals who became teen parents as well as an array of other pertinent individual-level control variables (Furstenburg, Brooks-Gunn & Morgan, 1987; Hayes, 1987). The major methodological issue at hand was that of causality. Without taking into account proper counterfactual explanations of the problem (i.e., what would the outcomes have been for these teens had they delayed childbearing), many of these early prominent studies may have inaccurately depicted the adverse consequences of teenage childbearing.

The second generation of literature used instrumental variables to control for the endogeneity of fertility timing (Klepinger, Lundberg, & Plotnick, 1995; Marini, 1984; Rindfuss, Bumpus, & St. John, 1980). However, these studies produced mixed results. For example, although Marini's (1984) study found that teenage childbearing was significantly related to decreased educational attainment, the effects were much smaller than previously reported. Rindfuss and colleagues (1980) used an instrumental variable approach as well and found that there were no significant effects on educational attainment. A later study in this second

generation of literature found that teenage childbearing was related to decreases in educational attainment among Whites, Blacks, and Hispanics (Klepinger, Lundberg, & Plotnick, 1995).

The third generation of studies used slightly more advanced techniques such as fixed effects and quasi-experimental designs to more accurately estimate the effect of teenage childbearing on later income and educational outcomes (Hoffman, Foster, & Furstenberg, 1993; Hoffman, 1998; Geronimus & Korenman, 1992; Hotz, McElroy, & Sanders, 2005). Third generation studies also used counterfactual designs such as sister studies or designs that compared teens who miscarried to teens who gave birth (Geronimus & Korenman, 1992; Hotz, Mullin, & Sanders, 1997). In improving the methodological approach to more closely approximate an experimental design, results from these studies may be more valid representations of the causal relationship between teenage childbearing and adverse outcomes.

Since Ribar's (1994) assertion of three distinct generations of literature, there has been another wave of studies which have cast doubt on these more sophisticated models such as Geronimus & Korenman's (1992) sister study which compared sisters who gave birth at different ages and Hotz, McElroy & Sanders' (1997) study which utilized a counterfactual model that compared teenage women who carried pregnancies to term to teenage women who miscarried. For example, Fletcher and Wolfe (2009) argue that using females who miscarry as a comparison group is not as compelling as was once thought since miscarriages are not random events and are thus correlated with unobserved community-level factors. When Fletcher and Wolfe (2009) employed a fixed effects specification, they found that teenage childbearing still has deleterious effects on future education, income and welfare receipt. However, these effects are still smaller than may have been estimated in the first generation of research on the consequences of teenage childbearing. Additionally, teenagers who miscarry may have received an abortion later on, so

there are inherent selectivity issues that threaten the validity of this group as a comparison. In order to address this issue, Ashcraft and Lange (2006) utilize an instrumental variable approach which first assumes that all miscarriages occur before abortion decisions and secondly that all abortion decisions occur before miscarriages. When using this approach, they find that the negative effect of teenage childbearing on later educational outcomes remains negative (albeit small). This is contrary to findings such as those in Hotz, McElroy & Sanders' (1997) which suggest that negative effects were negligible and even positive in some cases.

Despite the debate among scholars on the adverse outcomes of teenage childbearing (Geronimus, 1997; Furstenburg, 2007; Luker, 1996), there is still some consistency in findings. After utilizing counterfactual methods and controlling for a multitude of individual characteristics, adolescents who bear children continue to obtain fewer educational assets (Geronimus & Korenman, 1992; Hoffman, Foster, & Furstenburg, 1993). Although the findings about the negative consequences of teenage childbearing may not be as robust as once assumed, teenage childbearing deleteriously impacts employment and earnings outcomes (Ashcraft & Lange, 2006; Fletcher & Wolfe, 2009; Hotz, McElroy, & Sanders, 2005). Hoffman (1998) advocates the need for a conservative position that does not negate the potential adverse effects of teenage childbearing, yet at the same time, does not characterize the social phenomenon as one of eventual doom for mothers. While innovative experiments utilizing counterfactual methods are certainly compelling, there is room for methodological improvement in these experiments. In particular, biases in these designs may be conflating the effects of teenage childbearing and the larger disadvantage of growing up in poverty (Hoffman, 1998). Although debate in the literature persists regarding the seriousness of teenage childbearing as a problem, one might surmise that the U.S. socioeconomic system works to the benefit of women who either

delay childbearing to receive education/job skills or assemble two-income family structures (Furstenburg, 2007).

Individual-level risk factors for teenage childbearing. Parallel to the emergence of literature on the consequences of teenage childbearing, was the development of another body of literature which examined the individual-level risk factors for teenage childbearing. This line of research complemented the literature on the consequences of teenage childbearing by identifying individual characteristics that may have been unmeasured in previous studies and thus led to overestimated effects. Kirby (2000) reviewed more than 250 studies on the antecedents of adolescent sexual initiation, contraceptive use, and pregnancy. Included in his systematic review were peer-reviewed publications that were published after 1975, analyzed data on individuals 19 years of age or younger, and included a minimal sample size of 100. According to this comprehensive review, individual predictors of teenage childbearing include older age, earlier physical development, race/ethnicity, physical abuse/maltreatment, sexual abuse, attachment to school and success in school (negative relationship), relationships with peers, relationships with partners, prosocial activities such as participation in sports (negative relationship), alcohol/substance use and other delinquent behaviors, emotional well-being and distress, and a wide variety of sexual beliefs, attitudes, skills, and behaviors (Brewster, Billy, & Grady, 1993; Miller, Benson, & Galbraith, 2001; Ramirez-Valles, Zimmerman, & Newcomb, 1998; Sucoff & Upchurch, 1998).

Miller (2002) identifies a number of mediating and moderating variables in the relationship between individual- and family-level influences on teenage pregnancy outcomes. Commonly cited mediating variables include depression, high risk peer associations (Evans, Oates, & Schwab, 1992), early/steady dating, sexual values/intentions, prosocial activities, and

alcohol/drug use (Mensch & Kandel, 1992). These effects may be moderated by gender, race/ethnicity, family structure, and religion/religiosity (Miller, 2002). Many of these variables have been cited as individual-level risk factors, but they could also be viewed as mediating and moderating forces depending on the empirical modeling.

Ethnic Differences

Teenage childbearing among Latina youth. Latina adolescents vary from their Black counterparts in a number of meaningful ways. Careful research on the nuanced experiences of Latino youth has only recently emerged (Denner, Kirby, Coyle, & Brindis, 2001; Kaplan, Erickson, & Juarez-Reyes, 2002; Sterling & Sadler, 2009; Upchurch, Aneshensel, Mudgal, & McNeely, 2001), and research which distinguishes between various cultural groups within the larger Latino context (i.e., Mexican, Puerto Rican, Cuban, etc.) is slowly making its way in the literature. Nonetheless, the majority of research to date on Latino youth over-represents the experiences of Mexican youth (Erickson, 1998; Hernandez, 2002).

Latinas have shorter periods of "maidenhood" as evidenced by the trend to marry and marry young (Erickson, 1998). While part of these trends may be culturally attributable to the disproportionate number of Roman Catholics among Latinas and their contraceptive usage patterns, there may also be something to do with the emphasis on strict gender roles, and the notion that motherhood is the pinnacle of the female experience (Erickson, 1998). According to National Vital Statistics, 53% of Latinas become pregnant before the age of 20, compared to 33% of adolescent women overall (Martin, Hamilton, Sutton, Netrua, Menacker, & Munson, 2005). The Latina teenage childbearing rate is higher than the White teenage childbearing rate (Guttmacher Institute, 2012). In addition, the age at marriage for Latinas is younger than that of Whites (Erickson, 1998). The Pew Hispanic Center reports that 15% of Latinos ages 16 to 25 are

married, as compared to 9% of non-Latinos (2009). Immigrant Latino youth have much higher marriage rates (22%) than second generation (10%) or third generation Latino youth (11%) (Pew Hispanic Center, 2009).

Although Latinas have the highest teenage birth rate among ethnic groups, there is a great deal of variation between subgroups of Latinas. Compared to the overall Latina teenage birth rate of 83.0 per 1,000, Mexicanas have a birth rate of 93 per 1,000. Puerto Ricans, Cubans, and Latinas of other descents have birth rates under 70 per 1,000 (Martin, Hamilton, Sutton, Ventura, Menacker, Kirmeyer, et al., 2009). There also may be differences between first generation Mexican adolescents and those who have lived in the U.S. for a number of generations (Denner, Kirby, Coyle, & Brindis, 2001; Sterling & Sadler, 2009). For example, in a mixed methods study, combining public and administrative data sources on birth rates and neighborhood indicators with interviews and observations, neighborhoods with higher proportions of Latinos, stronger social networks and greater ties to one's country of origin were associated with lower teenage birth rates (Denner, Kirby, Coyle, & Brindis, 2001). First generation Latino teens have later sexual initiation than more acculturated Latino teens, but they also are highly unlikely to use contraception. Compared to their acculturated counterparts, pregnancy and birth rates are disproportionately higher among sexually active, first generation Latino teens (Franzetta, Terry-Humen, Manlove, & Ikramullah, 2006; Sterling & Sadler, 2009).

Teenage childbearing among Black youth. Considerable attention has been given to teenage childbearing among Black females (Brewster, 1994a; Colen, Geronimus & Phipps, 2006; Crane, 1991; Hogan & Kitigawa, 1985; South & Crowder, 1999; Spence & Eberstein, 2009; Stevens, 1996; Wilson, 1987). Relative to their White counterparts, Black adolescents have higher pregnancy and birth rates coupled with lower rates of marriage (Bramlett & Mosher,

2002; Graefe & Lichter, 2002). Although Black teens have slightly lower birth rates than Latino teens, they also have lower marriage rates and thus may be more economically vulnerable (Guttmacher Institute, 2010). Of particular interest to scholars are the intersections between teen pregnancy, class and race. In Carol Stack's (1974) classic *All Our Kin,* notions about socialization processes in neighborhoods of concentrated poverty and disproportionate Black populations were examined. In particular, Stack discusses the emphasis placed on childbearing and the important emergence into adulthood that bearing a child brings about for a woman. Poor Black families may be multigenerational in composition, and thus provide the family structural support for raising a child without the presence of the father. This notion of motherhood as a passageway to adulthood is also discussed in Hogan and Kitigawa's (1985) work as well as Steven's (1996) theoretical piece on alternative-lifestyle models. Stevens suggests that "adolescent parenthood is a pathway to adulthood, especially when opportunities for social mobility are blocked" (p. 290).

Edin and Kefalas (2005) also detail the social processes that serve to normalize early childbearing for low-income women, and discuss these childbearing and family formation characteristics in terms of class and race. Building on Elijah Anderson's work (1989, 1991), their study suggests that shifts in marriage patterns since the 1950s, combined with economic forces, such as the disproportionately low numbers of "marriageable" men in disadvantaged neighborhoods, are related to the changing criteria that low-income women place on marriage. So how do marriage patterns relate to teenage childbearing? Namely, as motherhood, rather than marriage, has become a passageway to adulthood, teenage childbearing has become a normative, even adaptive, choice for adolescents who have limited opportunities (Stevens, 1996). This notion is emphasized in some neighborhood-level studies which indicate female employment as

being negatively related to teenage childbearing (Brewster, 1994a). As perceived options for

employment and opportunity increase in one's sphere of lived experience, it would seem that the

perceived benefit of bearing children at younger ages would be diminished.

Gender differences

The literature comparing adolescent female childbearing and adolescent male fathering is

scarce. This may be due in part to a long history of the burden of childrearing falling primarily

on the female. In the not-so-distant past (and enduring today), teenage mothers have been

targeted for the study of out-of-wedlock childbearing while far less attention has been paid to the

role of fathers (Coley & Chase-Lansdale, 1998; Robinson, 1988). Gendered notions of female

promiscuity as a social problem have fueled these social constructions, and thus a great deal of

research on teen pregnancy and policy/prevention efforts have focused on female behavior.

There has also been a prevalent gendered social stereotype of the "irresponsible young father"

(Robinson, 1988), and perhaps this perceived stereotype of an uninvolved father has led

researchers to focus more exclusively on females. However, these conclusions seem to have been

made with very little evidence (Hernandez, 2002). There is a small literature which suggests that

teen fathers have a strong desire to be actively involved in their children's lives (Rhoden &

Robinson, 1997; Danziger & Radin, 1990). In regards to Latino teen fathers, there is strong

social pressure for men to take responsibility for their children. Many young fathers "step up to

take care of business" (Hernandez, 2002, p. 2). For Latino teens, fatherhood is integrally

intertwined with masculinity and is a prominent feature of familism in the Latino population

(Hernandez, 2002; Mirandé, 1997).

Although there has been considerably less empirical research on teenage fathering, there

are several consistencies across genders. Teenage fathers tend to come from low socioeconomic

backgrounds (Ketterlinus, Lamb, Nitx, & Elster, 1992; Lerman, 1993), have greater propensities for psychological and emotional problems (Ladner, 1987), have a history of delinquent behaviors (Bunting & McCauley, 2004; Resnick, Chambliss, & Blum, 1993), and come from neighborhoods with higher poverty and fewer opportunities (Lerman, 1993). Similar to studies on the outcomes of teenage motherhood, teenage fatherhood has also been associated with lower educational attainment and decreases in employment (Bunting & McCauley, 2004). It is important to note that these are associative relations. Similar to Luker's (1996) critique suggesting that the deleterious effects of female teenage childbearing are really a larger function of the deleterious effects of poverty, teenage fathers may have decreased employment outcomes because they are disproportionately coming from neighborhoods in which the employment opportunity structure is relatively diminished (Wilson, 1987). Early ethnographic research on teenage fathering in urban settings, suggests that low-income teenage males have "sex codes" that tend to elevate the value of fathering a child in an effort to compensate for the lack of employment opportunities available to them in their neighborhoods (Anderson, 1989; 1991). In similar fashion, an early quantitative study found that having non-traditional views about parenting outside of marriage (i.e., viewing out-of-wedlock childbearing as acceptable) was a significant predictor of teenage fatherhood (Hanson, Morrison, & Ginsburg, 1989).

Emergence of Family-level Research on Teenage Childbearing

Concurrent with this evolution of literature on the individual consequences and antecedents of teenage childbearing, was a competing interest in family-level risk factors. Perhaps spurred by the inadequacy of the first generation literature to control for important family-level factors (i.e., parent socioeconomic status, etc.) this literature emerged in the 1980s starting with Inazu and Fox's (1980) study of maternal influences on teenage sexual behavior.

The authors found that household socioeconomic status, the closeness of the mother/daughter relationship and mother/daughter communication about sexual issues, were positively associated with early sexual initiation. A number of other studies throughout the 1980s and 1990s documented the influence of family characteristics (i.e., sibling characteristics, parental marital status, household socioeconomic status, parental values, and family biological variables such as hormone levels and genes) on adolescent pregnancy risk (Forste & Heaton, 1988; Grady, Hayward, & Billy 1989; Pick & Palos, 1995; Upchurch, Aneschensel, Sucoff, & Levy-Storms, 1999). Miller, Benson, and Galbraith (2001) summarized the literature on family-level risk factors for adolescent pregnancy, and found three dominant themes: (1) parent/child relationships (i.e., parental support/connectedness, parental control/regulation, parent/child communication, and parental values); (2) contextual family influences (i.e., parents' socioeconomic status, parents' marital status, sibling characteristics, and sexual abuse); and (3) biological influences (i.e., age at first menarche, genetic hormone levels and pubertal development).

In particular, the family contextual influences of both maternal childbearing age and sibling childbearing age have been identified as risk factors for both teenage childbearing and fathering. Having a mother who bore children in her teen years is positively related to teenage pregnancy risk (Ensminger, 1990; Ku, Sonenstein, & Pleck, 1993). Single parent family structure (particularly female-headed homes) also has been consistently positively related to teen pregnancy risk (Forste & Heaton, 1988; Inazu & Fox, 1980; Manlove, 1998). Another important risk factor is whether or not one's older sibling became pregnant during her teenage years (Hogan & Kitigawa, 1985; Pick & Palos, 1995).

Neighborhood-level Risk Factors for Teenage Childbearing

In addition to the emergence of family-level research on teenage childbearing, there was an upswing in contextual research on teenage childbearing. As it became apparent that first and second generation studies were inadequately quantifying the risk factors or consequences of teenage childbearing, a number of ecologically grounded studies on teenage childbearing emerged. Beginning with Hogan and Kitigawa's (1985) study on the impact of neighborhood on Black adolescent fertility, a rich line of neighborhood effect studies on teenage childbearing ensued in the 1990s (Billy, Brewster, & Grady, 1994; Brewster, 1994b; Crane, 1991; Harding, 2003; Ku, Sonenstein, & Pleck, 1993; Lauritsen, 1994; Plotnick and Hoffman, 1999; Ramirez-Valles, Zimmerman, & Newcomb, 1998; Small & Luster, 1994; Sucoff & Upchurch, 1998; Upchurch, Aneschensel, Sucoff, & Levy-Storms, 1999).

This line of research also has undergone a number of methodological transitions (these are discussed in key studies below), but findings have been fairly consistent. Some of the prominent neighborhood risk factors for teenage childbearing include the degree of neighborhood affluence (Crane, 1991), the level of female employment (Brewster, 1994b) and concentrated poverty (South & Crowder, 1999). Additionally, neighborhoods with high levels of residential instability, crime, and violence generally have higher rates of teenage pregnancy, early sexual initiation, and decreased contraceptive use (Billy, Brewster, & Grady, 1994; Miller et al., 2001; Upchurch, Aneschensel, Sucoff, & Levy-Storms, 1999). Concentrated disadvantage is generally defined as high levels of poverty restricted to a given geographic space. This construct is often devised as an index of neighborhood indicators including some variation of the following: rates of poverty, unemployment, female-headed households, minority households, children under age 18, and households on public assistance (Cohen, Farley, & Mason, 2003;

MacDonald & Gover, 2005; Sampson, Raudenbush, & Earls, 1997; Xue, Leventhal, Brooks-Gunn, & Earls, 2005). The actual mechanisms by which concentrated disadvantage impacts the likelihood of a teen becoming pregnant are less well known. In the section that follows, a number of key neighborhood effects studies on teenage childbearing are described.

Key Neighborhood Effect Studies on Teenage Childbearing

Hogan and Kitigawa's (1985) study was the first prominent study to investigate neighborhood effects on teenage sexual behaviors and pregnancy rates. Their study examined the pregnancy rates and sexual behaviors of 1,078 Black female adolescents between the ages of 13 and 19. Their sample was drawn from Chicago neighborhoods, and key neighborhood variables were drawn from 1970 Census tract data. Neighborhood indicators incorporated into their multivariate model included racial composition, median family income, proportion of families below the poverty line and sex ratio. They created a neighborhood index and then categorized neighborhoods by quartiles in terms of neighborhood quality. The authors found that youth living in the most disadvantaged neighborhoods had pregnancy rates 33% higher than those in the middle and upper quartiles. Moreover, when parental supervision was entered in the statistical model, these effects were ameliorated. This finding was important in the early stages of identifying neighborhood effect mechanisms. Essentially, disadvantaged neighborhoods were comprised of parents with diminished parental supervision (possibly a result of neighborhood social disorder) and this lack of parental monitoring and supervision actually mediated the effect between neighborhood disadvantage and increased rates of teen pregnancy. While this study provided an important first step in quantifying neighborhood effects, it only considered Black adolescents and suffered from the issue of selection bias. For example, one cannot be certain that parents who innately were less likely to monitor their children did not self-select into

neighborhoods which were then associated with higher teen pregnancy rates. Additionally, the mediating effect of parental monitoring could be seen as mutually causal (i.e., neighborhood disadvantage may lead to weakened parental supervision, but weakened supervision may also lead to greater levels of social disorder and neighborhood disadvantage).

Crane's (1991) seminal study on the epidemic theory of neighborhood effects on high school dropping out and teenage childbearing is one that heavily informs the current study. Crane utilized 1970 Public Use Microdata Samples to examine the extent to which neighborhood effects are transmitted in a nonlinear manner. The sample consisted of 44,466 Black and White adolescent females in urban and rural settings. This study was among the first to propose a "contagion model" of neighborhood effects wherein social problems are spread through peer influence and are thus considered contagious. He asserts that if

[...] the incidence of problems stays below a critical point, the frequency or prevalence of the problem tends to gravitate toward some relatively low-level equilibrium. But if the incidence surpasses a critical threshold, the process will spread explosively. In other words, an epidemic may occur, raising the incidence to an equilibrium at a much higher level (p. 1227).

Crane's study identified the existence of neighborhood thresholds. When percent high status (characterized by percent of employed persons in the neighborhood who held professional or managerial jobs) fell below 3.5 percent, there was a significant upswing in the probability of childbearing for Black and White teens. Additionally, these threshold effects were more pronounced for teens living in urban settings compared to rural settings (See Figure 2.6).

Figure 2.6 Crane's Neighborhood Thresholds for Teenage Childbearing
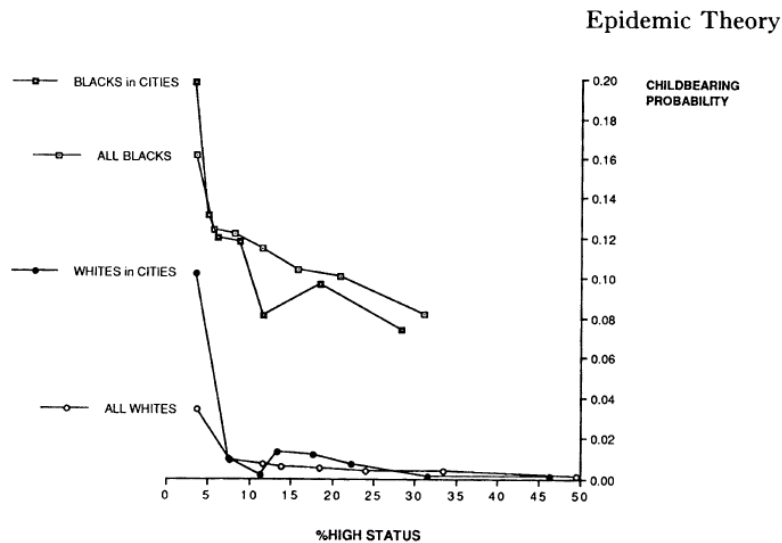
Figure 2.6. Teenage childbearing probability for Black and White females as a function of percentage high-status workers in their neighborhood, figure taken from "The Epidemic Theory of Ghettos and neighborhood Effects on Dropping Out and Teenage Childbearing," by Crane, J., 1991, *American Journal of Sociology, 96*(5), p. 1241.

Although Crane's study was groundbreaking, there were a number of inherent weaknesses in the study design. Not only does the study suffer from the issue of selection bias, but in an attempt to control for family-level variables, teens who were no longer living with their parents had to be excluded from the sample. Given this exclusionary criteria, one might conclude that the remaining sample does not accurately reflect the larger population of teens at risk for bearing children, and thus the results should be interpreted cautiously. Additionally, while the threshold effects for percent high status were robust, there is the need for an expanded examination of other potentially nonlinear neighborhood effect mechanisms.

Similar to Hogan and Kitigawa's (1985) study, Sucoff and Upchurch (1998) examined neighborhood effects on childbearing among Black adolescents in urban neighborhoods in Chicago. They found that neighborhood racial composition was the greatest predictor for teenage

childbearing inasmuch as teens living in neighborhoods with higher proportions of Black residents were at greater risk of teenage pregnancy regardless of neighborhood socioeconomic status. Further, they found that Black teens living in predominantly segregated neighborhoods (whether impoverished or working class) had birth rates 1.5 times higher than those teens who lived in racially mixed neighborhoods. Again, this study utilized data at the Census tract level, and thus the results should be interpreted cautiously because concentration of Black residents in a given Census tract does not exactly represent concentration of Black residents in a more finite, socially meaningful neighborhood. Essentially, there is a potential for mismatch between the study's scale of neighborhood and study participants' definition of neighborhood. Most notably, there were limitations on how the study measured neighborhood. Using principal components analysis, the authors created an index including Census indicators such as percent Black, percent female headship, percent below the poverty line, median family income, sex ratio, average number of children born per ever-married woman, and percentage married. The index was divided into quartiles, and the highest was deemed low, the middle two were medium and the lowest were deemed high in terms of neighborhood quality. This method loses significant variation in the key variable. Additionally, this study was unable to address the issue of selection bias.

Another prominent study conducted by Plotnick and Hoffman (1999) utilized a fixed effects approach in order to deal with the issue of selection bias. Using data from the Panel Study of Income Dynamics, the authors examined childbearing among pairs of sisters in a nationally representative sample of adolescent females. They specified three models: (1) one which did not include control variables to represent gross neighborhood effects; (2) one that included individual and family controls to obtain net effects; and (3) one that used a fixed-effects

approach to control for unobserved family characteristics. The authors found that key Census indicators did not have any independent effects on childbearing outcomes.

However, it should be noted that there were a number of accompanying methodological weaknesses to this study despite the attempts to overcome selection bias. For example, as has been noted earlier in regards to measuring appropriate neighborhood characteristics, a short list of Census indicators may be inadequate for quantifying the complexity and breadth of how neighborhoods impact individuals. Plotnick and Hoffman used four Census tract measures to represent neighborhood (percent female-headship, percent receiving public assistance, percent low income, and percent middle-upper income). Plotnick and Hoffman used Census data for the neighborhoods in which adolescent females resided between the ages of 16 and 18 to model neighborhood influence. Considering only one point in time during an adolescent's life disregards the potential influence of residential mobility and does not take into account the characteristics of all previous neighborhoods.

In an effort to overcome the issue of selection bias, Harding (2003) used sensitivity analysis, a method that tests the robustness of effects under varying conditions of a hypothetical unobserved covariate. First, he employed a counterfactual model to compare the "treatment" of living in a high poverty neighborhood to that of living in a low poverty neighborhood on teenage childbearing and high school dropout. Using propensity score matching, Harding analyzed data from the Panel Study on Income Dynamics (PSID) and matched treatment and control groups based on observable personal characteristics at age 10. In this model, changing personal characteristics would be attributable to the treatment, or in this case, neighborhood poverty. The robustness of the results were then tested for hypothetical unobserved covariates. Harding suggests that the use of this sensitivity analysis would require that unobserved factors and

personal characteristics would have to be unreasonably strong in order to ameliorate the effects between neighborhoods and high school dropout and teen pregnancy. He found that children who grew up in neighborhoods of concentrated disadvantage were more likely to drop out of high school and experience a teenage pregnancy than children identically matched on observed characteristics but who grew up in more advantaged neighborhoods. Although Harding's study attempted to address the issue of selection bias unlike many other studies reviewed here, it has a number of methodological concerns. First, one of the weaknesses of using propensity score matching is that it requires dichotomous treatment variables and thus weakens statistical power and masks nonlinear effects. Additionally, despite the sensitivity analysis that tested for the bias of one hypothetically unobserved covariate, the method does not provide a complete picture of the potentially vast array of unobserved covariates that might bias neighborhood effects.

Conclusion

Although there are a number of ecologically grounded studies that cite community context variables as risk factors for teenage pregnancy, most do not test the independently *causal* effect of neighborhoods on teenage childbearing and fathering. While correlational research has highlighted the importance of neighborhoods, this often cross-sectional research has not advanced the neighborhood effects literature in terms of establishing a compelling causal connection between neighborhood residence and teenage childbearing. Although a number of the studies described above have provided a solid framework for continuing this line of questioning, many have been unable to overcome the methodological challenges inherent in neighborhood effects studies.

In an attempt to overcome some of these methodological limitations, this study utilizes an approach that incorporates a wide range of neighborhood characteristics (U.S. Census,

administrative data, and survey self-reports). Rather than solely modeling neighborhood characteristics using a short list of Census indicators, my study utilizes participant reports of social-interactive features of neighborhood such as social capital and perceived neighborhood problems. Unlike Harding (2003) and Plotnick and Hoffmann (1999), this study does not rely on advanced statistical methods to account for selection bias. Rather this study overcomes the challenge of selection bias by exploiting a natural experiment which mimics randomization. Unlike other studies that restrict the range of neighborhood exposure to a contemporaneous conceptualization of neighborhood, this study utilizes a comprehensive residential history that allows for a cumulative conceptualization of neighborhood influence from birth to age at first becoming pregnant or fathering a child. In addition to these methodological improvements, the present study also examines intensity of neighborhood effects by examining potential neighborhood thresholds. Finally this study assesses how neighborhood effects (both linear and nonlinear) may operate in various combinations of timing, something that very few studies have accomplished to date.

CHAPTER 3

THEORY

Introduction

This chapter examines the applicability of the ecological model for the current study and provides a general introduction to the common theoretical frameworks employed to understand teenage childbearing. Along this vein, individual theories for teenage childbearing will be discussed. Next, a larger discussion of the ecological model and theories that operate at the macro level, and in this case, neighborhood level will be presented. This includes a discussion of the antecedents for and consequences of the rise in concentrated poverty, with a particular focus on the confluence of race, class, and space. Most germane to this research is the discussion of threshold effects associated with both neighborhood risk and protective factors, such as poverty and social capital. Following this, theories of social control and social capital will be discussed with emphasis given to the theory of collective socialization. Finally, the chapter concludes with a synthesis of relevant theories and the study hypotheses that have emerged from these theoretical considerations.

Ecological Model of Child Development

The ecological model (Bronfenbrenner, 1979, 1986, 1989) provides an intuitively appealing conceptual framework for understanding the dynamic interactions that take place across system levels and how these dynamic processes relate to child development. The theory considers individual development to be a process that takes place within nested and complex systems. While the ecological model does not articulate causal theoretical suppositions, it does provide a compelling backdrop for discussing theories of relevance within each system. Further, due to the dynamic interchange between systems, the ecological model promotes the idea that

theories that are exclusive to specific system levels are incomplete. Because the current study is concerned with the independently causal effect of neighborhoods on the individual-level outcome of teenage childbearing and fathering, the ecological model offers an appropriate overarching conceptual framework through which competing and interacting theories may be tested.

Brofenbrenner's ecological systems theory (1989) posits that children and adolescents are shaped by both proximal and distal influences. This theory looks at child development within the context of the system of relationships operating within their environment (micro-, meso-, and macro-level systems). Bronfenbrenner's theory defines multiple and complex interactions between system levels, each having an effect on a child's development. Neighborhood influences may originate from external sources (e.g. public services, neighborhood stigmatization) or internal social sources (social networks, social norms) suggesting that multiple system levels interact in generating neighborhood effects (Galster & Santiago, 2006). Although the ecological model offers a comprehensive explanation of the varied systems which impact child development, the actual empirical utility of the theory leaves something to be desired. Intuitively, this model is ideal for understanding the impact of neighborhoods on children; however, neighborhoods may have differential effects based on the child's gender, race/ethnicity, family composition or nativity status (Oberwittler, 2007). Add to these differential effects the complexity of multiple interacting systems, and it is understandable that the neighborhood effects field has had difficulty in identifying a theoretical model which adequately describes the mechanisms by which neighborhood effects are transmitted. Refer to Figure 3.1 to see how the ecological model provides an overarching framework for the current study.

Figure 3.1 Conceptual Model based on the Ecological Model
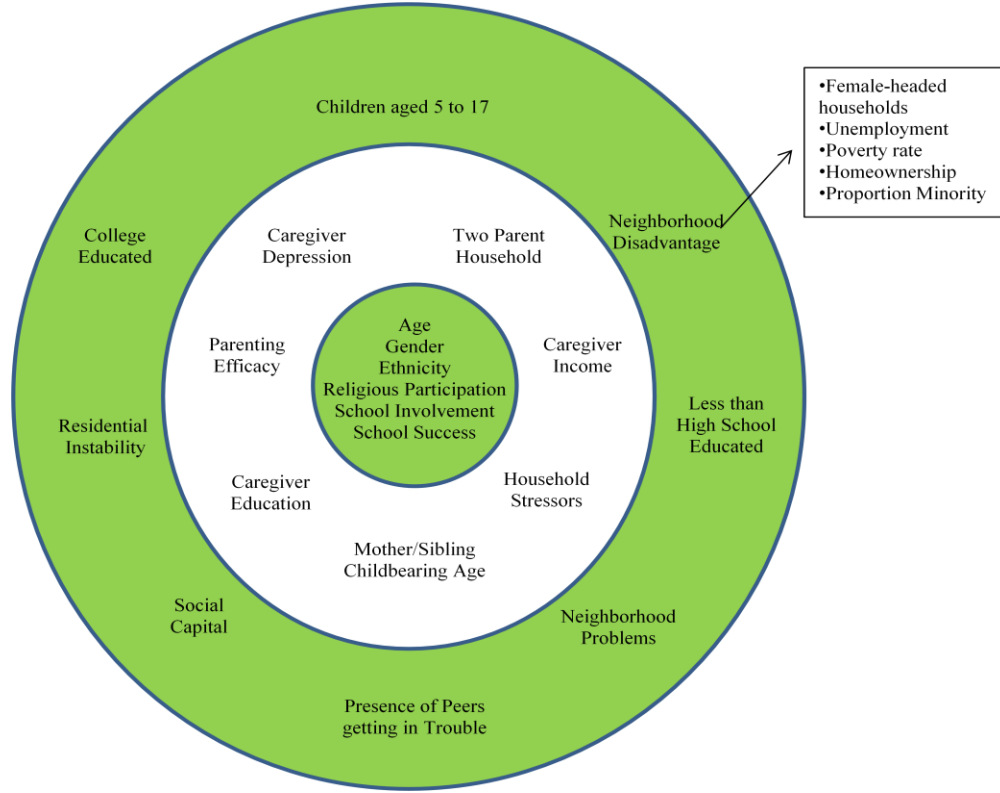
Figure 3.1 Ecological Conceptual Model for Teenage Childbearing/Fathering, adapted   from Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by nature and Design.* Cambridge, MA: Harvard University Press.

Theoretical Development of Teenage Childbearing

Teenage childbearing did not emerge as a social problem and thus an issue to study scientifically until the 1960s (Furstenburg, 2007). Prior to the 1960s, theoretical work in this area tended to focus on illegitimacy (Kammerer, 1918). Childbearing age was not the central issue, but rather out-of-wedlock childbearing. Beginning in the 1960s, early theoretical work cited individual-level psychological theories such as psychodynamic theory to explain teenage childbearing. In these models teenage motherhood outside of wedlock was viewed as resulting from psychological deficits of young females (Young, 1966; Vincent, 1961). More recent literature has examined the influence of family on teenage childbearing (Dean, Ducey, & Malik,

1998; Miller et al., 2001). Dean and colleagues (1998) discussed the generational transmission of teenage motherhood in the context of mother-daughter communication and attachment theory. Following the development of individual- and family-level theoretical explanations for teenage childbearing, neighborhood context was included in the theoretical models of teenage childbearing (Billy, Brewster, & Grady, 1994; Upchurch, Aneschensel, Sucoff, & Levy-Storms, 1999).

Individual-level Theories

Since the empirical literature on teenage childbearing generally focused on the individual, it logically followed that theories of teenage childbearing likewise focused on individual behavior. The most prominent individual-level theories for teenage childbearing are psychological and behavioral. However, Stevens (1996) proposes an explanatory model that emphasizes individual behavior within various opportunity structures. The following section briefly describes the psychological, behavioral and alternate-lifestyle models which have been applied to teenage childbearing.

Psychological models. Early individual-level theories most often relied on psychodynamic explanations of behavior and emphasized pathology (Roberts, 1966; Young, 1954; Vincent, 1961). Historically, teenage childbearing was viewed as the result of neurosis (Stevens, 1996). Psychodynamic explanations articulated in the classic, *The Unwed Mother* (Young, 1954), set an early precedent for understanding teen pregnancy from an emotional disorder perspective. This theory suggests that teenage childbearing results when females experience sexual acting out, developmental crisis, identity foreclosure, the lack of separation-individuation, feelings of inadequacy or poor self-concept, and impulsivity. An adolescent girl with low self-esteem may look to a male peer for validation, and this validation could be found

in the form of sexual intercourse. Several studies that employed psychodynamic theories considered the intergenerational transmission of teenage motherhood for poor, Black females as it relates to depression, and other emotional disorders (Horowitz, Klerman, Kuo, & Jekel, 1991; Sanders, 1991). The problem with early psychodynamic models is that these explanations often assume universal experience of adolescence and a uniform effect from pathology to outcome. Stevens (1996) notes that psychodynamic models can be particularly harmful for Black adolescents because "unlike their White counterparts, [they] find psychiatric definitions of their pregnancy and sexual conduct unacceptable and are more dependent on the symbolic definitions of their peers and parents in providing meaning for their behaviors" (p. 286). Stevens explains that this rejection is symbolic for Black adolescents because it "resists internalizing the oppressive standards of the dominant group" (p. 286).

Although psychodynamic theories of teenage childbearing have fallen out of favor, they have been replaced by more general psychological theories that examine the relationship between self-esteem and teen pregnancy. Consistent with psychodynamic theorists, teenage pregnancy is thought to be the result of poor self-concept among adolescent females (Shaffer & Pine, 1972; Zongker, 1977). Essentially, a teen with low self-esteem may be more likely to engage in risky sexual behavior, perhaps seeking a sense of validation. Once pregnant, a teen may be more likely to give birth and raise her child despite the unfavorable circumstances because she is attempting to fill the psychological gaps of her poor self-concept with the love of a child. Kissman (1990) found corroborating evidence that suggested poor self-concept, sexual activity, and pregnancy were all positively related. Additionally, albeit less studied, adolescent males tend to seek masculine confirmation through sex and fathering children (Castiglia, 1990;

Friedman, 1990). Essentially, young males may engage in risky sexual behavior in order to achieve a certain masculine status, and fathering a child also may be related to this sort of masculine self-concept.

These theoretical suppositions have certainly been called to question by empirical research. For example, Plotnick and Butler (1991) found that locus of control had no bearing on teenage childbearing, McCullough and Scherman (1991) found that negative view of self was not related to teenage pregnancy. While psychological theories of teenage childbearing may have some relevance for understanding teenage childbearing and fathering, they are certainly limited in scope and place too great of an emphasis on individual deficits. Just as Bronfenbrenner's (1989) ecological model suggests, a theory which examines individual development and behavior within a vacuum is one that can only explain a fraction of the phenomenon.

Behavioral models. Behavioral theories have been commonly used to explain teenage pregnancy (Williams, 1991; Zabin & Hayward, 1993). Socialization models such as social learning theory and contagion models explain adolescent behavior as the result of social modeling and peer influences. Socialization models may help explain the intergenerational transmission of teenage childbearing. In family, school, and neighborhood contexts where early teenage childbearing is modeled as normative, youth may be more likely to become teen parents as well (Barber, 2002). This may be especially true in family contexts where early childbearing is modeled by mothers and siblings (Miller, Benson, & Galbraith, (2001). Rational choice models suggest that teenage childbearing may be a reasoned choice that is made based on one's observable social environment (Erickson, 1998; Stevens, 1996).

Social learning theory rests on the relation between social cognition and behavior (Bandura, Rotter, 1954). Rather than relying on explanations of teenage sexuality and pregnancy

as a product of biological drives and forces, social learning theory suggests teenage sexual behavior is a learned process which is cognitively oriented (Brindis, Sattley, & Mamo, 2005). A major assumption of social learning theory is that individuals are social beings and are thus constantly engaged in their social environment. Sexual behaviors can be taught, and this learning process often takes place within the context of one's immediate environment. For example, permissive sexual norms modeled within a family or group of friends may serve to foster similar sexual norms for an individual adolescent (Warner, Giordano, Manning & Longmor, 2011).

In contrast, the contagion model posits that social problems increase when neighborhood conditions deteriorate (Crane, 1991). The underlying assumption is that social problems are contagious and transmitted through peer influences. In this model, teenage childbearing may be seen as a "contagious" behavior when it is viewed by peers as normative. Whereas social learning theory emphasizes social cognition within the learning process more than the contagion model does, both of these models rely heavily on the notion that behavior is modeled in one's immediate environment.

Rational choice theory suggests that teenage childbearing may be adaptive in certain populations due to sociostructural constraints and limited opportunity structures. For example, in high poverty neighborhoods characterized by low-income and low-life expectancies, early childbearing and multigenerational family structures can be viewed as adaptive (Erickson, 1998; Geronimus, 2003; Stevens, 1994). Early childbearing may be a life course choice that would actually enhance the vitality of otherwise disadvantaged communities (Geronimus, 2003). Teenage childbearing may be viewed as a rational and strategic choice that allows teens from disadvantaged backgrounds an avenue for taking care of their children with the help of kin networks. This theory also suggests that in more advantaged communities, where opportunities

abound, the choice to bear children in adolescence would be illogical given the alternative opportunities for upward mobility (Florez & Nunez, 2001).

One critique of behavioral explanations of teenage childbearing is that they place too great of an emphasis on teenage childbearing as deviant. Additionally, the contagion model perhaps unfairly emphasizes group pathology. Stevens (1996) suggests that behavioral models depend on a thorough analysis of the intersections of race and class. Socialization models are not as concerned with intrapersonal processes but rather with interpersonal and person-environment processes. Because of this emphasis, these theories may have more appeal to researchers who are concerned with ecological frameworks.

Alternative-lifestyle model. The alternative-lifestyle model was proposed by Stevens (1996) and was based on the earlier work of Ladner (1971). The alternative-lifestyle model, though not terribly descriptive in title, purports that teenage childbearing may be a pathway to adulthood, particularly when opportunity structures are limited and social mobility is inhibited. The middle-class pathway to adulthood achieved through a good education, stable employment, and a two-parent family structure is not necessarily easily obtained in a disadvantaged neighborhood where unemployment is widespread, female headship is ubiquitous, and public schooling is sub-par. The alternative-lifestyle model focuses on individual behavior within social context. In this model, social inequality is addressed "without assigning moral blame to individuals or groups" (Stevens, 1996, p. 290). The alternative-lifestyle model argues that the view of teenage pregnancy as avoidable and problematic in inherently superior opportunity structures is not necessarily the view in more disadvantaged opportunity structures.

A recent qualitative study explored teenage childbearing and fathering from the perspective of youth from disadvantaged backgrounds using findings from 51 in-depth

interviews with young mothers and fathers (Cater & Coleman, 2006). Their results suggest that teenage childbearing is shaped by neighborhood forces, especially in terms of socialization. Becoming pregnant in one's teen years appeared to be a normative life-course decision among interviewees, one that was shaped and reinforced by their perceptions of the local vicinity (e.g. adult role models, supportive environment, family patterns of early childbearing). Social status is a relative phenomenon often conferred through direct relationships among people in proximity to each other (Stevens, 1996). The negotiated values, status, and norms surrounding teenage childbearing in contexts of minimized opportunity structures necessarily diverge from those of the larger society. This model has appeal in that it pays attention to the person-environment interaction as well as to the particularities of varying experiences by class and race. However, it assumes that pathways to adulthood through early motherhood are adaptive or accepted in all disadvantaged circumstances. This may not be the case, and could potentially be a problematic overgeneralization. In other words, this theory may promulgate a stereotype, especially of poor, young Black adolescents as being incapable of making choices that value alternatives to early childbearing.

Neighborhood-Level Theories

This section will first document the changing structures of neighborhoods and the resulting social problems of concentrated disadvantage. In particular, theories of neighborhood threshold effects will be discussed. Following this, theories of social control, social disorganization and social capital will be discussed in terms of their relevance for understanding neighborhood effects on teenage childbearing. Finally, study hypotheses that take into account the theories presented here will be proposed.

Concentrated disadvantage and neighborhood thresholds. There have been a number

of influential scholarly works that have drawn attention to structural inequality based on the

intersections of race, space, and class and identified theories by which neighborhoods influence

individual residents' behavior (Massey & Denton, 1993; Sugrue, 1996; Wilson, 1987; Wilson,

2009). In particular, these social analyses have considered the shifting nature of employment

opportunities for minority populations in urban settings since the White flight to suburbia

beginning in the 1960s. They note how major highway construction, the relocation of viable jobs

to the suburbs, and increasing racial segregation brought extreme concentrated disadvantage to

many inner cities. The resulting disadvantaged opportunity structures for inner-city minority

populations have been characterized by high rates of structural decay, unemployment

(particularly for males), high levels of crime and violence, greater proportions of single-parent

households, and a multitude of other social problems (Akers & Sellers, 2004; Sampson,

Raudenbush, & Earls, 1997; Sugrue, 1996; Wilson, 1987).

Given the prevalence of social problems within neighborhoods with high levels of

concentrated disadvantage, there has been much policy and planning interest in the potentially

beneficial effects of deconcentrating poverty (Davis, 1993; Goering & Feins, 2003; Rubinowitz

& Rosenbaum, 2000). There is a small but growing literature that examines threshold effects of

poverty to determine if there is a minimal level of concentrated disadvantage at which social

problems begin to pervade the neighborhood (Carter, Schill, & Wachter, 1998; Galster &

Keeney, 1993; Galster, Quercia, Cortes, 2000; Galster, Andersson & Musterd, 2010). Studies

modeling changes in neighborhood poverty rates have been remarkably consistent in suggesting

that indeed, there is a non-linear threshold effect of neighborhood poverty on social problems.

The identification of these neighborhood thresholds has major implications for policies and

programs aimed at deconcentrating poverty. This theory in part informed the Moving to Opportunity experiment wherein public housing residents were relocated to neighborhoods that had less than 10 percent poverty rates. Galster (2002) synthesized the literature and examined various functional forms of poverty concentration as it relates to social problems. Essentially, social problems were found to increase steadily as neighborhood poverty rates increased from 5 to 10 percent up to 35 to 40 percent. After reaching this threshold, neighborhoods tend to reach a sort of saturation wherein the effect of increasing poverty on social problem prevalence seems to plateau (Galster, 2002).

Neighborhood thresholds were first used in the 1970s for urban planning purposes (Saville, 1996). Early studies of neighborhood thresholds largely focused on racial tipping points (Schelling, 1972). Schelling's (1972) tipping model, also known as the bounded-neighborhood model, provides a theoretical understanding of how and why a neighborhood becomes segregated. Tipping refers to the process of changing racial composition within neighborhoods. For example, White residents remained in a neighborhood until a certain threshold of Black residents moved into the neighborhood. Although neighborhood racial composition preferences vary for individuals, once the least tolerant White residents move out and are replaced by Black residents, the out-migration of Whites accelerates until the neighborhood tips to an all-Black neighborhood. For instance if the percentage of Black residents deemed acceptable by a group of White individuals in the neighborhood is 10%, this group may leave the neighborhood once this threshold is exceeded. With potential in-migration of more Black residents, the neighborhood composition could quickly tip toward being a dominantly Black neighborhood as more White residents (who may have been only slightly more tolerant of neighborhood percentage of Black residents) leave.

Although the notion of neighborhood thresholds for teenage childbearing is relatively unexplored, there is a body of literature from which to draw inferences. Tipping points also have been used in criminological studies to examine the nonlinear effect of abandoned buildings on vandalism and the number of bars and liquor establishments in a given geographic space on alcohol-related crime (Saville, 1996). Further, collective socialization models suggest that social interactions exert a meaningful force on the development of an individual's attitudes, values, and behaviors (Simmel, 1971; Weber, 1978). Quercia and Galster (2000) suggest that collective socialization models inherently imply neighborhood thresholds. Essentially, when a group of similar people reaches a critical mass in a neighborhood, social interactions spurred by this dominant group may have an influence on individual behavior. Once this threshold is achieved, the dominant group's power to influence individuals increases exponentially. Quercia and Galster (2000) report the presence of threshold effects in neighborhood racial composition, income group composition, and social and economic conditions such as criminal activity and welfare dependency. The idea of neighborhood thresholds also is examined in Wilson's (1987) work which relates male joblessness to social isolation resulting from racial segregation. Accessibility to legitimate employment (in this case for Black men) decreases as neighborhoods become increasingly segregated. As job sources migrate to the suburbs, segregated neighborhoods become socially isolated. The premise of thresholds is implied here, considering that neighborhood segregation (and subsequent job loss) happens in a nonlinear manner (e.g., Schelling's 1972 Tipping Model).

While there is little empirical work on neighborhood thresholds as they relate to teenage childbearing, there is one prominent study that has examined the nonlinear effects of neighborhood indicators on teenage childbearing. Crane's (1991) seminal work found that the

percentage of high status residents in a neighborhood (defined as percentage of workers in professional or managerial jobs) had a nonlinear effect on the probability that a teen would give birth during adolescence. He found that when percentage of high status residents dropped below a threshold of 3.5%, the probability of teenage childbearing increased exponentially. While this provided theoretical support for his proposed social contagion model, Crane's study only considered one neighborhood indicator (percentage high status). More recent than Crane's work, Browning, Burrington, Leventhal, and Brooks-Gunn (2008) found evidence of nonlinear effects between immigrant concentration and teenage sexual risk behavior. Although their work does not specifically examine teenage childbearing, it provides further empirical evidence that neighborhood thresholds exist. The identification of neighborhood thresholds may have implications for teenage childbearing and fathering prevention efforts. For example, if neighborhood thresholds are identified, then community-based prevention programs may be able to target neighborhoods where risk thresholds are apparent.

Social control and social disorganization theories. Social control theory and social disorganization theory originated from ecological studies emanating from the Chicago School of Sociology. Although theories of social disorganization and social control have their roots in the understanding of crime and deviance (Reiss, 1951; Toby, 1957; Shaw & McKay, 1969), there has been a resurgence in the application of these theories to study crime, disorder, social control, social capital, and social ties (Kubrin & Weitzer, 2003). Social disorganization theory does not focus on "'kinds of people' explanations for crime and other social problems but rather on 'kinds of places.'" Specifically, this theory focuses on different types of neighborhoods that serve to create conditions favorable or unfavorable to crime and delinquency (Kubrin & Weitzer, 2003, p. 374).

With the outmigration of White residents from city centers, and the subsequent segregation of inner-city neighborhoods by race and class, social disorganization theory had theoretical appeal for understanding the conditions of social disorder in relatively deprived neighborhood settings. Wilson (1987) describes the population of residents living in concentrated disadvantage as the "truly disadvantaged." These neighborhoods are often characterized by high rates of unemployment, poverty, single-parent families, minority families, drug use and abuse, non-marital births, and violence (Akers & Sellers, 2004). In *Cracks in the Pavement,* Sanchez-Jargowski (2008) characterizes poor neighborhoods in a more nuanced manner. Rather than focusing on the social disorder of impoverished neighborhoods, he highlights the prevailing social norms and controls evident in various settings and institutions found in poor neighborhoods (e.g. housing projects, high schools, barber shops, grocery stores, etc.). Sanchez-Jargowski emphasizes the resilience and industriousness of individuals who live in poor neighborhoods. Social disorganization theory does not presuppose that the resulting disorder in these neighborhoods is a product of people but rather a product of structures. Akers and Sellers (2004) contended that the term social disorganization may in itself be problematic. They suggest that neighborhoods may not necessarily be *disorganized* but rather *organized* around values that are not the prevailing norm. They question the use of what have commonly been held as objective indicators of social disorder (e.g., crime and violence). They suggest that the term "social disorder" may actually "reflect a value judgment about lower-class lifestyle and living conditions" (p. 161).

Related to theories of social disorganization and social control, Wikstrom and Sampson (2003) contend that the behavior setting is the crucial link between the context of the surrounding community and individual action. Building on Barker's (1968) concept of the

behavior setting, Schoggen (1968) defines the behavior setting as naturally occurring boundaries wherein behavioral patterns exist and physical environments are associated with specific behaviors. The behavior setting can best be understood as the result of the interaction of the three Rs: resources, rules, and routines (Wikstrom, 1998). Resources can be conceptualized as the external social and economic supports that neighborhood residents may use to cope with daily struggles. Rules are considered to be the formal and informal norms that govern daily interaction within a neighborhood. Routines can be described as the activities that provide for the needs of the individuals within the community.

The structure of the community provides basic group level resources and rules that influence the patterns and content of daily routines associated with specific types of behavior settings (Wikstrom, 1998). More specifically, the community context limits or enables human action through the behavior settings that are created by and connected to community routines, resources, and rules. Depending on the prevailing routines, resources, and rules of the community, an individual makes cognitive appraisals of his or her potential options, makes choices within those norms, and acts upon those options. Thus, individual action only occurs through interacting with the existing routines, resources, and rules of the larger community. In neighborhoods with high levels of residential instability, the routines, resources and rules may not be conducive to healthy behavioral patterns (Coleman, 1990; Sampson Morenoff, & Earls, 1999).

How does social disorganization and social control apply to teenage childbearing? First, these theories have been applied to understanding how neighborhoods influence individuals. For example, nearly every quantitative neighborhood effects study utilizes a number of neighborhood measures that would indicate the level of social disorder present in a given neighborhood. In

particular, there have been promising results suggesting that the level of social disorder does have an independent effect on the outcome of teenage childbearing (Harding, 2003; Plotnick & Hoffman, 1999; Way, Finch, & Cohen, 2006). However, social disorganization theory seems to be better at offering a "what" rather than a "how" in terms of the transmission of neighborhood effects. Social disorganization theory offers a good guide to selecting neighborhood variables that serve to influence an outcome such as teenage childbearing, but it does less to offer an explanation for *how* this effect is transmitted. This is why it is particularly important to simultaneously consider previously mentioned theories of collective socialization including the contagion model and social learning theory to provide this answer for how neighborhoods impact individuals within the context of a socially disordered landscape.

A weakness of social disorganization theory is its over-emphasis on the social deficits of social structures rather than acknowledging the potentially protective factors of social structures which predict incidence of both prosocial and antisocial behavior. It may be that neighborhoods with high levels of social disorder are conducive to higher rates of teenage childbearing. However, the pathways by which this relationship occurs may vary greatly depending on factors such as cultural norms and collective behavior. In other words, social disorder is not deterministic. Protective features of neighborhood, such as collective efficacy, may exist in spite of crime and disorder and these features may be enough to buffer the deleterious effects of said disorder.

Social capital and collective efficacy. Social capital theory has become a prominent theoretical framework for understanding the socialization processes for Black and Latino youth who live in neighborhoods of concentrated disadvantage (Stanton-Salazar, 1997). Social capital has been defined as features of social organization, such as trust, norms, and networks that can

improve the efficiency of society by facilitating coordinated actions (Putnam 1995) or more specifically as "the degree and quality of middle-class forms of social support inherent in a young person's interpersonal network" (Stanton-Salazar, 1997). Neighborhoods with high levels of social capital may protect teens from the deleterious effects of poverty. For example, a neighborhood with advantageous access to social capital might consist of elements such as parental and kin support; relationship networks that provide collective supervision; resources for youth to pursue goals, positive opportunities, safe places; and norms that emphasize education, social control, and rule enforcement (Aber, Gephart, Brooks-Gunn, & Connell, 1997; Benson, Leffert, Scales & Blyth, 1998; Coleman, 1988; Denner, Kirby, Coyle, & Brindis, 2001; Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999; Garmezy, 1991; Kretzmann & McKnight, 1993). All of these elements of social capital may serve to create a sense of collective efficacy or "a willingness of residents to organize and intervene on behalf of the neighborhood and its youth." Particularly relevant to the current study's population, social capital may be a unique feature of Latino populations, particularly immigrant enclaves and thus protect youth from negative aspects of neighborhoods (Denner, Kirby, Coyle, & Brindis, 2001).

Collective efficacy is a concept that is part of the larger social capital framework. Collective efficacy may be present in neighborhoods that have high levels of social disorder (high rates of the standard litany of deleterious Census variables) and thus decrease the likelihood that social problems will pervade the neighborhood. Sampson (2003) suggests that public health outcomes are strongly associated with neighborhood characteristics which go far beyond individual-level measures. Essentially, neighborhoods should be approached as units of measurement which do not simply reflect an aggregation of individual traits. In their work on collective efficacy, Sampson, Raudenbush, and Earls (1997) provide compelling evidence

concerning the use of this construct to understand neighborhood studies of violent crime. The concept of collective efficacy can be understood in the context of informal social control and social cohesion. If a collective group of persons perceives itself to be a cohesive whole that has the ability to regulate the group's environment, then this group would be thought to have a sense of collective efficacy. Sampson and colleagues (1997) suggest that a number of stabilizing factors, such as homeownership and social ties, contribute to the collective's capacity for social control. The salience of this concept is evidenced in the study's findings that collective efficacy mediates the relationship between concentrated disadvantage and residential instability

Despite the decreased opportunity structures present in neighborhoods of concentrated disadvantage, there are potential neighborhood-level mediating variables that might serve to protect adolescents from the common linkages between poverty and deleterious outcomes like teenage childbearing. Collective efficacy has been shown to mediate the effect between concentrated disadvantage and violent crime (Sampson, Raudenbush, & Earls, 1997), but more recently collective efficacy has been studied as a protective factor for other social problems including teenage pregnancy. For example, data from the *Los Angeles Family and Neighborhood Study* demonstrates that neighborhood collective efficacy is associated with decreases in teenage childbearing, even in neighborhoods with high concentrations of Latino populations (Way, Finch, & Cohen, 2006). This is notable because concentrated minority neighborhoods generally are at higher risk for teenage pregnancy. Despite the preliminary empirical evidence on the protective nature of collective efficacy, further study, wherein methodological challenges are overcome, is warranted in order to establish the efficacy of this hypothesis as it relates to teenage childbearing.

Related to teen pregnancy, one study found that collective efficacy delayed the onset of early sexual activity among adolescents who had little parental monitoring (Browning, Leventhal, & Brooks-Gunn, 2005). This suggests that neighborhood social controls may actually serve to protect adolescents from risky sexual behavior even when family-level monitoring and control is absent. An inherent weakness in using collective efficacy theory to understand teenage childbearing is the assumption that collective efficacy is a natural result of cohesive neighborhood structures, and the assumption that social cohesion will have an effect on teenage childbearing. Given the previous discussion on the potentially normative pathway to adulthood that teenage parenthood provides in certain neighborhoods, it may be erroneous to assume that collective efficacy would prevent teenage childbearing.

Conclusion

As has been explicated here, there are a number of competing and complementary theoretical models for understanding teenage childbearing. The ecological model provides a useful overarching framework that has the potential to integrate individual-, family- and neighborhood-level explanatory models. Although psychological models have become somewhat obsolete, it is still useful to consider behavioral, alternative-lifestyle, socialization and family influence models for this research. While a neighborhood effects study is primarily concerned with the independently causal effect of neighborhood characteristics (social and geographic) on individual outcomes (teenage childbearing in this case), proper steps must be taken to control for individual and family characteristics. Without an adequate theoretical orientation to individual- and family-level explanatory models, it is highly probable that the lack of proper controls would cause one to overestimate neighborhood effects and thus misconstrue the social reality of the interacting systems. The theories of greatest relevance to the current study are those of social

disorganization, social control, and collective efficacy. These theories provide a solid framework for understanding the social conditions of neighborhoods, particularly those of concentrated disadvantage, and the social processes that regulate and protect neighborhoods.

Study Research Questions and Hypotheses

Given all that has been presented in the preceding chapters, the present research will focus on the following questions:

(1) What neighborhood factors independently (e.g., percent foreign born) or constructed (e.g., neighborhood disadvantage) are associated with teenage childbearing and fathering?

(2) Are these associations stronger when measured during preschool, elementary school, middle school, or high school developmental stages?

(3) Are neighborhood effects on teenage childbearing and fathering cumulative, lagged, or contemporaneous?

(4) Do these effects vary by gender, race/ethnicity?

(5) Are there threshold effects for neighborhood disadvantage?

(6) Do these thresholds operate differentially by gender, race/ethnicity?

In the light of the above research questions, the following research hypotheses are proposed:

H_1: Neighborhood disadvantage will be positively related to teenage childbearing and fathering for both Black and Latino males and females.

H_2: Adolescents who have lived in neighborhoods of neighborhood disadvantage for longer periods of time will be more likely to bear and father children.

H₃: Adolescents who have lived in disadvantaged neighborhoods during the developmental stage during middle school and high school will be at greater risk for teenage childbearing and fathering than those who may have lived in disadvantaged neighborhoods during earlier developmental stages.

H₄: Social capital will decrease the risk for teenage childbearing and fathering.

H₅: Neighborhood disadvantage will operate in a non-linear, threshold-like manner.

'

CHAPTER 4

RESEARCH METHODS

Introduction

This chapter begins with a description of the *Denver Child Study* (*DCS*)[3]*,* the study from which the data for this dissertation are drawn. Following this description, I discuss methodological challenges inherent to neighborhood effects studies. In this context, I discuss the unique aspects of the *Denver Child Study* within the context of methodological issues of concern to the neighborhood effects field. Following this, I describe the adolescent subsample (N=781) of the larger sample (N=1,793) of children. Next, I introduce the study variables and operational definitions. The chapter concludes with a description of the analytic plan and implications for overcoming methodological weaknesses prominent in the larger neighborhood effects literature.

Study Description

The *Denver Child Study* was conducted between the years of 2006 and 2008. The mixed-methods research design incorporated a complex, retrospective survey with analysis of administrative data from the Denver Housing Authority (DHA) and neighborhood indicators from the U.S. Census and Piton Foundation *Neighborhood Facts* database[4]. The purpose of the *Denver Child Study* was twofold:

> (1) quantify how a variety of outcomes for low-income children residing in public
>
> housing for a substantial period are statistically related to various conditions in the

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[3] The *Denver Child Study* (DCS) was conducted by Principal Investigators, Dr. George Galster and Dr. Anna Santiago. This study received support from the National Institute for Child Health and Human Development, the W.K. Kellogg Foundation, the John D. and Catherine T. MacArthur Foundation, and the U.S. Department of Housing and Human Development.

[4] The Piton Foundation is a private foundation that was established in Denver in 1976. The Piton Foundation is part of the Neighborhood Network Indicators Partnership aimed at providing local agencies and organizations with data to more effectively address community issues and concerns.

neighborhoods in which they were raised; and (2) probe various causal mechanisms about how neighborhoods might cause these outcomes (Galster & Santiago, 2008 p. 1).

Participants were recruited through a variety of methods, including mail, phone, and direct in-person canvassing efforts. Participants were eligible for the study if they were a Black or Latino parent or caregiver aged 18 to 64 who had one or more children under the age of 18 residing in the home when they moved into DHA. Additionally, participants had to have lived in DHA with one or more of their eligible children for at least two years. Finally, participants had to have first entered DHA after 1987, the year when random assignment to DHA units began. Of the 1,570 primary caregivers who met the study's inclusionary criteria, the final response rate was 57% (N=736). The majority of primary caregivers interviewed were mothers (N=693).

Study participants were interviewed in-person or over the phone for approximately 90 minutes, and participants received $60 compensation. Beyond reporting household characteristics, perceptions of neighborhood quality, and personal characteristics, respondents provided retrospective information on all eligible children's health, behavior, education, employment, marriage and childbearing, and exposure to violence. Additionally, complete residential histories were completed beginning at the birth of each eligible child's life. Primary caregivers provided physical addresses for all locations that their children resided in since the oldest eligible child's birth. Addresses were then geocoded and linked to applicable U. S. Census and Piton Neighborhood Facts data for each year of each child's life. While there were only a couple of residential locations for most families, in some cases, there were up to 20 residential locations.

To understand the structure of the linked database, it may helpful to refer to Figure 4.1. This gives a pictorial description of a hypothetical family included in the study and how the

residential histories were linked to specific child years. For family X, the primary caregiver reported having two children at the time of the survey. Child 1 was age 22 and Child 2 was age 14. The primary caregiver reported having lived in three separate residences since the birth of Child 1. As can be seen in Figure 4.1, Child 1 lived in all three residences, while Child 2 lived only in the latter two. For each year of a child's life, geocoded data from the corresponding neighborhood residence was linked to each child's personal and family characteristics in a master database. The residential history and subsequent linking process was fairly straightforward for hypothetical family X. However, other families with more children, greater residential mobility, potential bouts of homelessness, or out-of-home care made some residential histories and linking processes much more complicated. It is important to note that although the *Denver Child Study* provides comprehensive neighborhood data linked to particular health, behavioral, educational, and employment outcomes over the course of a child's life, the study is not a panel design (Galster & Santiago, 2008).

Figure 4.1 Hypothetical Denver Child Study Family Structure and Residential History
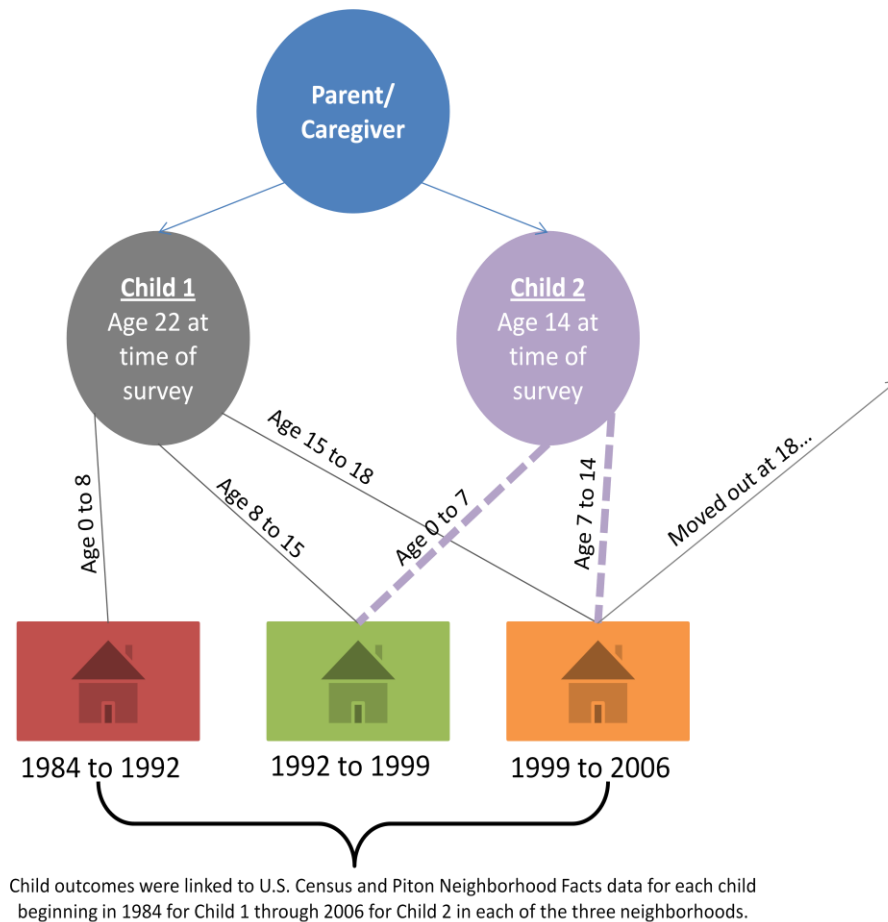
Figure 4.1. Describes a hypothetic primary caregiver and her or his children who lived in three neighborhood residences over the course of the children's lives. This Residential history could have also been interspersed with bouts of homelessness, or other extenuating circumstances.

The PIs have a long history of collaboration with the Denver Housing Authority (DHA), and the metro area of Denver is a prime location for the study of neighborhood effects for a number of reasons. First, DHA has a progressive housing agenda and has been operating dispersed or scattered site housing for decades. In contrast to other public housing developments in the U.S., scattered site residents are dispersed throughout Denver County in subsidized single family or smaller multifamily housing units. Such dispersion in housing locations introduces considerable variation in the neighborhood contexts where low-income children live. Children in the *Denver Child Study* resided in approximately 53% of all Census tracts in Denver County

(see Figure 4.2), so it logically follows that the sample reflects greater diversity in neighborhood

exposure than in other communities (Galster & Santiago, 2008).

Figure 4.2 *Location of First DHA Residence by Neighborhood Poverty*
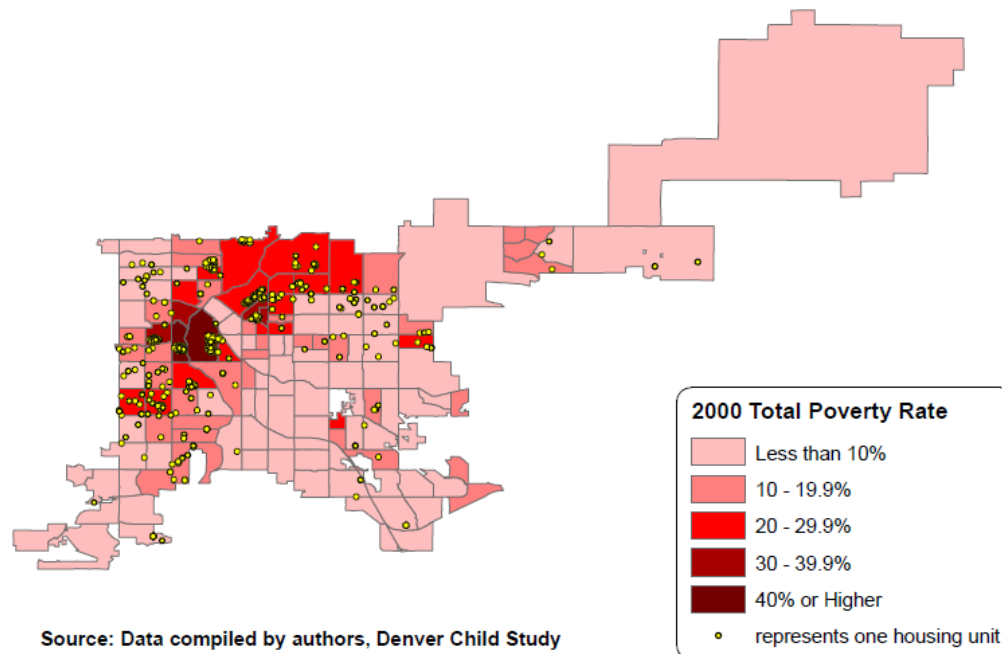
Figure 4.2. Visually represents the assignment of study participants to their first DHA location neighborhoods. Neighborhoods are delineated and categorized in neighborhood poverty percentages. First location assignments were fairly widespread, but as a whole were in higher poverty areas. Figure taken from "Magnitudes and Mechanisms of Neighborhood Impacts on Children: Analyzing a Natural Experiment in Denver" by Galster, G. C, & Santiago, A. M. (2012). Final Report to John D. and Catherine T. MacArthur Foundation, Grant #08-92652-000-HCD.

Additionally, DHA assigns its housing residents in a quasi-random process, allowing for

a natural experimental design. After 1987, all DHA applicants underwent a common screening

process and were assigned to a housing unit that met their family's needs (e.g. number of rooms,

accessibility, etc.). Applicants were placed on a wait list, and when they came to the top of the

list, they were assigned a residence that met their family's needs without regard for location

preference. If they did not accept the assigned unit, they had to wait until the next available unit

that met their needs became available. After a second refusal, they dropped to the bottom of the

list. Galster and Santiago's (2008) evaluation of this process showed that 75.5% of applicants accepted the original offer, and only 7.9% rejected both offers. Given this process, the initial assignment of households to a DHA unit and neighborhood therefore appears to mimic random assignment of household to neighborhood. This is particularly important in order to overcome the methodological issue of selection bias (the omission of explanatory individual characteristics).

Through a series of Monte Carlo simulations, Galster and Santiago (2012) found that "the observed correlations between neighborhood characteristics and household characteristics that are typically unobserved in most databases (but revealed in our survey) were not significantly different from what would have been expected by chance" (p. 15). However, it should be noted that the families in the study had very diverse residential histories. Some families only lived in DHA for the requisite 2 years whereas other lived in DHA for the majority of their children's lifetimes. This variation in length of time spent in randomly assigned neighborhoods may introduce some selection bias.

Overview of Methodological Challenges

As has been briefly described earlier, the neighborhood effects field is one that is wrought with methodological challenges. As the field burgeoned in the 1990s, increasing attention was paid to the weaknesses inherent in study design and the potentially biased conclusions of many of these studies. The underlying questions of recent critiques are: (1) Do neighborhoods actually exert a meaningful and statistically significant force on an individual's life course?; and (2) Are the methodological weaknesses in many studies simply obscuring the fact that individual and family characteristics are the sole predictors of human outcomes? Many have reviewed the current state of the field and articulated the key methodological issues (Booth

& Crouter, 2001; Dietz, 2002; Furstenberg, Cook, Eccles, Elder & Sameroff, 1999; Leventhal & Brooks-Gunn, 2000; Sampson, Morenoff, & Gannon-Rowley, 2002). In particular, Galster (2008) provides a thorough analysis of the issues researchers face in quantifying neighborhood effects. He suggests there are six paramount challenges that researchers must deal with in order to appropriately decipher the independent causal effects of neighborhoods on individual behavior: (1) defining the scale of the neighborhood; (2) identifying mechanisms of neighborhood effect; (3) measuring appropriate neighborhood characteristics; (4) measuring exposure to neighborhood; (5) measuring appropriate individual characteristics; and (6) endogeneity (reciprocal relationships between individual/family and neighborhood). In keeping with Galster's (2008) paper, the following sections will examine each of the identified problematic methodological issues and synthesize the literature which addresses these issues.

Defining the scale of neighborhood. Neighborhoods have been defined by both social and geographic boundaries. Suttles (1972) recognized early the nested nature of neighborhoods (ranging from immediate to city sector) and the varied meanings attached to neighborhoods by its residents at each scale. Building on Suttles' work, Galster (1986; 2001) theorized about the varying scales of neighborhood and the external amenities provided at each scale of neighborhood. Essentially, he suggests there may be differential neighborhood effects depending on what scale of neighborhood is being utilized and what externalities that scale offers to its residents. Furthermore, Galster (2001) describes nine elements of neighborhood that are identified as importantly distinct and simultaneously interactive. These include structural characteristics, infrastructural characteristics, demographic characteristics of the resident population, class status characteristics, tax/public service package characteristics, environmental characteristics, proximity characteristics, political characteristics, social-interactive

characteristics, and sentimental characteristics. Many of these characteristics exist at multiple scales of neighborhood, and it may be difficult to parse out at which scale intangible characteristics such as sentimental or social-interactive characteristics exist. For example, collective efficacy as perceived by a neighborhood resident may be on a smaller scale, such as within an apartment complex. This scale also may be fluid and changing as neighborhood residents live in their neighborhoods for longer periods of time and become more socially connected.

Galster (2008) suggests that the problem with defining the scale of neighborhood lies within the measurement of multiple scales. If each scale of neighborhood is measured separately, problems of multicollinearity may arise when the varying scales are too highly correlated. This is problematic because the independent effects of the varying scales may be indecipherable from each other. However, the larger problem is that of a mismatch between the residents' definition of neighborhood and the data sources' operationalization of neighborhood. Because many neighborhood effect analyses overlay Census data with self-reported survey data, this is of great concern. If an individual experiences his or her neighborhood as intangible social connections to immediate neighbors, then a conceptualization of even the smallest Census unit may not perfectly align with the resident's perceptions and thus the two data sources may be incompatible.

Identifying mechanisms of neighborhood effect. Galster (2008) proposes three types of neighborhood effect mechanisms: (1) endogenous neighborhood effects where an individual's behaviors or attitudes directly influence his or her neighbors (e.g., socialization); (2) correlated neighborhood effects where external sources influence neighborhood residents differentially (e.g. spatial mismatch or institutional resources); and (3) exogenous neighborhood effects where an

individual's attitudes or behaviors may be shaped by the outward characteristics of his or her neighbors (e.g. ethnic solidarity or social cohesion). In conceptualizing the mechanisms of neighborhood effect that are relevant to child development, one may first assume that only the endogenous mechanisms are applicable. However, considering the impact of correlated mechanisms on parents' employment and opportunity structures for example, it is reasonable to assume that these mechanisms are transmitted to the child via the parent.

Measuring appropriate neighborhood characteristics. The problem that presents itself in measuring appropriate neighborhood characteristics is the gap between theoretical constructs and the reality of access to appropriate data and/or operationalization of theoretical constructs. For example, while the theoretical construct collective efficacy (informal social control and social cohesion) has been found to be an important neighborhood effect mechanism (Sampson, Raudenbush, & Earls, 1997), access to data sources that have appropriate measures of collective efficacy are difficult to obtain considering the enormous cost of large scale social surveys. Many other endogenous effect mechanisms can only be explored by collecting data from individuals in specified study neighborhoods. Although it is much easier to access either Census data or other forms of administrative data to examine correlated effect mechanisms, it is critical to approach neighborhood effect mechanisms more comprehensively. Measuring diverse and comprehensive neighborhood characteristics will ensure that the neighborhood effect of a standard Census indicator is not actually sharing a significant portion of explanatory variance with an unmeasured endogenous effect mechanism. A diverse set of neighborhood predictors will elucidate varied effect mechanisms and more accurately estimate these causal pathways.

Measuring exposure to neighborhood. Although it is fairly straightforward to determine the geographic location of an individual's residence, it is far more complicated to

determine the degree to which said resident is exposed to the neighborhood conditions and social processes that are features of that geographic location. Galster (2008) suggests that these processes may "work instantaneously to generate outcomes for individuals or with substantial lag or cumulative impact" (p. 9). Another issue that arises out of measuring exposure to neighborhood is one similar to that discussed under neighborhood scale: what residents perceive as exposure may be different than how exposure is operationalized. On a related note, Galster and Santiago's (2006) mixed method study examined parental perceptions about neighborhood effects on their children and found that parents most often state that their neighborhood has no effect on their children (often because they keep their children indoors and away from neighborhood influences. Of course, increased parental monitoring and restricted neighborhood exposure is, in itself, a response to the neighborhood effect mechanism, but the fact remains that these children may be less exposed to external mechanisms, such as violence and crime. Two issues seem to be at play here: (1) perceptions of exposure may vary from actual and measured degrees of exposure; and (2) actual exposure may likewise vary from measured degrees of exposure.

Compounding the issue of varying degrees of neighborhood exposure is an issue most germane to children: the at once shared yet distinct effects of neighborhoods *versus* school environment. The current study is not meant to examine school effects specifically, but it should be noted that children spend a large portion of their lives at school, and some of the same mechanisms that operate in neighborhoods may also operate in schools. Given that income and racial segregation in schools often differ from that in neighborhoods, it is important to consider the potential differential effects of these two separate environments. Oberwittler (2007) suggests that adolescents in particular "make choices about the location of their friendship networks and

their routine activities. By doing so, they actively decide upon the relevance of their own neighborhood context for their behavior" (p. 167). Because a number of children may attend schools that are outside of their immediate neighborhood, one of the most salient neighborhood effect mechanisms, peer influence, may be more at play in school than in one's immediate neighborhood and thus accurately estimating neighborhood exposure becomes even more important.

Galster (2008) suggests that duration of exposure is particularly salient when considering endogenous effect mechanisms such as socialization. Studies that only look at contemporaneous neighborhood effects essentially disregard the accumulation of social-interactive neighborhood mechanisms. A more complete picture would be obtained by examining the length of time an individual is exposed to various neighborhood conditions, and the extent to which these individuals move in and out of varying types of neighborhoods. For example, if social norms regarding teen childbearing are due to peer networks in a neighborhood, then one might expect that this norming process would have different degrees of influence based on how long one has lived in a given neighborhood as well as the degree to which one spent time in or out of the neighborhood.

Endogeneity. Endogeneity is essentially the mutual causality between independent and the dependent variables. Endogeneity appears to be a problem in nearly all neighborhoods and one that has not yet been adequately addressed. The individual- and family-level characteristics that are controlled for in many neighborhood effects studies may themselves be predicted by neighborhood. Thus an "overloaded" statistical model may actually introduce downward bias to neighborhood effects by assuming one-way causality. One method for dealing with endogeneity is the instrumental variable approach (i.e., adjusting the model for the endogenous explanatory

variables by finding instrumental variables that are uncorrelated with the error term and correlated strongly with the explanatory variables). Oakes (2004) argues that the instrumental variable technique (i.e.,) is insufficient to overcome endogeneity because the chances of finding good instruments are low. However, Galster (2008) argues that computing an average of exogenous variables based on predicted values of neighborhood poverty over the course of child's life shows tentative conceptual promise in addressing the methodological challenge of endogeneity.

Measuring appropriate individual characteristics or selection bias. The issue of selection bias is really a component of the aforementioned issues relative to establishing causality, particularly the challenge in measuring appropriate individual characteristics. However, it is perhaps one of the most often discussed methodological challenges in neighborhood effect studies and thus warrants closer examination. Essentially, selection bias refers to the possibility that individuals may self-select into neighborhoods based on unmeasured innate personal characteristics, and as a result, the independent effects of neighborhoods cannot be accurately estimated due to the lack of adequate control variables. Even if all observable individual characteristics are controlled, systematic selection bias may still remain (Manski, 1993). For example, if individuals who live in public housing are given the option to relocate to neighborhoods of their choice (within reason and programmatic feasibility) then it may be possible that those individuals who relocate to less disadvantaged neighborhoods (with accompanying superior amenities) may be motivated by innate characteristics such as higher self-efficacy. The successes they may find in these advantaged neighborhoods may be associated, in part, with external resources found within the neighborhood, but improved outcomes may also simply be a reflection of uncontrolled personal characteristics. The best way

to account for selection bias is to use experimental or quasi-experimental methods. However, addressing the issue of selection bias is difficult due to the paucity of experimental data and the nature of secondary data sources to which researchers have access. Administrative or government data rarely measure these constructs, and large scale social surveys are nearly the only way to collect these data (Galster, 2008).

The *Denver Child Study* in Methodological Context

As has been described above, there are numerous methodological threats apparent in neighborhood effect studies. The *Denver Child Study* provides an unprecedented opportunity to overcome many of these challenges. Foremost, the issue of selection bias is one that is addressed in the design of study. Since 1987, DHA has been randomly assigning individuals on their waiting list to the first available housing unit which matches their family's physical needs (i.e., number of bedrooms, etc.). Through rigorous statistical testing, this process has been found to mimic random assignment, and thus provides a unique opportunity to observe neighborhood effects in the context of a natural experiment (Galster & Santiago, 2008). In addition, a number of individual characteristics that are not generally observed were measured in the survey portion of the study (e.g. household socioeconomic status, parenting efficacy, caregiver depression, etc.) so as to properly control for potentially influential parental or household characteristics. Secondly, the *Denver Child Study* merged database has rich sources of data including geocoded address histories using both Census and Piton *Neighborhood Facts* data as well as participant self-reports of neighborhood conditions. Because Galster and Santiago were well aware of important endogenous and exogenous neighborhood effect mechanisms, such as collective socialization or social disorganization, the data allow for a more nuanced examination of

neighborhood effect mechanisms than the standard correlated effect mechanisms that public data sources allow.

Although the scale at which neighborhood is measured in the *Denver Child Study* is the Census tract level (or two Census tracts for Piton data), this is not necessarily as problematic as it might be in other metropolitan areas. The city of Denver has 77 distinct neighborhoods, and these neighborhoods are easily identified by residents (Coulton, Chan, & Mikelbank, 2010). Although neighborhood residents may have a slightly different conceptualization of neighborhood scale that includes socially meaningful features, the overlay of primary caregiver perceptions of neighborhood with publicly and administratively defined scales of neighborhood gives a comprehensive measurement of neighborhood, though still possibly obscuring the independent effect of neighborhood due to varying definitions. Perhaps the most useful aspect of the *Denver Child Study* data is the comprehensive residential history of each study child. Because each child's year of life is linked to a particular neighborhood residence and accompanying neighborhood indicators, this dataset allows one to examine neighborhood exposure in a manner that has been vastly understudied. Issues of timing (At what point was child exposed to deleterious aspects of neighborhood?) and duration (For how long was child exposed to neighborhood?) can be studied due to the comprehensive residential histories available in this dataset.

The unique methodological design of the *Denver Child Study* allows for an examination of neighborhood effects and teenage childbearing and fathering unlike previous studies. With the threat of selection bias minimized, appropriate individual characteristics measured, rich and varied neighborhood effect mechanisms identified, and the potential to measure neighborhood

exposure in terms of duration and timing, this data source provides an excellent opportunity to answer the present study's research questions.

Study Sample

As has already been described, the full study sample consisted of 714 families with 1,793 eligible children. Because the outcome of interest for this study is teenage childbearing and fathering between the ages of 15 and 19, the full sample has been significantly trimmed. In order to be included in the study sample, children had to be at least 15 years old at time of the survey. This simple exclusionary criteria provides a sample of N=795, wherein 51% are female and 54% are Latino. After losing 14 cases due to missing data in the dependent variable and variables necessary for individual and caregiver computed variables, the cumulative sample size was 743. All of the extract samples are within the range of 699 to 743, with varying missing data across the developmental stages. For the cumulative sample, 19% had birthed or fathered a child before the age of 19 (n=141). Just over one third of the sample (39%) was under the age of 18 at time of survey (but over the age of 15) and thus residential histories for these participants will only extend to age 15, 16, or 17. Almost half of the sample (47%) had lived in DHA for at least half of their childhood up to age 18 or age at the time of survey. Refer to Table 4.1 for sample characteristics of the cumulative model sample. Sample characteristics are presented for both 'Ever in DHA' and 'Majority in DHA' samples in order to determine if there are any differences between children who lived in randomly assigned DHA neighborhoods the majority of their lives compared to children whose parents may have self-selected into various neighborhoods outside of the minimum two years in DHA that was required for study inclusion.

Table 4.1 Descriptive Statistics of Youth and Caregiver Characteristics in Cumulative Analysis across Childhood

Variable	Ever in DHA (N=743)				Majority in DHA (N=351)			
	n (%)	Range	Mean	SD	n (%)	Range	Mean	SD
Age*		15-36	20.84	4.69		15-35	20.1	4.38
Race								
African American	347 (46.1)				118 (33.6)			
Hispanic/Latino	405 (53.9)				233 (66.4)			
Gender								
Female	386 (51.3)				156 (44.4)			
Pubertal Timing (early)	94 (12.5)				34 (9.7)			
School honors	418 (55.6)				193 (55.0)			
School Involvement	154 (20.5)				65 (18.5)			
Religious Participation								
None	185 (24.6)				105 (29.9)			
Some	313 (41.6)				135 (38.5)			
All	254 (33.8)				111 (31.6)			
Sibling Teen Parent	97 (12.9)				47 (13.4)			
Caregiver Foreign Born	90 (12.0)				44 (12.8)			
Mother Teen Parent	211 (28.1)				52 (14.8)			
Household Stressors*		0-7	2.45	1.25		0-7	2.57	1.38
Household Income*		0-39,209	8536.8	7924.9		0-35,072	7767.5	8048.7
Parents' Education								
<HS	252 (33.5)				126 (35.9)			
GED	115 (15.3)				55 (15.7)			
HS Diploma	192 (25.5)				93 (26.5)			
Technical/Certificate	106 (14.1)				45 (12.8)			
College	87 (11.6)				32 (9.1)			
Proportion of Time in Two Parent Household*		0-1	0.38	0.35		0-1	0.34	0.35
Parent Depression								
Borderline	120 (16.0)				55 (15.7)			
Clinical	58 (7.7)				26 (7.4)			
Parenting Efficacy		6-20	16.68	3.46		6-20	16.69	3.43

*Indicates significant one sample *t*-test mean differences between Ever in DHA and Majority in DHA samples at the *p*< .05 level.

Study Measures

Outcome Variable

The outcome variable for this study is teenage childbearing or fathering. Conceptually this refers to whether or not an adolescent actually gave birth or fathered a child during her or his teen years. Given that the majority of the literature focuses on childbearing between the ages of 15 and 19, this study will use this definition. Operationally, the outcome will be measured dichotomously as 0=never birthed or fathered a child between the ages of 15 and 19 or 1=birthed or fathered a child between the ages of 15 and 19. The data are probably highly reliable and valid given that the primary caregiver will most likely be well aware if their own daughter or son birthed or fathered a child. However, it is possible that teenage fathering may be a less reliable indicator based on primary caregivers' reports because some teenage fathers may not even be aware of their own paternity. Paternity information is often not reported on birth certificates, and up to 15% of information (e.g., father's name, father's age, etc.) is missing on birth certificates (Wei, 2000). Young women may choose not to inform the father of their pregnancy or birth, and thus it is possible that some male teens in the study may be unaware that they are fathers.

Predictor Variables

Child characteristics. Primary caregivers were asked to indicate the age at time of survey as well as the gender for each of their eligible children in the study. Child age is operationalized as age at time of survey in years. Age was dummy coded as 15, 16, 17, or 18 with greater than 18 at time of survey as the reference category. This was done in order to control for the varying lengths of time one may have fit in the eligible age category for the outcome of interest (teenage childbearing or fathering between ages 15 and 19). Gender was operationalized as a dichotomous variable, either male or female. Ethnicity was operationalized as either Black or Latino. The

small portion of primary caregivers who indicated that the ethnicity of their child was something other than Black or Latino was excluded from the study sample. The excluded children were generally biracial or identified as "other."

School involvement represents the extent to which an adolescent participates in school-related activities. Operationally, school involvement is measured as a dichotomous variable during each developmental stage (elementary, middle school, and high school) based on responses to two separate survey items: (1) Did your child ever participate in clubs or activities in school?; and (2) Did your child ever participate in sports teams at school? This variable was dummy coded at all developmental stages as 1=participated in clubs/activities and/or sports in developmental stage; 0=otherwise.

School success was conceptualized as the degree to which a child was academically successful in school. This was operationalized as having been on the honor roll during elementary, middle school, or high school developmental stages as 1=was on the honor roll in developmental stage; 0=otherwise.

Religious participation was conceptualized as the extent to which an adolescent attended religious services or activities. Operationally, this was measured with one survey question, "Did your child ever attend religious services/activities?" This variable was dummy coded for all developmental stages as 1=attended religious services during developmental stage; 0=otherwise.

Pubertal timing was conceptualized as the extent to which a child entered puberty later or earlier than usual. Operationally, this was measured using one survey item wherein parents were asked if their child(ren) was "early, on time, or late in reaching puberty?" Due to small cell counts, responses were dummy coded as 1=for early; 0=on time/late.

Family and household variables. Primary caregiver depression was conceptually defined as the extent to which a primary caregiver exhibited depressive symptomology in the week prior to the time of survey. In order to assess depression, the Center for Epidemiologic Studies Depression scale (CES-D) was used (Radloff, 1977). The scale is based on 20 questions about the emotions a person has felt during the previous week. Overall scores range from 0 to 60; with scores less than 16 indicating no depressive symptoms, 16 to 26 indicating sub-clinical depression and scores of 27 or higher indicating clinical depression (Cutsinger, Galster, & Santiago, 2011). In this study, two dummy variables were used to indicate sub-clinical and clinical depression; the reference category was no depressive symptomatology. The Cronbach's alpha for the CES-D scale with this study population was 0.87 (Cutsinger, Galster, & Santiago, 2011). See Appendix B for further details.

Primary caregiver income was conceptually defined as the average annual earnings reported by primary caregivers during each developmental stage. Operationally, annual earnings were calculated by multiplying the hourly wage rate by hours worked per week and weeks worked per year for each residential location. This, in turn, was matched to the appropriate child years and then primary caregiver earnings were averaged across child years during a specific developmental stage.

Primary caregiver educational attainment was operationalized using self-reported highest degree earned at time of survey completion. This variable is represented by four dummy variables: GED, high school diploma, technical/certificate, and college degree. Less than a high school diploma is the reference category.

Parenting efficacy was conceptually defined as the extent to which a caregiver was confident about his or her ability to parent effectively. Operationally, this was measured using a

10-item scale developed by Santiago which asks parents to rate their confidence in their parenting skills using a 3-point Likert scale. The scale ranges from 0 to 30 with higher scores indicating higher levels of parenting efficacy. The Cronbach's alpha for this scale was 0.87 (Santiago, Cutsinger & Galster, 2011). See Appendix A for further details.

Residence in a two-parent household was defined as the proportion of time within each developmental stage that the child lived with two parents. For example, middle school (ages 12 through 14) had proportions ranging from .0, .33, .66, and 1.0. High school had proportions of .0, .25, .5, .75, and 1.0. The cumulative portion of time spent with two parents was calculated as an average across all other developmental stages.

Maternal teen parent was defined as whether a child's mother gave birth to a child between the ages of 15 and 19. Sibling teen parent was defined similarly. Both maternal teen parent and sibling teen parent were dummy coded as 1=mother (sibling) gave birth between ages 15 and 19; 0=otherwise.

Key neighborhood predictors. Key neighborhood predictors were derived from survey items, U.S. Census and Piton neighborhood indicators. The *Denver Child Study* database included interpolations for Census indicators between the 1970, 1980, 1990, and 2000 decennial periods and extrapolations for the years 2001 through 2008. Multicollinearity problems that arose from entering all of the relevant Census indicators separately into the statistical model led to the creation of an index of neighborhood disadvantage that was computed in a similar manner in previous studies (Cohen, Farley, & Mason, 2003; MacDonald & Gover, 2005; Sampson, Raudenbush, & Earls, 1997; Xue, Leventhal, Brooks-Gunn, & Earls, 2005). In keeping with Sampson, Raudenbush, and Earls (1997) this study conceptually defines neighborhood disadvantage as the degree to which persons with socioeconomically disadvantaged profiles are

clustered together at the neighborhood level (Sampson, Raudenbush, & Earls, 1997). Concentrated disadvantage generally has been constructed by an index of neighborhood indicators including some variation of the following: rates of poverty, unemployment, female-headed households, minority households, children under age 18, and households on public assistance. In this study neighborhood disadvantage was measured by summing averages of Census tract percentages of family poverty, female headship, minority households, homeownership (reverse-coded), and unemployment. These particular Census indicators were used in index form due to problematic collinearity when used separately. The indicators were selected based on a factor analysis of all Census indicators in Denver neighborhoods across the potential study decennial years (1970 to 2000). Factor analyses suggested that the five aforementioned indicators performed consistently across these years. Neighborhood disadvantage averages were calculated for all developmental stages, and cumulatively.

In order to examine potential thresholds of neighborhood disadvantage, we computed a mean disadvantage index for the entire Denver metropolitan area using Census data for the years that corresponded to the survey (between 1970 and 2008). Disadvantage indices for each child were then compared to metropolitan means for the corresponding years, and if it was within one standard deviation above the mean, it was coded as "average level of deprivation," More than one standard deviation above the mean was coded as "disadvantaged." Index scores below the mean were coded as "advantaged." Finally, in order to compute a disadvantage typology for both middle school and high school developmental stages, each developmental stage was dummy coded as 'all or majority lived in advantaged neighborhood,' 'all or majority lived in average neighborhood,' or 'all or majority lived in disadvantaged neighborhood.' Very few cases were unable to be categorized as 'all' or 'majority,' but if they were, those cases were dropped from

the analyses. For some analysis samples that was as few as 9 cases, but for others it was as many as 22.

In keeping with Putnam's (2000) conceptualization of social capital, this study defines social capital as a collective social connectedness that inclines individuals to do things for each other and for the collective. Social capital is operationalized by a 6-item index that identifies the degree to which a primary caregiver could rely on his or her neighbors in times of need. Items asked respondents if there were people in the neighborhood who (1) could get together to solve neighborhood problems; (2) would watch out for their children and property; (3) knew them and their children by name; (4) were adults who they or their children could look up to; or (5) were people they could count on in times of trouble. The sixth item asked if respondents were active in any organizations located in the neighborhood (e.g., block clubs, tenant groups, religious organizations and the like). Each affirmative response was scored as 1 and total scores ranged from 1 to 6, higher scores indicated greater levels of social capital. Social capital scale scores for each child year were used to calculate mean scores of social capital within each developmental stage and cumulatively. See Appendix A for further details.

Social disorder is conceptually defined as the presence of crime and violence in the neighborhood. It was measured using a 5-item index of respondents' self-reports about the level of social disorder (e.g., selling drugs; gang activity; homes broken into by burglars; people being robbed or mugged; people getting beaten or raped) experienced within their neighborhood. Responses were either 1 or 0 for each of the five items, resulting in a range from 0 to 5, with higher scores indicating higher levels of social disorder. Social disorder scale scores for each child year were used to calculate mean scores of social disorder within each developmental stage and cumulatively. See Appendix A for further detail.

Negative peer influences in the neighborhood is conceptually defined as the presence of delinquent teens in a neighborhood. The presence of negative peer influences in the neighborhood was measured by one survey item that asked if "there are many teens who get into trouble" in the neighborhood. This was dummy coded as 1=yes; 0 otherwise. This was dummy coded for all developmental stages and cumulatively.

Residential instability was conceptually defined as the instability in a neighborhood that results from frequent residential turnover in a neighborhood. Residential instability was operationalized by the Census indicator s the percentage of households that moved out of the Census tract in the previous year.

Proportion of persons in the neighborhood who are foreign born was conceptualized as the share of persons in a neighborhood who were not born in the United States. Foreign born in the neighborhood was operationalized by the Census indicator of percentage of neighborhood residents born outside the United States.

Children aged 5-17 was conceptualized as the share of persons in the neighborhood who were between ages 5 and 17. It was operationalized by the Census indicator as percentage of neighborhood residents who are between the ages of 5 and 17.

All of these Census indicators were linked to the neighborhood(s) in which children lived during each year since their birth and reflect a standard percentage ranging from 1 to 100. Average percentages of residential instability, foreign born, and children aged 5-17 were calculated for all developmental stages and cumulatively.

Neighborhood Dosage-Response Relationship

Galster (2012) discusses neighborhood effects in terms of a pharmacological metaphor wherein neighborhood "dose" is related to individual "response." Essentially this dosage-

response considers the "active ingredients" of neighborhood dosage (i.e., social-interactive, institutional, or geographical mechanisms) and how this dosage might play out in terms of duration and intensity. In terms of duration, one must consider how long the neighborhood dosage continues. In terms of intensity, one must consider the size of the neighborhood dosage. Both duration and intensity can be related to dosage-response by considering neighborhood thresholds and timing. For example, if the neighborhood dose of concentrated disadvantage exceeds a meaningful threshold, then one might consider the intensity of this dose to be greater than the intensity of another dose which does not exceed the threshold. In terms of timing, one might consider whether the response to the neighborhood dosage occurs immediately or in a lagged manner following the accumulation of neighborhood dosage. This issue of timing relates to duration of neighborhood exposure across developmental stages. For example, is it possible that a particular intensity of neighborhood dosage at an early developmental stage has a lagged effect on the individual outcome of teenage childbearing in a later developmental stage? Is it the accumulation of effects, or developmentally-specific exposure to neighborhood that matters? These questions will be considered closely in the current study. The following analytic plan provides a quantitative context for examining this neighborhood dosage-response relationship.

Analytic Procedures

Statistical power. First it is important to address statistical power. Given the obvious sample restrictions of secondary data analysis, it is necessary to ensure that one has an adequate sample size before embarking on any analytic plan. Cohen (1992) suggests that in order to detect medium effects at a power of .80 and an alpha level of .05, one would need approximately 13 cases per variable entered into a multivariate model. Given this recommendation, statistical power will be reached using the ever in DHA model extracts with sample sizes ranging from 699

to 752. However, the majority DHA samples and stratifications by ethnicity are significantly smaller (though feasibly still adequate in predicting large effect sizes). Because of this, the robustness of results will be compared across the full samples and subsamples, and only the results that are robust across both samples will be reported.

Multilevel modeling. Over the past several decades, there has been a proliferation in the use of multilevel modeling in the social sciences (Bryk & Raudenbush, 1992; Guo & Zhao, 2000; Raudenbush & Bryk, 2002). This type of statistical modeling has great appeal for researchers because so much of the social world is hierarchical in nature (e.g., children nested within families nested within neighborhoods). As has been noted, the structure of the *Denver Child Study* does not lend itself to a 3-level multilevel model due to the widely changing contexts of neighborhoods in Denver over the course of the study years. There are two viable statistical modeling choices, both potentially useful for analyzing this data: (1) STATA's maximum-likelihood logistic regression algorithm using clustered robust standard errors; and (2) STATA's random effects multilevel logistic regression specifying two levels. The debate between these two approaches is ongoing (Green & Vavreck, 2008), but both are valid choices for analyzing two-level data structures. Both analytic procedures were employed in my study and results were compared. However, I decided to use the multilevel model results because intraclass correlations and likelihood ratio tests in the random effects models indicated that there was significant variation between families,

First stage analysis. First, descriptive and bivariate analyses were conducted, comparing teens who birthed or fathered children with those who did not. Additionally, comparisons across race/ethnicity, gender, and average neighborhood exposure by developmental stage were made. These bivariate analyses included independent samples t-tests, contingency table analyses and

analyses of variance. Following these descriptive and bivariate analyses, the first stage multivariate analyses were undertaken. In order to get a big picture understanding of the significance of timing of exposure, multilevel logistic regression was conducted. Because individual children in this study are nested within families, and there may be an effect that is common among siblings, it is necessary to add a family-level error term. However, it is not appropriate given the nature of the *Denver Child Study* data to add a neighborhood-level error term. While the data were collected at one point in time, they reflect neighborhood data that range from the 1970s (if the child retrospectively reported on was between the ages of 27 and 36 at the time the primary caregiver was interviewed) to the early 2000s if the child was younger than 6 at the time of survey. Not only did neighborhood conditions change drastically in some of these neighborhoods, but boundaries may have also shifted. When neighborhood boundaries were redefined, the U.S. Census Neighborhood Change database (NCDB) appropriately adjusted data values. Although the data structure does not necessitate a three-level multilevel model (children nested within families nested within neighborhoods), there is still clustering at the family level. Therefore, when sample size permits, a two-level random effects logit model will be utilized. When sample size is insufficient (e.g. in ethnic and gender stratifications) clustered robust logit models will be specified.

The multilevel models in the first stage of analysis examined neighborhood averages across developmental stages to determine if a particular age range of neighborhood exposure was more or less predictive than other age ranges. In addition to the four separate equations for each developmental stage of neighborhood exposure, a fifth model examined the effects of cumulative neighborhood exposure, from birth to age 18 or age at time of survey if less than 18. The 2-level random effects logit equations for the first stage analysis are as follows:

1. $\text{logit}[O_{ij}] = \beta[C_{tpreK}] + \beta[C_{ij}] + \beta[P_{tpreK}] + \beta[P_i] + \beta[N_{kpreK}] + \mathcal{E}$

2. $\text{logit}[O_{ij}] = \beta[C_{telem}] + \beta[Cj_i] + \beta[P_{telem}] + \beta[P_i] + \beta[N_{kelem}] + \mathcal{E}$

3. $\text{logit}[O_{ij}] = \beta[C_{tMS}] + \beta[C_{ij}] + \beta[P_{tMS}] + \beta[P_i] + \beta[N_{kMS}] + \mathcal{E}$

4. $\text{logit}[O_{ij}] = \beta[C_{tHS}] + \beta[C_{ij}] + \beta[P_{tHS}] + \beta[P_i] + \beta[N_{kHS}] + \mathcal{E}$

5. $\text{logit}[O_{ij}] = \beta[C_{tCUM}] + \beta[C_{ij}] + \beta[P_{tCUM}] + \beta[P_i] + \beta[N_{kCUM}] + \mathcal{E}$

Where:

$[O_{ij}]$ = outcome of interest (teenage childbearing or fathering between the ages of 15 through 19)

$[C_t]$ = characteristics of youth that can vary over time (e.g., substance use, number of siblings in the home)

$[C]$ = characteristics of youth that do not vary over time (e.g., race, gender, etc.)

$[P_t]$ = characteristics of youth's parent(s) that can vary over time (e.g., marital status, income)

$[P]$ = characteristics of youth's parent(s) that do not vary over time (e.g., race, nativity status)

$[N_t]$ = characteristics of neighborhood where youth resides during time t (e.g., concentrated poverty, residential instability)

$[\mathcal{E}]$ = individual error term

ij = individual youth (i) nested within their family (j)

k = neighborhood

preK = developmental stage ages 1 thru 5

elem = developmental stage ages 6 thru 11

MS = developmental stage ages 12 thru 14

HS = developmental stage ages 15 thru 18

CUM=cumulative neighborhood exposure, birth thru 18 or age at time of survey if less than 18

The first stage of analyses answers research questions: (1) What neighborhood factors are associated with teenage childbearing and fathering?; (2) Are these associations stronger when measured during PS, ES, MS, HS?; and (3) Are neighborhood effects cumulative, lagged, or contemporaneous?

Second stage multivariate analysis. The second stage of analysis more fully parses out the issues of timing, duration, and intensity while stratifying by race/ethnicity. Multilevel logistic regression modeling specifying a similar model to those in the first stage of analysis was conducted. The results of the first stage analysis indicated that middle school and high school neighborhood exposure had the most robust effects on the outcome. Therefore, the sample was stratified by race/ethnicity, and two separate multilevel models were specified to examine middle school and high school neighborhood exposure for Black and Latino youth:

1. $\text{logit}[O_{ij}] = \beta[C_{ijMS}] + \beta[C_{ij}] + \beta[P_{iMS}] + \beta[P_i] + \beta[N_{kMS}]$

2. $\text{logit}[O_{ij}] = \beta[C_{ijHS}] + \beta[C_{ij}] + \beta[P_{iHS}] + \beta[P_i] + \beta[N_{kHS}]$

Unlike the first stage models which included an average disadvantage index as one of the key neighborhood predictors, the second stage models included a neighborhood disadvantage typology. These models were specified for middle school and high school only for practical and theoretical reasons. First, results from the earlier developmental stages (both in lagged and cumulative models) suggested that there were more neighborhood variables predictive in middle school and high school than in earlier developmental stages. Theoretically, this analytic choice is supported by the notion that during adolescence, youth increasingly spend time with their peers and away from their home (e.g, in their neighborhood or at school) (Darling & Steinberg, 1997). Because neighborhood effects may be more pronounced during adolescence, the identification of threshold effects may be more likely. The typology of 'disadvantaged', 'average,' or

'advantaged' allowed for a study of the intensity of neighborhood exposure by estimating potential threshold levels at which disadvantage may become meaningful. The second stage of analysis answers research questions (4) Do neighborhood effects vary by ethnicity?; (5) Are there threshold effects for neighborhood disadvantage?; and (6) Do these thresholds operate differentially by ethnicity?

Conclusion

This chapter has summarized the methodological challenges in the study of neighborhood effects and situated the current study in a manner that addresses many of these challenges. The analytic plan laid out fulfills this study's purpose of (1) determining if neighborhood effects on teenage childbearing/fathering operate differentially for Black and Latino youth; and (2) estimating how these effects may vary according to the timing, duration, and intensity of neighborhood exposure.

CHAPTER 5

RESULTS

Introduction

I begin this chapter with a discussion of the prevalence of teenage childbearing and fathering in the study sample. Following this, I present descriptive statistics of neighborhood conditions across all developmental stages. Then, I examine variations in teenage childbearing/fathering by key neighborhood characteristics. Finally, I present the results of the multivariate analyses predicting teenage childbearing and fathering. I conclude this discussion by summarizing the bivariate and multivariate results within the framework of the study research questions and hypotheses.

Prevalence of Teenage Childbearing and Fathering

Of the 1,793 children in the Denver Child Study sample, 795 met the eligibility requirement of being at least 15 years old at the time of the survey. After eliminating cases with key missing data (i.e. missing the variables necessary to compute teenage childbearing/fathering), the final sample size was 781. This is the sample from which all developmental stage analysis extracts were drawn. Of the 781 adolescents, 19.1% (n=149) had borne or fathered a child between the ages of 15 and 19. Of the 149 youth who were teen parents, 25% were male and 57% were Latino.

Neighborhood Characteristics across Child Developmental Stages

Neighborhood conditions may have changed over the course of a child's life for several reasons: (1) the child may have moved to a new neighborhood, potentially many times; and (2) the neighborhood conditions may have improved or deteriorated over the years in which child resided there. In order to understand the average neighborhood conditions across a child's

lifetime in this study, average neighborhood descriptors are presented (both in terms of caregiver reports of social interactive features of neighborhood, such as social capital, as well as U.S. Census indicators of neighborhood composition). These descriptive statistics are compared between two samples of children: (1) children who lived in DHA for at least two years during their childhood (referred to as "Ever in DHA"); and (2) children who lived the majority of time during each developmental stage in DHA (referred to as "Majority in DHA").

Changing neighborhood demographics across developmental stages. There were a number of notable changes in neighborhood conditions across the children's life course development. Figures 5.1 and 5.2 depict neighborhood characteristics during each developmental stage and cumulatively over childhood. Across developmental stages there are gradual decreases in neighborhood fractions of adults who are less than high school educated, and conversely gradual increases in neighborhood percentages of college educated adults. The average proportion of children aged 5 to 17 in these neighborhoods remained fairly constant at just over 20% across each developmental stage. There also was a decline in the average level of residential instability (percentage of people who moved out of the neighborhood during the previous year) across developmental stages. The most marked neighborhood change was the increase in foreign born residents in the neighborhood. The fraction of foreign born in the neighborhood more than doubled over the course of the childhood with the average rising from 12% during preschool years to approximately 24% during high school. These changing patterns of neighborhood characteristics suggest that, on average, neighborhood quality improved for children in the study over childhood. Neighbors were increasingly better educated and there was more stability in terms of fewer residential outmovers.

Neighborhood conditions as expressed by a cumulative average show that children lived in neighborhoods across their lifetimes comprised of approximately 17% foreign born, 21% children aged 5 to 17, 12% college educated, and 19% less than high school educated. On average children lived in neighborhoods across their lifetimes where 27% of people had moved in the previous year.

Figure 5.1 Trends in Average Neighborhood Conditions across Developmental Stages for Ever in DHA Sample (N=752)
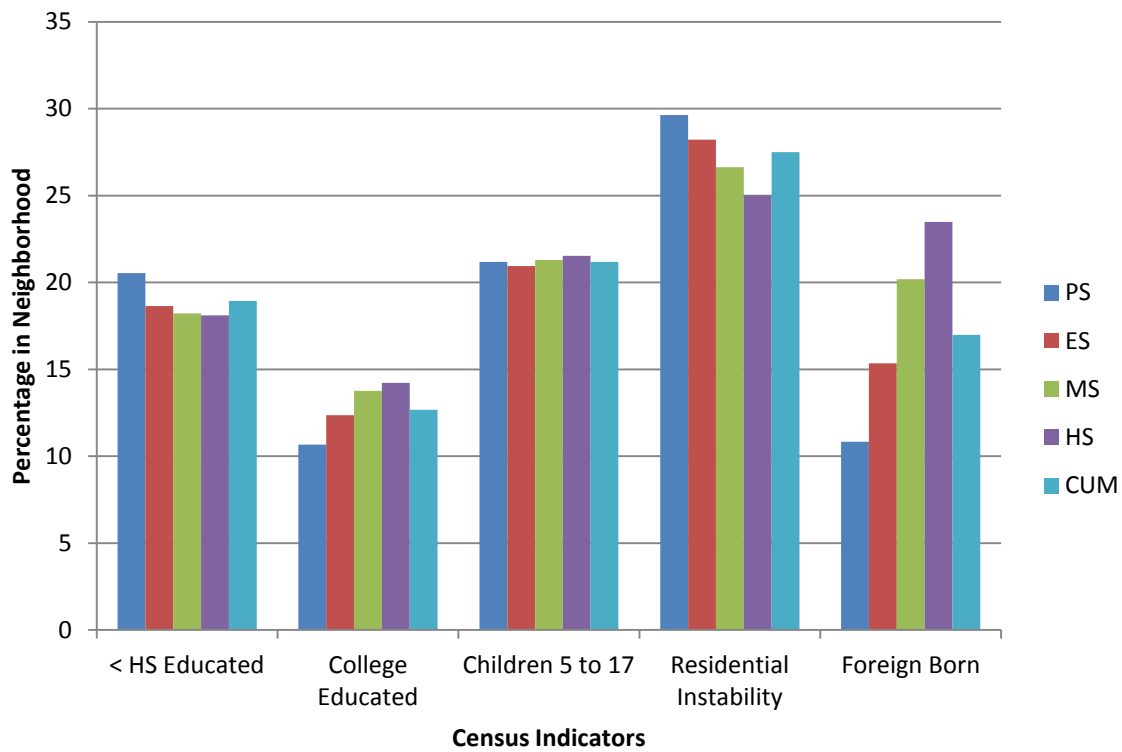
Figure 5.1. Depicts changing percentages for Ever in DHA sample across developmental stages for Neighborhood Conditions. Data source: *Denver Child Study* linked database.

Figure 5.2 Trends in Average Neighborhood Conditions across
Developmental Stages for Majority in DHA Sample (N=351)
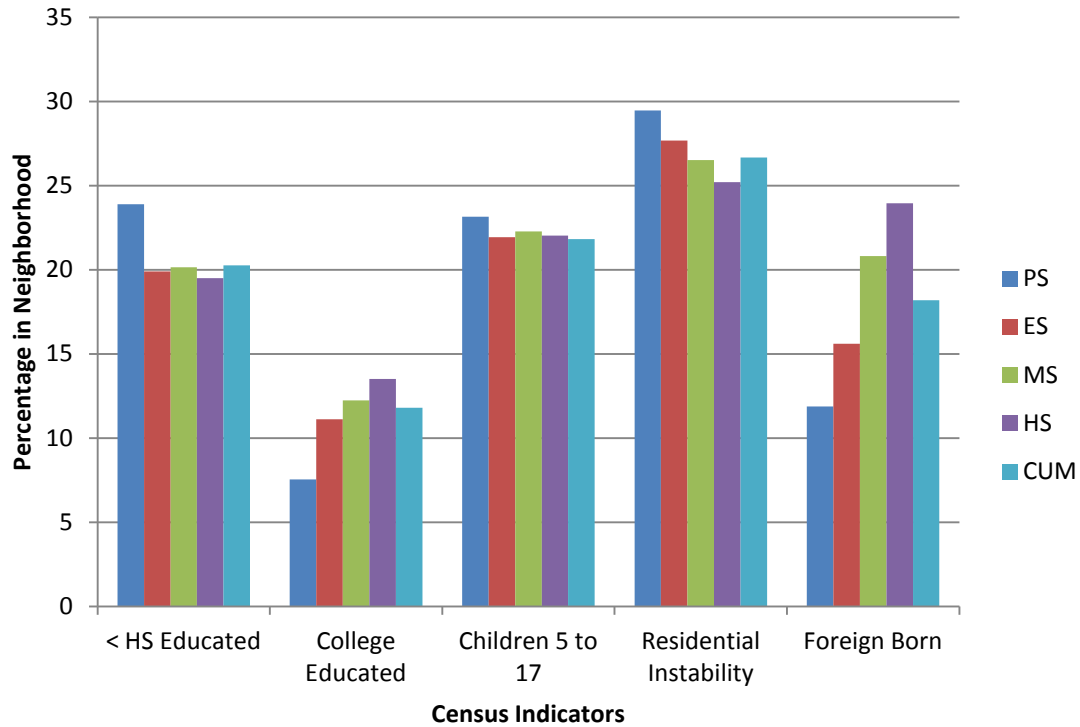
Figure 5.2. Depicts changing percentages for Majority in DHA subsample across developmental stages for neighborhood conditions. Data source: *Denver Child Study* linked database.

Although patterns of neighborhood change were nearly identical between the Ever in DHA and Majority in DHA samples, it appears that children who lived in DHA for the majority of each developmental stage (and cumulatively) lived in slightly more disadvantaged neighborhoods. The only exception here is that the Majority in DHA sample had significantly higher mean scores of social capital (M= 3.18, 3.52) than the Ever in DHA sample (M=2.92, 3.14) during preschool and elementary school, respectively. In this regard, the Majority in DHA sample seemed to live in more socially connected neighborhoods. Compared to children who lived the majority of their lives in DHA, children who ever lived in DHA resided, on average, in neighborhoods with significantly lower levels of social capital, social disorder, neighborhood disadvantage, proportion foreign born, children aged 5 to 17, and proportion of less than high

school educated. In addition, children who ever lived in DHA, on average, lived in neighborhoods with significantly higher percentages of college educated The significant differences were similar across developmental stages and cumulatively for each indicator. The only Census indicator where Majority in DHA children were nearly identical to Ever in DHA children was residential instability. Please refer to Tables 5.1 through 5.2 for further detail on significant differences.

The disadvantage index changed in tandem with the aforementioned neighborhood characteristics. There were gradual declines in neighborhood disadvantage from preschool through high school for both Ever in DHA and Majority in DHA samples. When examining neighborhood quality, one can see that children who lived in DHA during the majority of their childhood resided in slightly more disadvantaged neighborhoods, on average, compared to children who did not. One sample *t*-tests demonstrated that the differences between the two samples of children were statistically significant within developmental stages; however, this was not true for the cumulative average of neighborhood disadvantage. Across all developmental stage neighborhoods, the average disadvantage index scores only exceeded 200 for the Majority in DHA preschool sample (range is 0 to 500). From preschool to high school, there was a gradual decline in neighborhood disadvantage for both Majority in DHA and Ever in DHA samples. In preschool neighborhoods, the average disadvantage index for Majority in DHA children was 217 and for Ever in DHA it was 196. By high school, the average neighborhood disadvantage index in places where Majority in DHA children lived had declined to 176 and the Ever in DHA children's to 168. While all of these differences were significant within developmental stages, across childhood, there was no significant difference between average levels of neighborhood disadvantage for Majority in DHA children (M=187) and Ever in DHA children (M=184).

Table 5.1 Descriptive Statistics of Developmental Stage Neighborhood Characteristics by DHA Residence Status

Variable	Pre-School				Elementary School				Middle School				High School			
	Ever in DHA (N=699)		Majority DHA (N=225)		Ever in DHA (N=748)		Majority DHA (N=377)		Ever in DHA (N=747)		Majority DHA (N=443)		Ever in DHA (N=747)		Majority DHA (N=497)	
	M or (N)	SD or %	M or (N)	SD or %	M or (N)	SD or %	M or (N)	SD or %	M or (N)	SD or %	M or (N)	SD or %	M or (N)	SD or %	M or (N)	SD or %
Avg Social Disorder (0-6)	1.36*	1.54	2.04	1.70	1.58*	1.62	2.12	1.74	1.73*	1.77	2.13	1.83	1.73*	1.78	1.93	1.86
Avg Social Capital (0-6)	2.92*	1.82	3.18	1.81	3.14*	1.77	3.52	1.65	3.25	1.80	3.41	1.71	3.28	1.75	3.31	1.73
Avg Neigh'd Disadvantage (37-410)	195.7*	64.22	216.5	64.12	189.3*	59.32	200.2	61.24	179.4*	59.93	190.35	61.92	167.7*	58.61	175.6	62.14
% Negative Peer Influence	(312)	44%	(149)	66%	(383)	51%	(236)	62%	(360)	48%	(242)	54%	(363)	48%	(256)	51%
% Foreign Born (0-74)	10.83*	7.45	11.88	4.43	15.34*	9.01	15.59	6.94	20.19*	10.38	20.81	9.97	23.48	12.17	23.94	12.12
% Residential Instability (7-68)	29.63	8.09	29.45	6.00	28.21	7.25	27.67	6.45	26.64*	8.04	26.52	7.43	25.02	8.55	25.20	8.20
% Children Aged 5 to 17 (0-36)	21.18*	5.39	23.14	4.43	20.94*	4.50	21.93	4.35	21.30*	5.00	22.28	4.87	21.53*	5.22	22.03	5.33
% College Educated (1-70)	10.66*	7.97	7.54	4.50	12.36*	8.47	11.12	7.52	13.77*	11.06	12.24	10.58	14.23	11.40	13.50	11.92
% < High School Educated (1-68)	20.58*	10.11	23.89	7.10	18.65*	8.53	19.90	6.76	18.21*	8.52	20.14	7.70	18.10*	9.10	19.50	8.78

Notes: *Indicates significant mean differences using a one sample t-test between Ever in DHA and Majority in DHA samples at the *p*< .05 level. Compared to children who ever lived in DHA during preschool, children who lived the majority of time in DHA during preschool, lived in neighborhoods with significantly higher levels of social disorder, social capital, neighborhood disadvantage, proportion of foreign born, proportion of children aged 5 to 17, and proportion of people with less than high school educations, and significantly lower proportions of people with college educations. Compared to children who ever lived in DHA during elementary school, children who lived the majority of time in DHA during elementary school, lived in neighborhoods with significantly higher levels of social disorder, social capital, neighborhood disadvantage, proportion of foreign born, proportion of children aged 5 to 17, and proportion of people with less than high school educations, and significantly lower proportions of people with college educations. Compared to children who ever lived in DHA during middle school, children who lived the majority of time in DHA during middle school, lived in neighborhoods with significantly higher levels of social disorder, neighborhood disadvantage, proportion of foreign born, proportion of children aged 5 to 17, and proportion of people with less than high school educations, and significantly lower levels of residential instability and proportions of people with college educations. Compared to children who ever lived in DHA during high school, children who lived the majority of time in DHA during high school lived in neighborhoods with significantly higher levels of social disorder, neighborhood disadvantage, proportion of children aged 5 to 17, and proportion of people with less than high school educations.

Table 5.2 Descriptive Statistics of Average Neighborhood Characteristics Across Childhood by DHA Residence Status

Variable	Ever in DHA (N=752)		Majority DHA (N=351)	
	M or (N)	SD or %	M or (N)	SD or %
Avg Social Disorder (0-24)	6.27[*]	5.46	7.45	6.05
Avg Social Capital (0-6)	3.10	1.47	3.13	1.56
Avg Neighborhood Disadvantage (62-354)	184.17	48.99	187.08	51.92
% Negative Peer Influence				
None	(231)	30.7%	(97)	27.6%
Some	(345)	45.9%	(153)	43.6%
All	(176)	23.4%	(101)	28.8%
% Foreign Born (2-68)	16.99[*]	8.03	18.18	7.44
% Residential Instability (13-45)	27.49[*]	5.87	26.66	6.07
% Children Aged 5 to 17 (6-34)	21.19[*]	3.93	21.82	4.12
% College Educated (0-52)	12.67[*]	7.59	11.80	7.92
% < High School Educated (1-46)	18.93[*]	7.25	20.26	6.53

Notes: [*] Indicates significant mean differences using a one sample t-test between Ever in DHA and Majority in DHA samples at the *p< .05* level.

To get a better sense of what this neighborhood disadvantage score actually means, it is helpful to compare it to the larger Denver metropolitan area. I calculated the disadvantage index for the Denver metropolitan area for each year between 1979 and 2007. On average, the neighborhood disadvantage index for Denver was 74.67. Although the children in the *Denver Child Study* lived in approximately two-thirds of Denver's neighborhoods, we can see that they tended to live

neighborhoods that were significantly more disadvantaged than the typical neighborhood in the Denver metropolitan area.

Figure 5.3 Developmental Stage Comparisons of Neighborhood Disadvantage
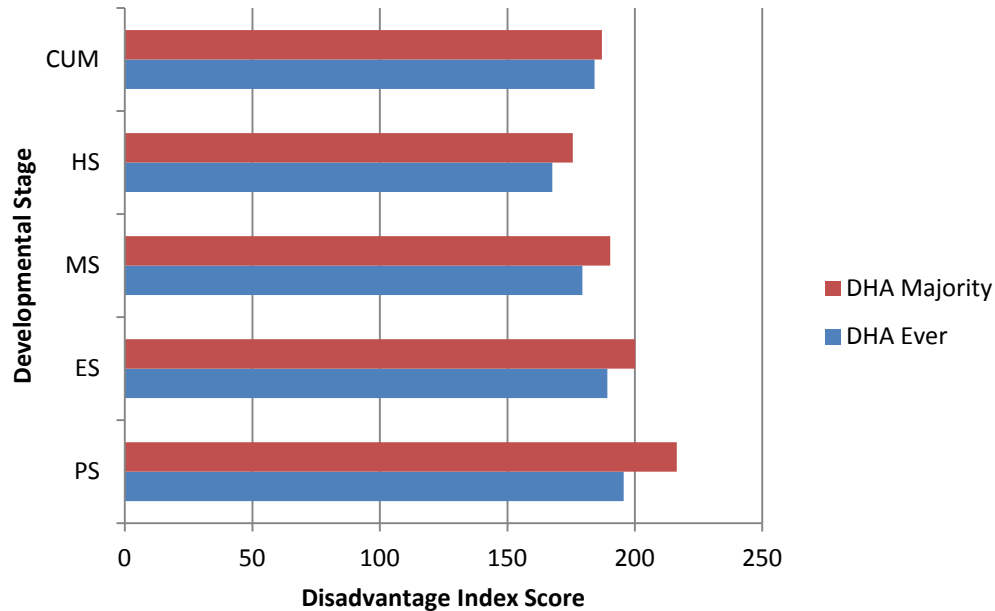
Figure 5.3. Depicts comparisons of average neighborhood disadvantage index scores by developmental stage. Data source: *Denver Child Study* linked database.

Changing neighborhood social features across developmental stages. Primary caregiver reports of three social aspects of neighborhood were included in my statistical models: (1) negative peer influence; (2) social capital; and (3) social disorder. The changing nature and cumulative conceptualization of these measures are reported below.

Negative peer influence. Across the different developmental stage neighborhoods, between 45% and 51% of primary caregivers of children ever in DHA reported negative peer influence. This varied from 45% reporting the presence of negative peers in preschool neighborhoods to 51% in elementary school neighborhoods. For children in the Majority in DHA sample, between 52% and 66% of primary caregivers noted negative peer influence in the neighborhoods in which their children resided across childhood. For children who spent the

majority of childhood living in DHA, there was a gradual decline in the presence of negative peer influence in their residential neighborhoods: whereas 66% of caregivers indicated that there were negative peer influences in their children's preschool neighborhoods as compared to 52% of caregivers reporting the same in their high school neighborhoods. Cumulatively speaking, 69% of children in the Ever in DHA sample and 72.4% of children in the Majority in DHA subsample lived in neighborhoods across their lifetime where their primary caregivers reported there being negative peer influences some or all of the time. The differences between the Ever in DHA and Majority in DHA samples were not significant.

Figure 5.4 *Developmental Stage Comparisons of Percentage of Children who lived in Neighborhoods where Primary Caregivers reported Negative Peer Influence.*
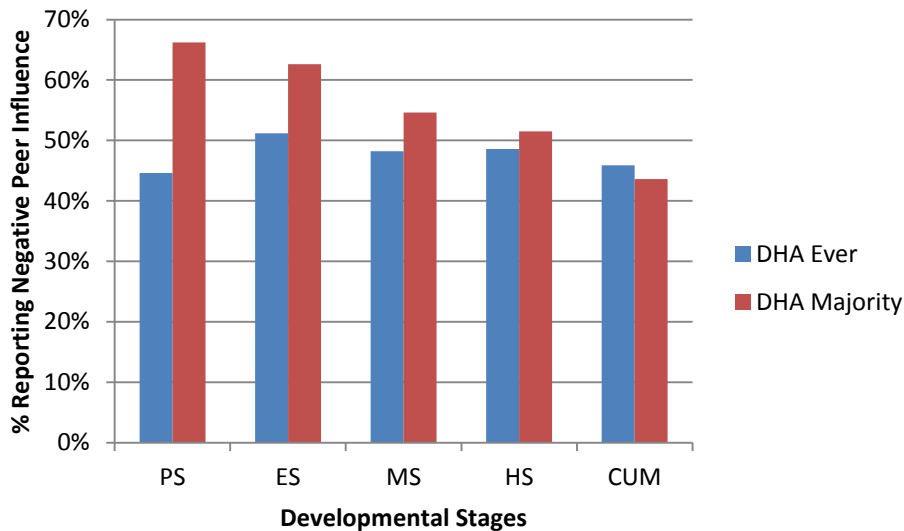
Figure 5.4. Describes the varying percentages of children who lived in neighborhoods with negative peer influence between developmental stages. Compares these transitions between Ever in DHA and Majority in DHA sub-sample. Data source: *Denver Child Study* linked database.

Social capital. Across all developmental stages and for both samples, average social capital scores hovered just above or below 3 on a scale of 0 to 6. The only significant differences between the Ever in DHA and Majority in DHA samples occurred during preschool (M=2.92, 3.18) and elementary school (M=3.14, 3.52). Similarly, there were no significant differences

between the two samples relative to cumulative measures of social capital. See Figure 5.5 for reference.

Figure 5.5 Developmental Stage Comparisons Social Capital
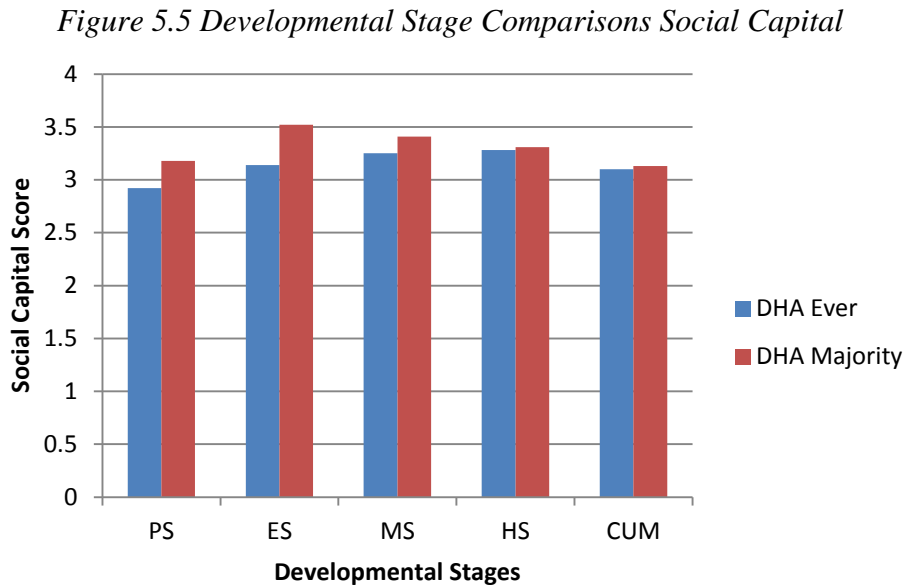
Figure 5.5. Describes the varying levels of primary caregiver reported social capital between developmental stages of neighborhood exposure for Ever in DHA and Majority in DHA samples. Note: Social Capital Index ranges from 0 to 6 with higher scores indicating greater social capital. Data source: *Denver Child Study* linked database.

Social Disorder. Across all developmental stages and for both Ever in DHA and Majority in DHA samples, average social disorder scores were ranged from 1.36 to 2.13 on a possible scale of 0 to 5. One sample *t*-tests indicated that for all of the developmental stages and cumulatively, children who lived in DHA during the majority of childhood resided in neighborhoods with significantly higher levels of social disorder, though this disparity lessened by high school. Across developmental stages, children who lived the majority of childhood in DHA resided in neighborhoods with mean levels of social disorder between 0.2 and 0.7 points higher than children who ever lived in DHA for briefer periods of time. For the Ever in DHA sample, there were gradually increasing average levels of social disorder across developmental stages. This was not true for the Majority in DHA sample, however. Figure 5.6 describes the

varying levels of social disorder across developmental stages for Majority in DHA and Ever in DHA samples.

Figure 5.6 Developmental Stage Comparisons Social Disorder
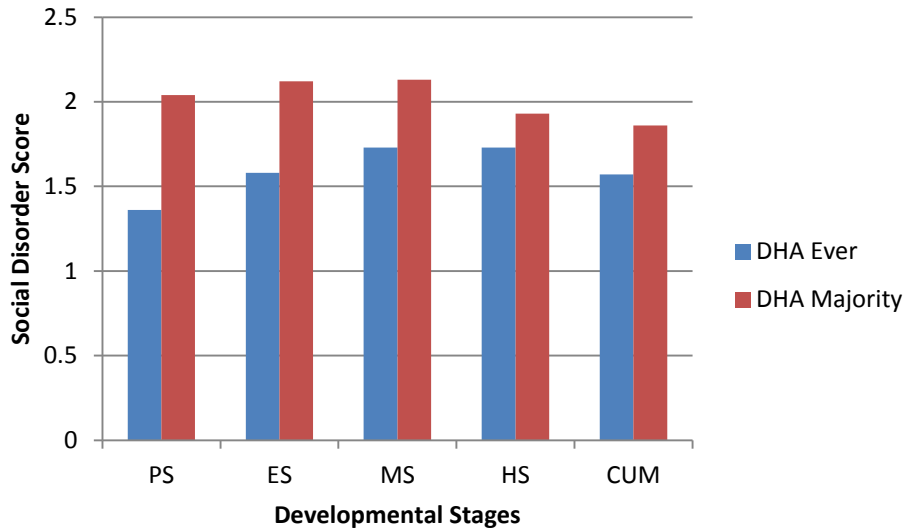
Figure 5.6. Describes the varying levels of primary caregiver reported social disorder between developmental stages of neighborhood exposure for Ever in DHA and Majority in DHA samples. Note: Social Disorder ranges from 0 to 5 with higher scores indicating greater social disorder. Data source: *Denver Child Study* linked database.

Summary of Neighborhood Conditions by Developmental Stage

There were a number of key patterns of neighborhood change. First, on average children lived in neighborhoods that were increasingly populated with foreign born persons. Second, average residential instability decreased over the course of the four developmental stages. Third, there were gradual improvements in the educational attainment of the neighborhoods in which these youth resided over the course of their development. There was an increasing share of college educated persons in the neighborhood and a small but decreasing share of less than high school educated persons in the neighborhood. Consistent with the comparisons between Ever in DHA and Majority in DHA samples within and across developmental stages, the cumulative averages of neighborhood Census indicators and survey reports suggest that the children in the

Majority in DHA sample lived in slightly more disadvantaged neighborhoods than those in the Ever in DHA sample.

In summary, the average Census indicators, separately and in index form, showed gradual improvements in neighborhood quality for both Ever in DHA and Majority samples. While the differences were small between the Ever in DHA and Majority in DHA samples, the Ever in DHA children tended to live in slightly better neighborhoods on average across their childhoods. Compared to the Majority in DHA subsample, the Ever in DHA sample resided in neighborhoods which exhibited significantly lower levels of social disorder, higher levels of social capital, and lower levels neighborhood disadvantage scores across most developmental stages. On average, the Ever in DHA sample also resided in neighborhoods having significantly smaller fractions of foreign born, children aged 5 to 17, and higher fractions of college educated across most developmental stages. Generally, the samples did not vary by average level of residential instability. Although the level of social capital was significantly lower in the Ever in DHA sample, this was only true in preschool and elementary school. Of all the measures of neighborhood conditions, social capital was the only one that indicated the Majority in DHA sample had a relative advantage. This suggests that children who lived in DHA for longer periods of time during each developmental stage (and cumulatively) resided in slightly more disadvantaged neighborhoods.

The previous sections provide an overview of the types of neighborhoods that the children in my study resided in across their lifetimes and the differences in neighborhood contexts between the Ever in DHA and Majority in DHA samples. There were a number of key changing patterns in neighborhood conditions which will help to make sense of the bivariate and multivariate results presented below.

Research Question 1: What Neighborhood Factors are Associated with Teenage

Childbearing and Fathering?

To address the first research question, I conducted a series of contingency table analyses and independent sample *t*-tests to examine the relationship between youth, family, and neighborhood characteristics and teenage childbearing and fathering. In order to provide an initial big picture, I first present bivariate statistics for the cumulative sample (N=752) where all potentially changeable aspects of neighborhood are expressed in lifetime averages.

Youth characteristics. A number of youth and caregiver characteristics varied significantly by teenage childbearing/fathering (see Table 5.3). A chi-square goodness of fit test demonstrated those who bore or fathered a child in their teen years were more likely to be females, χ^2 (1, N = 752) = 39.94, *p* = < 0.01. Approximately 28% of females were teen parents compared to 10% of males. An independent sample *t*-test indicated that child's age at time of survey was significantly associated with teenage childbearing/fathering. On average, youth who had a child in their teen years (M=23.6, SD=4.45) were older at the time of survey than were youth who did not have a child in their teen years (M=20.2, SD=4.5). This illustrates the importance of controlling for exposure to the possibility of teen childbearing in the multivariate statistical models. For example, youth who were 19 at time of survey had 5 years of exposure to bear/father a child between the ages of 15 and 19 whereas youth who were only 15 at time of survey had only 1 year of exposure. By including age at time of survey dummies, I was able to control for the potential window of exposure during which one might become a teen parent.

Caregiver characteristics. Youth who bore or fathered a child in their teen years were more likely to have a mother who also had borne a child during her teen years, χ^2 (1, N = 752) = 4.78, *p* = 0.03. Primary caregiver education also was associated with teenage

childbearing/fathering χ^2 (4, N = 752) = 14.75, p = 0.01. Slightly more than a quarter of the youth (26%) whose primary caregivers had less than a high school diploma had higher observed counts of teenage childbearing and fathering. This was not true for other caregiver educational attainment levels.

Cumulative neighborhood characteristics by teenage childbearing/fathering. More germane to the first research question and the overall study purpose, I conducted a series of chi-square and independent sample t-tests that tested the associations between neighborhood characteristics (both caregiver reports and U.S. Census indicators) and teenage childbearing and fathering. An independent sample t-test revealed that youth who had borne or fathered a child in their teen years lived in neighborhoods with lower average percentages of foreign born in the neighborhood (M=14.2, SD=7.19) than those who did not bear or father children in their teen years (M=17.7, SD=8.09), $t(750)$ = 4.65, $p < .01$. No other significant associations were found between cumulative neighborhood characteristics and the teenage childbearing/fathering.

Table 5.3 Variations in Youth, Caregiver, and Neighborhood Characteristics by Dependent Variable (Teenage Childbearing/Fathering), Cumulative Sample (N=752)

| | Teenage Childbearing/Fathering | |
	No	Yes
Age [a]	20.19 ± 4.50	23.60 ± 4.45
Majority in DHA	299 (85)	52 (15%)
Gender [b]		
Male	330 (90%)	36 (10%)
Female	278 (72%)	108 (28%)
Race		
Black	286 (82%)	61 (18%)
Latino	322 (80%)	83 (20%)
School Honors		
Yes	346 (82%)	72 (18%)
No	262 (78%)	72 (22%)

| | Teenage Childbearing/Fathering | |
	No	Yes
School Involvement		
Yes	132 (86%)	22 (14%)
No	476 (80%)	122 (20%)
Religious Participation		
None	147 (80%)	38 (20%)
Some	258 (82%)	55 (18%)
All	203 (80%)	51 (20%)
Pubertal Timing		
Early	75 (80%)	19 (20%)
On Time/Late	533 (81%)	125 (19%)
Sibling Teen Parent		
Yes	82 (85%)	15 (15%)
No	526 (80%)	129 (20%)
Household Stressors	2.46 ± 1.25	2.36 ± 1.18
Parenting Efficacy	16.72 ± 3.53	16.55 ± 3.16
Mother Teen Birth [b]		
Yes	160 (83%)	51 (17%)
No	448 (76%)	93 (24%)
Primary Caregiver Education [b]		
< High School	186 (74%)	66 (26%)
GED	95 (83%)	20 (17%)
HS Diploma	166 (87%)	26 (13%)
Tech/Certificate	92 (87%)	14 (13%)
College	69 (79%)	18 (21%)
Primary Caregiver Depression		
No Depression	471 (82%)	103 (18%)
Borderline	94 (78%)	26 (22%)
Clinical	43 (74%)	15 (26%)
Proportion of Time with 2 Parents in the Home	0.37 ± 0.35	0.41 ± 0.35
Parent Foreign Born		
Yes	532 (80%)	130 (20%)
No	76 (84%)	14 (16%)
Primary Caregiver Income	8785 ± 8089	7479 ± 7116

	Teenage Childbearing/Fathering	
	No	**Yes**
Negative Peer Influence		
None	177 (77%)	54 (23%)
Some	287 (83%)	58 (17%)
All	144 (82%)	32 (18%)
Social Capital	3.10 ± 1.48	3.13 ± 1.45
Social Disorder	6.33 ± 5.42	6.01 ± 5.65
Neigh'd Disadvantage Typology[a]		
Disadvantaged	370 (80%)	91 (20%)
Average	187 (82%)	40 (18%)
Advantaged	43 (81%)	10 (19%)
Neighborhood Disadvantage	183 ± 49	187 ± 48
< HS Educated	18.75 ± 7.13	19.68 ± 7.69
College Educated	12.84 ± 7.75	11.96 ± 6.84
Children 5 to 17	21.20 ± 3.87	21.14 ± 4.16
Residential Instability	27.31 ± 5.93	28.25 ± 5.55
Foreign Born [a]	17.65 ± 8.09	14.23 ± 7.19

[a] Differences in means test significant at the $p < .05$ level

[b] Differences across groups (χ^2 tests) significant at the $p < .05$ level

In summary, we see that teenage childbearing and fathering is related to child's age, primary caregiver's education, and whether the child's mother was a teen parent. The fraction of foreign born in the neighborhood was related to teenage childbearing and fathering. No other cumulative neighborhood measures were related to the outcome. In order to begin to understand how these associations may have varied when examined in more restricted time periods (developmental stages), I present the bivariate results that answer my second research question below.

Research Question 2: Do these Associations Vary when Measured During Pre-School, Elementary School, Middle School, or High School Developmental Stages?

Across childhood, the fraction of foreign born in the neighborhood was the only neighborhood characteristic that was significantly associated with teenage childbearing and

fathering. However, several significant associations emerged in the developmental stage-specific tests. There may be more significant associations within each developmental stage because the neighborhood averages were less diluted than the cumulative averages. For example, if a child lived in disadvantaged neighborhoods during preschool and elementary school but then moved to a more advantaged neighborhood during middle school and high school, the associations between neighborhood conditions and teenage childbearing may be vastly different than comparing preschool to the overall cumulative average.

During preschool, only percentage of college educated in the neighborhood was associated with teenage childbearing and fathering: teen parents tended to live in neighborhoods during preschool with lower average percentages of college educated persons (M=9.36, SD=6.61) than those who did not bear or father children in their teen years (M=10.98, SD=8.24), $t(648) = 2.07, p = 04$. Refer to Table 5.4.

Residential instability in elementary school neighborhoods was significantly associated with teenage childbearing/fathering $t(746) = -2.32, p < .01$, such that youth who had borne or fathered a child in their teen years lived in neighborhoods during elementary school with higher average percentage of individuals who had moved out of the neighborhood in the previous year (M=29.50, SD=7.23) than teens who did not (M=27.89, SD=7.22)

In elementary, middle, and high school, the fraction of foreign born in the neighborhood was significantly associated with teenage childbearing and fathering. On average within these developmental stages, teen parents lived in neighborhoods with lower fractions of foreign born. Youth who bore or fathered children in their teen years resided in neighborhoods during elementary school with lower average percentages of foreign born (M=13.10, SD=8.67) than those who did not (M=15.88, SD=9.02), $t(746) = 3.25, p < .01$. For middle school neighborhood

exposure, youth who had borne or fathered a child in their teen years lived in neighborhoods with lower average percentages of foreign born (M=16.68, SD=8.58) than those who did not (M=21.01, SD=10.59), $t(699) = 4.37$, $p < .01$. Similarly, teen parents lived in neighborhoods during high school with lower average percentages of foreign born (M=19.55, SD=9.74) than teens who were not teen parents (M=24.39, SD=12.50), $t(724) = 4.24$, $p < .01$. Refer to table 5.4.

Table 5.4 Variations in Youth, Caregiver, and Neighborhood Characteristics by Dependent Variable (Teenage Childbearing/Fathering)

	Preschool (N=662)		Elementary School (N=694)		Middle School (N=691)		High School (N=747)	
	No	Yes	No	Yes	No	Yes	No	Yes
Negative Peer Influence								
Yes	256 (82%)	56 (18%)	319 (83%)	64 (17%)	300 (83%)	60 (17%)	302 (83%)	61 (17%)
No	276 (79%)	74 (21%)	244 (79%)	67 (21%)	263 (80%)	68 (20%)	301 (78%)	83 (22%)
Social Capital	2.93 ± 1.84	2.88 ± 1.76	3.14 ± 1.79	3.14 ± 1.70	3.21 ± 1.80	3.39 ± 1.79	3.30 ± 1.76	3.19 ± 1.71
Social Disorder	1.37 ± 1.54	1.33 ± 1.55	1.60 ± 1.64	1.47 ± 1.52	1.74 ± 1.78	1.68 ± 1.74	1.75 ± 1.78	1.63 ± 1.78
Neighborhood Disadvantage	194.97 ± 62.90	198.41 ± 69.50	187.42 ± 58.64	196.91 ± 61.66	178.49 ± 60.07	183.25 ± 59.38	168.25 ± 58.77	165.17 ± 58.07
<HS Educated	19.78 ± 23.80	23.80 ± 11.24*	18.45 ± 8.46	19.45 ± 8.82	18.34 ± 8.66	17.62 ± 7.88	18.34 ± 9.35	17.10 ± 7.91
College Educated	10.98 ± 8.25	9.36 ± 6.61*	12.48 ± 8.66	11.85 ± 7.61	13.88 ± 11.33	13.29 ± 9.85	14.25 ± 11.48	14.16 ± 11.11
Children 5 to 17	20.99 ± 5.18	21.96 ± 6.15	20.97 ± 4.42	20.80 ± 4.85	21.43 ± 4.98	20.74 ± 5.01	21.67 ± 5.30	20.93 ± 4.84
Residential Instability	29.57 ± 7.90	29.84 ± 8.84	27.89 ± 7.23	29.50 ± 7.23*	26.49 ± 8.15	27.28 ± 7.54	25.01 ± 8.73	25.03 ± 7.74
Foreign Born	10.92 ± 7.09	10.47 ± 8.81	15.88 ± 9.02	13.10 ± 8.67*	21.01 ± 10.59	16.68 ± 8.58*	24.39 ± 12.50	19.55 ± 9.74*

Notes: [*] Differences in means test significant at the $p < .05$ level

Bivariate statistics summary. Across the various developmental stage neighborhoods, there were very few characteristics that were significantly associated with teenage childbearing and fathering. Teen childbearing and fathering was associated with the level of educational attainment in preschool neighborhoods and residential instability during elementary school neighborhoods. None of the survey measures of neighborhood characteristics were associated with teenage childbearing and fathering. Although not a significant predictor in the preschool

neighborhood context, the average percentage of foreign born in the neighborhood during elementary, middle, and high school as well as across childhood was significantly associated with teenage childbearing and fathering.

Multivariate Analyses

The merits of both clustered robust and random effects logit models have been discussed in Chapter 4, so I will only briefly describe them here. Green and Vavreck (2007) note that the use of robust clustered standard errors may be a step toward decreasing the downward bias of logistic regression; however, their work suggests that random effects regression (multilevel modeling) may have greater efficiency and more reliable standard errors. Using STATA 12 software, I compared the robustness of the results of (1) an unadjusted logit model; (2) a logit model using clustered robust standard errors; and (3) a random effects (multilevel) model. The results were remarkably consistent across all three statistical models (see Table B.1 for an example). Because these data are hierarchal (children nested within families), I chose to present the random effects multilevel results. A random effects logit model observes differences in covariances between and among families and thus does not introduce bias in the standard errors.

There are a number of statistical tests that reflect the appropriateness of multilevel modeling for a given data structure. First, the intraclass correlation measures the proportion of variance in the outcome (teenage childbearing/fathering) that is between groups (families) (Raudenbush & Bryk, 2002). Second, the likelihood ratio test compares the multilevel model to the model without random effects. If the test is significant then it is reasonable to conclude that there is significant variation between families (Raudenbush & Bryk, 2002).The likelihood ratio test statistics were significant at the $p < .05$ level in all but the Preschool 'Majority in DHA' model. Both the intraclass correlation statistic and the likelihood ratio test result suggest that

there was clustering at the family level. The intraclass correlations in my models ranged from .42 to .55 for all of the models except the Preschool 'Majority in DHA' model. Given that the intraclass correlation coefficient values and likelihood ratio tests are significant across nearly all models, multilevel modeling was indeed the best choice for these data. For the Preschool 'Majority in DHA' model as well as the models stratified by ethnicity and gender, I present clustered robust logit models. It is likely that the multilevel models were unable to converge due to inadequate sample size in these stratifications.

Core Statistical Model

The core statistical model included individual and caregiver controls along with key neighborhood predictors. These models were estimated using average neighborhood conditions during preschool, elementary school, middle school, high school developmental stages as well as across childhood to ascertain if neighborhood effects were contemporaneous, lagged, or cumulative. Core models were specified for children who ever lived in DHA as well as for children who lived in DHA for the majority of each developmental stage. These comparisons of Ever in DHA and Majority in DHA were crucial in determining if geographic selection bias was affecting the results. Only effects that were robust across both samples are reported here, but logit odds ratios and standard errors for the full models are presented for the Ever in DHA sample in Table 5.5 and the Majority in DHA sample in Table 5.6.

Research Question 3: Are Neighborhood Effects Contemporaneous, Lagged, or Cumulative?

Percentage of foreign born in the neighborhood. After controlling for a wide range of individual and caregiver characteristics, I found that the presence of higher fractions of foreign born in the neighborhood during all developmental stages and across childhood was a significant

protective factor for teenage childbearing and fathering. Looking at each developmental stage separately, each percentage point increase in foreign born persons in the neighborhood during a given developmental stage was associated with an 8 or 9% decrease in the odds of a teen bearing or fathering a child. Cumulatively speaking, the protective nature of foreign born in the neighborhood was magnified. Modeling cumulative exposure to neighborhood as lifetime averages produced similar results as the previous developmental stage models. For the cumulative model, each percentage point increase in foreign born persons in the neighborhood across a child's lifetime was associated with a 13% decrease in the odds of a teen bearing or fathering a child. These effects were comparable between Ever in DHA and Majority in DHA samples; however, the odds ratios were larger for the Majority in DHA sample when examining the lagged effects of foreign born in preschool and elementary school neighborhoods.

Aside from the consistent protective nature of fraction of foreign born in the neighborhood, there were very few additional significant neighborhood predictors. During preschool, every percentage point increase in less than high school educated in the neighborhood was associated with a 7% increase in the odds of teenage childbearing and fathering. In the elementary school developmental stage model, each percentage point increase in people moving out of the neighborhood during the previous year was associated with a 6% increase in the odds of bearing or fathering a child.

Table 5.5 Developmental Stage Comparisons of Random Effects Model Predicting Teenage Childbearing and Fathering for Ever in DHA Samples

			Lagged				Contemporaneous		Cumulative	
	Pre-School (N=640)		Elementary School (N=690)		Middle School (N=680)		High School (N=713)		Across Childhood (N=751)	
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
Age 16 dummy	--	--	0.05[**]	0.06	0.03[**]	0.04	0.04[**]	0.04	0.04[**]	0.04
Age 17 dummy	0.18[*]	0.13	0.26[*]	0.18	0.23[*]	0.15	0.23[*]	0.14	0.28[*]	0.18
Age 18 dummy	0.18[*]	0.13	0.19[*]	0.14	0.17[**]	0.12	0.19[*]	0.13	0.19[*]	0.14
Age 19 dummy	1.90	0.90	2.08	0.99	1.76	0.81	1.12	0.51	2.24	1.04
Black x Female	5.54[**]	3.28	4.61[**]	2.48	4.69[**]	2.45	6.83[**]	3.63	4.44[**]	2.47
Black x Male	0.85	0.54	0.54	0.33	0.65	0.38	1.19	0.67	0.64	0.4
Latino x Female	7.10[**]	3.58	6.04[**]	2.81	5.94[**]	2.72	6.53[**]	2.89	7.3[**]	3.38
School Honors[a]	--	--	1.22	0.41	1.05	0.35	0.85	0.3	0.88	0.29
School Involvement[b]	--	--	0.89	0.35	0.91	0.31	0.71	0.23	0.66	0.3
Religious Participation[c]										
Some	--	--	0.72	0.39	0.5	0.24	0.36[*]	0.18	0.72	0.33
All	--	--	1.77	0.74	1.06	0.43	0.56	0.22	0.96	0.48
Pubertal Timing[d]	--	--	0.92	0.45	1.1	0.53	0.68	0.32	0.72	0.36
Sibling Teen Parent[e]	0.28[*]	0.16	0.24[**]	0.13	0.29[*]	0.15	0.29[*]	0.15	0.24[**]	0.13
Household Stressors	0.95	0.14	0.97	0.13	1.15	0.14	0.99	0.11	1.06	0.17
Parenting Efficacy	0.98	0.06	0.99	0.05	1.02	0.05	1.03	0.05	1.01	0.06
Mother Teen Birth[f]	1.31	0.5	1.49	0.52	1.51	0.53	1.42	0.46	1.45	0.51
Primary Caregiver Education[g]										
GED	0.48	0.29	0.43	0.24	0.55	0.3	0.43	0.24	0.46	0.27
HS Diploma	0.42	0.22	0.31[*]	0.16	0.52	0.25	0.41	0.19	0.47	0.24
Tech/Certificate	0.5	0.31	0.37	0.22	0.43	0.26	0.37	0.21	0.45	0.28
College	1.47	0.96	1.12	0.71	0.94	0.59	0.91	0.55	1.18	0.78
Primary Caregiver Depression[h]										
Borderline	1.06	0.58	1.26	0.65	1.23	0.62	1.0	0.49	1.17	0.61
Clinical	2.5	1.86	4.03[*]	2.69	3.75[*]	2.44	2.7	1.77	4.46[**]	3.04
Proportion of Time with 2 Parents in the Home	0.84	0.34	1.66	0.68	1.02	0.38	1.28	0.49	1.37	0.7

	Pre-School (N=640)		Elementary School (N=690)		Middle School (N=680)		High School (N=713)		Across Childhood (N=751)	
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
Parent Foreign Born Primary Caregiver	0.99	0.7	1.32	0.85	1.34	0.81	2.67	1.66	1.34	0.87
Income	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0
Negative Peer Influence[i]	0.99	0.01	0.99	0.01	0.99	0.01	0.63	0.25	0.98	0.28
Social Capital	1.08	0.11	1.1	0.12	1.17	0.12	1.01	0.1	1.12	0.14
Social Disorder Neighborhood	1.16	0.15	0.99	0.12	1.09	0.12	1.15	0.14	1.02	0.04
Disadvantage	1.0	0	1.0	0	1.0	0	0.99	0.01	1.0	0.01
<High School Educated	1.07*	0.03	1.06	0.04	1.03	0.04	1.07	0.05	1.07	0.04
College Educated	0.97	0.04	1.01	0.03	0.97	0.02	0.97	0.02	0.97	0.04
Children Aged 5 to 17	0.95	0.05	0.92	0.06	0.93	0.05	0.95	0.05	0.87	0.07
Residential Instability	1.05	0.03	1.06*	0.03	1.04	0.03	1.01	0.03	1.06	0.04
Foreign Born	0.92*	0.03	0.91**	0.03	0.92**	0.03	0.92**	0.02	0.87**	0.03
_cons	0.11	0.22	0.04	0.08	0.26	0.51	0.85	1.69	0.48	1.27

Notes: [*]Indicates significance at the $p < .05$ level, [**]Indicates significance at the $p < .01$ level; [a]Reference category is never on honor roll in MS; [b]Reference category is never involved in sports or clubs in HS; [c]Reference category is never attended religious meetings in MS; [d]Reference category is did not have an older sibling who was a teen parent; [e]Reference category is on time/late; [f]Reference category is mother was not a teen parent; [g]Reference category is less than HS; [h]Reference category is no depression; [i]Reference category is U.S. Born; [j]Reference category is no negative peer influence.

Table 5.6 Developmental Stage Comparisons of Random Effects Model Predicting Teenage Childbearing and Fathering for Majority in DHA Samples

	Lagged						Contemporaneous		Cumulative	
	Pre-School (222)		Elementary (373)		Middle School (429)		High School (N=429)		Across Childhood (N=351)	
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
Age 16 dummy	--	--	0.21	0.32	0.08	0.12	0.08	0.1	0.07	0.1
Age 17 dummy	0.1	0.17	0.39	0.45	0.8	0.73	0.57	0.43	0.26	0.27
Age 18 dummy	0.2	0.27	0.58	0.57	0.5	0.49	0.21	0.2	0.39	0.42
Age 19 dummy	2.57	1.48	5.01	4.36	4.59	3.74	2	1.12	3.78	2.65
Black x Female	2.84	2.45	6.86	6.57	2.4	1.92	3.44	2.25	2.39	2.11
Black x Male	0.17	0.29	1.19	1.22	0.34	0.31	1.44	1.0	1.44	1.44
Latino x Female	3.01	1.78	16.21	15.2	8.59[**]	6.88	7.05[**]	3.86	6.62[**]	4.88
School Honors[a]	--	--	0.99	0.57	1.14	0.57	0.81	0.36	0.7	0.36
School Involvement[b]	--	--	1.22	0.8	0.8	0.41	0.54	0.23	0.63	0.48
Religious Participation[c]										
Some	--	--	0.38	0.38	0.76	0.57	0.47	0.3	0.52	0.36
All	--	--	2.15	1.49	2.11	1.33	0.6	0.29	1.1	0.79
Pubertal Timing[d]	--	--	0.36	0.36	1.65	1.29	0.55	0.35	0.52	0.43
Sibling Teen Parent[e]	0.23[**]	0.12	0.19	0.19	0.1[*]	0.1	0.45	0.3	0.42	0.34
Household Stressors	1.39	0.3	1.09	0.26	1.22	0.24	1.02	0.14	1.25	0.32
Parenting Efficacy			0.97	0.1	1.03	0.08	1.04	0.06	1.06	0.09
Mother Teen Birth[f]	0.99	0.09	0.93	0.61	2.51	1.38	2.28[*]	0.97	1.17	0.69
Primary Caregiver Education[g]										
GED	0.6	0.35	0.22	0.24	0.65	0.55	0.36	0.25	0.27	0.29
HS Diploma	1.41	1.12	0.29	0.28	1.34	0.96	0.66	0.35	0.52	0.42
Tech/Certificate	0.35	0.25	0.74	0.73	0.32	0.32	0.2	0.17	0.35	0.37
College	1.26	0.97	2.61	3.07	1.46	1.55	1.09	0.82	3.52	3.68
Primary Caregiver Depression[h]										
Borderline	1.99	1.66	1.7	1.45	2.6	1.97	1.19	0.72	1.81	1.42
Clinical	0.38	0.32	4.41	5.48	2.82	2.91	2.49	1.99	9.0	10.56
Proportion of Time with 2 Parents in the Home	2.92	2.96	3.12	2.3	0.72	0.44	1.15	0.55	2.51	2.09

	Pre-School (222)		Elementary (373)		Middle School (429)		High School (N=429)		Across Childhood (N=351)	
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
Parent Foreign Born	1.66	1.07	1.17	1.22	1.34	1.15	2.25	1.62	1.07	0.94
Primary Caregiver Income	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0
Negative Peer Influence[i]	1.0	0.01	3.75	2.89	1.01	0.01	0.65	0.33	1.82	0.91
Social Capital	0.84	0.13	1.07	0.21	1.19	0.2	0.96	0.12	0.99	0.19
Social Disorder	0.97	0.11	0.77	0.18	0.93	0.16	1.02	0.16	0.93	0.07
Neighborhood Disadvantage	1.0	0.01	0.99	0.01	0.99	0.01	1.0	0.01	0.99	0.01
<High School Educated	0.98	0.05	1.12	0.09	1.03	0.07	1.03	0.06	1.08	0.08
College Educated	0.98	0.05	0.95	0.07	0.94	0.05	0.94	0.03	1.02	0.06
Children Aged 5 to 17	1.04	0.1	0.89	0.1	0.87	0.09	0.83	0.07	0.99	0.12
Residential Instability	1.08	0.06	1.18[*]	0.09	1.11	0.06	1.01	0.04	1.16	0.09
Foreign Born	0.85[*]	0.06	0.81[**]	0.06	0.89[*]	0.04	0.91[**]	0.03	0.88[*]	0.05
_cons	0.17	0.58	0.02	0.1	0.34	1.11	11.6	30.37	0	0.02

Notes: [*]Indicates significance at the $p < .05$ level, [**]Indicates significance at the $p < .01$ level, [a]Reference category is never on honor roll in MS; [b]Reference category is never involved in sports or clubs in HS; [c]Reference category is never attended religious meetings in MS; [d]Reference category is did not have an older sibling who was a teen parent; [e]Reference category is on time/late; [f]Reference category is mother was not a teen parent; [g]Reference category is less than HS; [h]Reference category is no depression; [i]Reference category is U.S. Born; [j]Reference category is no negative peer influence

Summary. The fraction of foreign born in the neighborhood is a protective factor that operates in a contemporaneous, lagged, and cumulative fashion. Although the share of persons in the neighborhood with less than a high school degree and residential stability were associated with increased odds of teenage childbearing and fathering, this was only so in the preschool and elementary school developmental stage lagged effects models, respectively. Increases in the percentage of foreign born population in preschool, elementary school and middle school

neighborhoods produced significant lagged effects decreasing the odds of teenage childbearing and fathering. The same was true for contemporaneous models of foreign born in high school neighborhoods and cumulative models of lifetime neighborhood exposure to foreign born. The effect was magnified in the cumulative model where each percentage point increase in foreign born in the neighborhood across childhood was associated with a 13% decrease in the odds of bearing or fathering a child in their teen years – a 4-5% percentage point difference compared to the lagged effects.

Neighborhood Effects and Neighborhood Thresholds by Gender and Ethnicity

Research Questions 4 through 6 are intertwined. Question 4 asks if neighborhood factors associated with teenage childbearing and fathering vary by ethnicity or gender; Question 5 asks if there are threshold effects for neighborhood disadvantage; and Question 6 asks if these thresholds operate differentially by gender and ethnicity. I chose to stratify my statistical models by ethnicity and gender for middle school and high school developmental stages only because of extant theory which suggests that neighborhood contexts during adolescent years will have the strongest effect on teenage pregnancy and childbearing through neighborhood effect mechanisms such as social contagion and collective socialization (Harding, 2003; Jencks & Mayer, 1990). This may be so because adolescence is the developmental stage where it becomes increasingly more common to look to peers and environmental contexts such as neighborhoods and schools to shape behavior (Asch, 1951; Brown, Bakken, Ameringer, & Mayhon, 2008). Because the neighborhood disadvantage index was not a significant predictor in any of the core models, I hypothesized that if there were neighborhood thresholds present, they may be most easily detected in adolescence (when neighborhood effects are thought to matter most for teenage

childbearing). Therefore, I addressed research questions 4 through 6 using the following core model stratifications.

Core model stratifications. In order to better answer the research question about how neighborhood effects may operate differentially by ethnicity and gender, I stratified the core model by ethnicity and then by gender for middle school and high school models. Due to the inadequate sample size of teenage fathers (n=37) stratifications by gender were unable to produce robust results in either multilevel or clustered robust logit models. The MS and HS developmental stage models stratified by ethnicity included the disadvantage typologies rather than the disadvantage index in order to partially answer questions 5 and 6 regarding neighborhood effect thresholds. The calculation of these typologies was described in detail in Chapter 4. By utilizing the disadvantage typologies, I was able to examine categories of neighborhood disadvantage (e.g. disadvantaged, average, and advantaged as the reference group) relative to the Denver metropolitan area.

In the lagged middle school model stratified by ethnicity, each percentage point increase in foreign born in the neighborhood was associated with a 7% decrease in the odds of teenage childbearing/fathering for Black youth only (see Table 5.7 for details). Additionally, Black youth who had lived in DHA for the majority of middle school had 60% lower odds of teenage childbearing/fathering compared to Black youth who may have only lived in DHA for one out of the three years of middle school. There were not any significant lagged middle school neighborhood effects for Latino youth.

In the contemporaneous high school model stratified by ethnicity, each percentage point increase in foreign born in the neighborhood was associated with an 8% and 7% decrease in the odds of teenage childbearing and fathering for Black and Latino youth respectively. For Latino

youth there were a number of other significant high school neighborhood predictors. Each percentage point increase in children aged 5 to 17 living in the high school neighborhood was associated with a 12% decrease in the odds of teenage childbearing/fathering. Higher levels of social disorder were associated with higher odds of teenage childbearing and fathering: each point increase in the social disorder index was associated with 34% higher odds of bearing or fathering a child as a teen. Counterintuitive to what one might expect, each percentage point increase in the number of caregivers identifying negative peer influence in the high school neighborhood was associated with a 64% decrease in the odds of teenage childbearing/fathering. These results suggest that high school neighborhood contexts may differentially impact Latino youth when compared to Black youth.

The neighborhood disadvantage typology was not a significant predictor of teenage childbearing/fathering in the lagged middle or high school developmental stage models stratified by ethnicity. As a final test of this disadvantage typology, I estimated the cumulative model with neighborhood disadvantage typologies in place of the disadvantage index, and it still did not predict the outcome (see Table B.2). Two other approaches were used to detect potential nonlinearities. First, a quadratic term for neighborhood disadvantage was entered in the middle and high school developmental stage models. The coefficients of the linear and squared terms were tested for potential nonlinear effects. The quadratic term was not a significant predictor in any of the middle school or high school specifications. Although Browning et al. (2008) found evidence of nonlinear effects for foreign born concentration on adolescent sexual risk behavior using this approach, this method did not produce significant results for my sample. Finally, I employed a spline specification in the random effects and clustered robust logit models to test for potential nonlinearities in the disadvantage index. Again this method did not produce any

significant results for the neighborhood context variables. Further information about these

analyses are available upon request.

Table 5.7 Middle School and High School Clustered Robust Logit Model Predicting Teenage Childbearing and Fathering Stratified by Ethnicity

	Middle School				High School			
	Black (n=304)		Latino (n=334)		Black (n=306)		Latino (n=337)	
	OR	SE	OR	SE	OR	SE	OR	SE
Age 17 dummy	0.17[*]	0.16	0.32	0.25	0.12[*]	0.11	0.52	0.38
Age 18 dummy	0.33[*]	0.31	0.16[*]	0.14	0.35	0.34	0.12	0.15
Age 19 dummy	1.68	0.99	1.6	0.75	0.72	0.46	1.65	0.77
DHA Majority of HS	0.40[*]	0.18	0.71	0.26	0.69	0.28	1.1	0.47
Female dummy	4.99[**]	2.2	3.86[**]	1.44	4.71[**]	2.32	4.92[**]	1.92
School Honors	0.67	0.28	1.22	0.41	1.01	0.41	1.22	0.51
School Involvement	1.64	0.69	0.53	0.18	0.7	0.3	0.56	0.19
Religious Participation								
Some	0.53	0.29	0.52	0.3	0.5	0.28	0.55	0.33
All	0.9	0.43	1.74	0.76	0.81	0.36	0.65	0.32
Pubertal Timing	1.53	0.77	0.43	0.33	0.95	0.41	0.6	0.47
Sibling Teen Parent	0.46	0.27	0.42	0.21	0.33	0.2	0.48	0.26
Household Stressors	1.04	0.13	1.1	0.15	1.16	0.14	0.91	0.14
Parenting Efficacy	0.99	0.07	1.03	0.05	1.04	0.07	1.03	0.06
Mother Teen Birth	1.02	0.45	2.18	0.77	0.79	0.31	3.3[*]	1.18
Primary Caregiver Education								
GED	1.7	1.05	0.46	0.24	0.67	0.41	0.26[*]	0.14
HS Diploma	0.53	0.32	0.98	0.46	0.2[*]	0.13	0.61	0.27
Tech/Certificate	0.97	0.67	0.41	0.24	0.25	0.19	0.43	0.23
College	1.29	0.93	0.99	0.86	0.48	0.29	0.98	0.81
Primary Caregiver Depression								
Borderline	1.78	1.06	0.93	0.49	1.44	0.79	0.54	0.36
Clinical	2.81	1.87	3.93*	2.53	1.38	1.01	4.19	3.18

	Black (n=304)		Latino (n=334)		Black (n=306)		Latino (n=337)	
	SE	OR	SE	OR	SE	OR	SE	SE
Proportion of Time with 2 Parents in the Home	1.14	0.64	0.85	0.32	0.77	0.4	1.41	0.67
Parent Foreign Born	1.67	2.46	1.22	0.6	4.2	5.26	1.36	0.89
Primary Caregiver Income	1.0	0.0	1.0	0.0	1.0	0.0	10.	0.0
Negative Peer Influence	0.99	0.01	1.0	0.01	0.62	0.28	0.36[*]	0.18
Social Capital	1.21	0.14	1.03	0.11	0.93	0.12	1.04	0.12
Social Disorder	0.99	0.14	1.17	0.15	0.99	0.14	1.34[*]	0.2
Neighborhood Disadvantage Typology								
Disadvantaged	0.48	0.37	1.44	1.07	0.58	0.45	0.51	0.44
Average	1.07	0.87	1.04	0.69	1.01	0.69	0.9	0.62
< HS Educated	1.07	0.05	0.97	0.04	1.06	0.04	1.08	0.06
College Educated	0.97	0.03	0.99	0.03	0.99	0.02	0.98	0.03
Children Aged 5 to 17	0.92	0.06	0.97	0.06	0.98	0.05	0.88[*]	0.06
Residential Instability	1.01	0.03	1.04	0.03	0.97	0.03	1.02	0.03
Foreign Born	0.93[**]	0.03	0.97	0.02	0.92[**]	0.03	0.93[**]	0.02
_cons	0.73	1.78	0.14	0.29	0.83	1.88	1.42	3.13
Pseudo R-square	0.27		0.21		0.24		0.26	
Wald	87.42		67.8		77.03		81.16	
χ^2	0.00		0.00		0.00		0.00	
Log Pseudolikelihood	-104.9		-134.5		-110.1		-128.1	
N of Clusters	165		191		170.00		192.00	

Notes: [*]Indicates significance at the $p < .05$ level, [**]Indicates significance at the $p < .01$ level. [a]Reference category is never on honor roll in MS; [b]Reference category is never involved in sports or clubs in HS; [c]Reference category is never attended religious meetings in MS; [d]Reference category is did not have an older sibling who was a teen parent; [e]Reference category is on time/late; [f]Reference category is mother was not a teen parent; [g]Reference category is less than HS; [h]Reference category is no depression; [i]Reference category is U.S. Born; [j]Reference category is no negative peer influence; Reference category is advantaged

Summary of Multivariate Results

To summarize the study results, I re-present my research hypotheses below:

H$_1$: Neighborhood disadvantage will be positively related to teenage childbearing and fathering for both Black and Latino males and females. This was not found to be the case for any of the core or stratified core models.

H$_2$: Adolescents who have lived in disadvantaged neighborhoods for longer periods of time will be more likely to bear and father children. The results of the cumulative neighborhood disadvantage typology model, where youth were categorized as living in disadvantaged, average, or advantaged neighborhoods over the course of their childhood, suggest that duration of neighborhood disadvantage exposure is not predictive of teenage childbearing/fathering.

H$_3$: Adolescents who have lived in disadvantaged neighborhoods during the developmental stage during middle school and high school will be at greater risk for teenage childbearing and fathering than those who may have lived in disadvantaged neighborhoods during earlier developmental stages. Again, because neighborhood disadvantage was not predictive in any of the statistical models, I failed to reject the null hypothesis. Nor did middle school or high school developmental stage specifications offer any stronger or additional neighborhood effects than preschool or elementary school models.

H$_3$: Social capital will decrease the risk for teenage childbearing and fathering. There was no evidence that social capital was related to teenage childbearing and fathering, either at the bivariate or multivariate level, therefore, I failed to reject the null hypothesis.

H$_4$: Neighborhood disadvantage will operate in a non-linear, threshold-like manner. There was no evidence of neighborhood disadvantage thresholds, but this was not surprising as

the overall neighborhood disadvantage index did not perform at either the bivariate or multivariate level.

Closer Examination of Percentage of Foreign Born in the Neighborhood

Percentage of foreign born in the neighborhood was remarkably consistent across all of the empirical models. The odds ratios for the effect of foreign born ranged from .87 to .93 (7-13%), with the cumulative models having the largest effect. Clearly this is an important protective factor for teenage childbearing and fathering with exposures in earlier developmental stages continuing to be a protective factor throughout childhood. For Latino youth, the percentage of foreign born mattered only in high school neighborhoods: each percentage point increase in foreign born in the high school neighborhood was associated with a 7% decrease in the odds of teenage childbearing and fathering. Although one may assume that protective features of foreign born neighborhoods may only extend to the predominant ethnic group (in this case Mexican immigrants), I found that percentage foreign born in the neighborhood was also a strong and consistent protective factor for Black youth. For each percentage point increase in foreign born in the neighborhoods that Black youth lived during middle school and high school, the odds of teenage childbearing and fathering decreased by 7% and 8%, respectively.

Because percentage foreign born in the neighborhood was such an important protective factor, I divided the cumulative sample into foreign born quartiles and ran bivariate statistics by average lifetime neighborhood conditions, disadvantage typologies, and ethnicity. I did this to (1) see what the neighborhood conditions were within neighborhoods with various concentrations of foreign born; and (2) to see if Latino youth across their lifetimes lived in neighborhoods with higher concentration of foreign born than Black youth.

Across their lifetimes, there were no differences in exposure to residential instability or proportion of children aged 5 to 17 by quartiles of foreign born neighborhoods. However, children who lived in the highest quartile of foreign born neighborhoods across their lifetimes resided in neighborhoods with significantly higher percentages of less than high school educated adults (24%) than children who lived in the lowest quartile (16%). Conversely, children who lived in the highest quartile foreign born neighborhoods also had significantly lower percentages of college educated adults (10%) than children who lived in the lowest quartile (15%). See Figure 5.7 for reference.

Figure 5.7 Comparisons of Neighborhood Conditions by Foreign Born Quartiles
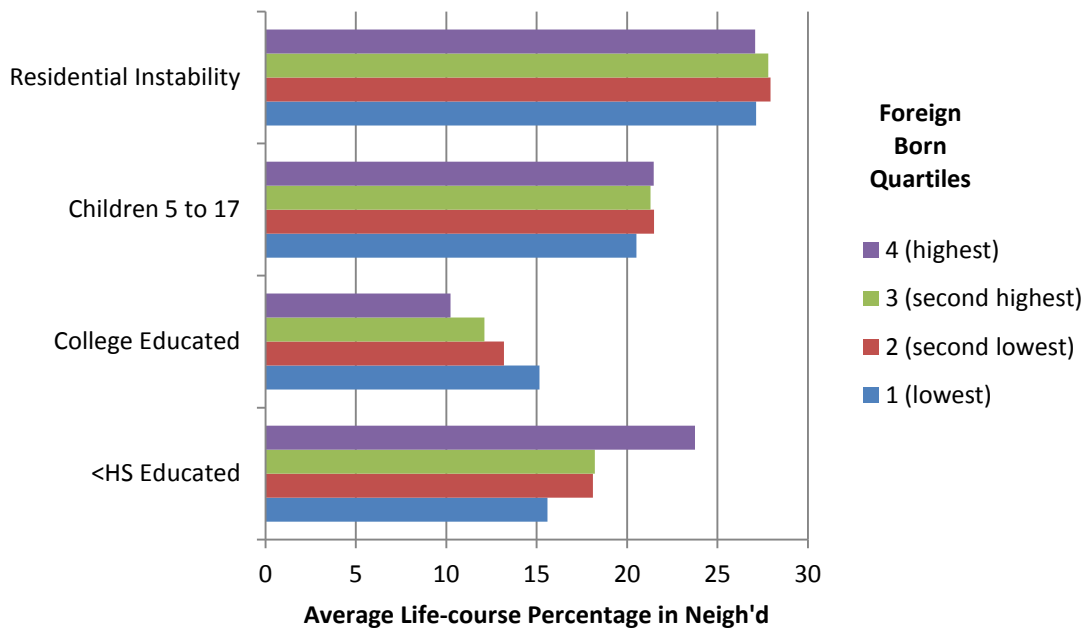
Figure 5.7. Depicts lifetime neighborhood conditions as they vary by foreign born quartiles. Data source: *Denver Child Study* linked database.

A chi-square test demonstrated that Black youth lived in the lowest foreign born quartile more often than Latino youth whereas Latino youth lived in the highest foreign born quartile more often than Black youth, χ^2 (1, N=752) = 26.53, $p < .01$. Over one third of Black youth

lived in the lowest quartile of foreign born across their lifetimes while only 1 in 5 Black youth

lived in the highest quartile. The opposite was true for Latino youth. Eighteen percent of Latino

youth lived in the lowest foreign born quartile across their lifetimes while 30% lived in the

highest quartile. See Figure 5.8 for reference. Multivariate results suggest that the fraction of

foreign born in the neighborhood is protective for Black youth, but we see here that Black youth

tended to live in less concentrated foreign born neighborhoods than Latino youth. It could be that

the protective nature of foreign born neighborhoods extends to Black youth even at very low

concentrations, though further testing of this theory would be necessary.

Figure 5.8 Foreign Born Quartiles by Ethnicity
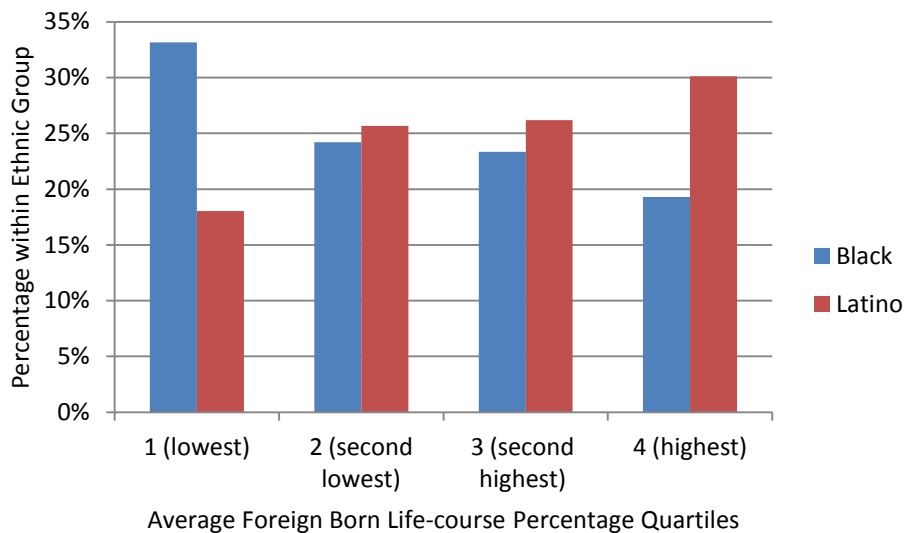
Figure 5.8. Depicts the varying percentages within each ethnic group of youth who lived in lowest to highest quartiles of foreign born in the neighborhood. Data source: *Denver Child Study* linked database.

A one-way analysis of variance test indicated that average lifetime scores of

neighborhood disadvantage differed significantly by foreign born quartiles (F = 2.79, *df* = 3/751,

p<.05). To assess pairwise differences among the foreign born quartiles, Tukey HSD tests were

estimated. The results indicated that the mean level of neighborhood disadvantage for the lowest

foreign born quartile (M = 179.43, SD = 61.74) was significantly lower than the mean for the second lowest foreign born quartile (M=192.87, SD = 58.03). There were not any other significant mean differences in neighborhood disadvantage by foreign born quartiles. In fact, the second highest and highest quartiles had nearly identical neighborhood disadvantage means (182.28 and 182.09, respectively). While one might assume that neighborhood disadvantage would be positively related to foreign born concentration, this test suggests that this relationship may be nonlinear and warrants further investigation.

Figure 5.9 Cumulative Neighborhood Disadvantage by Foreign Born Quartiles
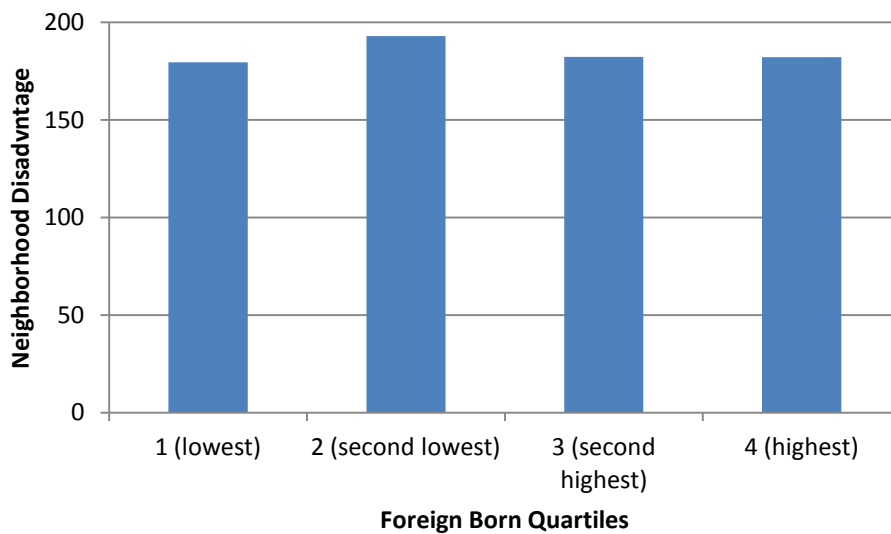
Figure 5.9. Depicts varying levels of cumulative neighborhood disadvantage by foreign born quartiles. Note that neighborhood disadvantage ranges from a possible scale of 0 to 500. Data source: *Denver Child Study* linked database.

Conclusion

In summary, during childhood, Latino youth tended to live in neighborhoods with greater concentrations of foreign born than Black youth. Although percentage of foreign born in the neighborhood was a protective factor across all multivariate models for Black and Latino youth, it also appears that higher concentrations of foreign born within neighborhoods is associated

with lower fractions of college educated and higher fractions of less than high school educated. Though decreased educational attainment among neighborhood residents might seem to be a risk factor, we see here that despite lower levels of educational attainment, greater shares of foreign born within neighborhoods across childhood are still a protective factor for teenage childbearing and fathering.

Contrary to my proposed hypotheses regarding neighborhood disadvantage, there did not appear to be any relationship between neighborhood disadvantage and teenage childbearing/fathering for Black or Latino youth in any of the contemporaneous, lagged, or cumulative models. Additionally, there was no evidence for neighborhood disadvantage thresholds as reflected by the neighborhood disadvantage typology variable. The neighborhood disadvantage typology also was not a significant predictor for the middle or high school models stratified by ethnicity nor in the cumulative effects model.

CHAPTER 6

DISCUSSION

Introduction

Over the past few decades, there has been considerable discussion about the varied mechanisms by which neighborhood residence impacts child and adolescent outcomes (Brock & Durlauf, 2001; Duncan & Raudenbush, 2001; Ellen & Turner, 1997; Galster, 2012; Jencks & Mayer, 1990; Leventhal & Brooks-Gunn, 2000; Sampson, Morenoff, & Gannon-Rowley, 2002). Although this discussion has not led to a consensus over these causal pathways, it has surfaced many questions regarding the measurement and conceptualization of neighborhood effects. One such question raised by Galster (2012) and Sampson (2008) is regarding the timing and durability of neighborhood effects. Neighborhood effects may operate in a contemporaneous, lagged, or cumulative manner. They also may be sensitive to specific child development stages. For example, there is evidence that neighborhood disadvantage experienced in early formative years may be more important for outcomes such as mental health and cognitive ability (Sampson, Sharkey, & Raudenbush, 2003; Wheaton & Clark, 2003).

The literature on teenage childbearing has focused primarily on the impact of contemporaneous neighborhood effects or the effects of adolescent neighborhood exposure on teens' likelihood of becoming parents. Very few studies have examined cumulative neighborhood effects in general, and, to date, no previous studies have modeled neighborhood exposure in the manner that I did. My study attempts to address the question about the role of timing and duration of neighborhood effects on teen childbearing and fathering by examining the neighborhood contexts in which youth resided across their lifetime.

This chapter is organized into five sections. First, I discuss study findings regarding timing and duration of neighborhood effects and place these findings within the context of the wider literature. Second, I more closely examine the protective nature of neighborhood foreign born concentration on teen childbearing and fathering. In this section, I discuss this finding in the context of changing demographic patterns in Denver and outline potential theoretical explanations. Third, I discuss differences in neighborhood effects by ethnicity and gender. Fourth, I present implications for social work practice and social welfare policy. Fifth, I enumerate study limitations, future directions, and study conclusions.

Timing and Duration of Neighborhood Effects

One of the major goals of my study was to examine how the timing and duration of neighborhood exposure over the life-course were related to teenage childbearing and fathering. Results that were robust across both 'Ever in DHA' and 'Majority DHA' samples suggest that neighborhood effects emanated from all developmental stage neighborhoods. Percentage of foreign born in the neighborhood was predictive in all model specifications and its effect was magnified when examined over the course of childhood. The percentage of foreign born in the neighborhood was a remarkably consistent protective factor for teenage childbearing and fathering across all of the models. With every percentage point increase in foreign born in the neighborhood, the probability of teenage childbearing and fathering decreased between 8 and 9 percent in the preschool, elementary, middle, and high school model specifications.

Over the course of childhood, this risk decreased by 13%, suggesting that the protective nature of percentage of foreign born in the neighborhood may be additive in effect. In discussing the cumulative effects of neighborhood exposure on health outcomes, Curie (2011) notes, "[…] it may be possible to take the child out of a bad neighborhood, [but] it may not be possible to

take the neighborhood out of the child in the sense that material deprivation associated with the neighborhood will have permanent effects [..]" (p. 4). In other words, the results suggest that the full picture of neighborhood effects cannot be observed using isolated time points. Though we may see significant associations, these associations do not begin to capture the potentially additive nature of lifetime exposures to risk and protective features in neighborhoods. Speaking in terms of duration, higher lifetime averages of neighborhood percentage foreign born were associated with a significantly lower risk of teenage childbearing and fathering. This finding is important because heretofore so few studies have examined the cumulative effects of neighborhood exposure.

Neighborhood effects are often conceptualized as occurring contemporaneously, discounting prior experiences of neighborhood. This is problematic because it oversimplifies the conceptualization of neighborhood influence which may be contemporaneous, lagged, or cumulative. They also may operate in each of the aforementioned manners as they do in my study. If I were to have only observed the high school stage of neighborhood exposure in this study, I may have assumed that all of the study participants' experiences of neighborhood until age 15 were either trivial or uniform. In discussing neighborhood effects and health, Johnson (2011) notes, "[…] outcomes are a product of cumulative exposures to advantaged/ disadvantaged environments spanning decades or exhibit long latent periods before problems manifest" (p. 30). We see in my study that living in neighborhoods with higher percentages of foreign born during earlier stages of development was equally as important in predicting teen childbearing as living in a neighborhood with higher concentrations of foreign born during adolescence. This speaks to the durability of this neighborhood characteristic as a protective factor. Percentage of foreign born in the neighborhood was not only a protective factor in each

developmental stage, but it was even more protective in reducing the odds of teenage childbearing/fathering across childhood. By examining the cumulative contexts in which children lived during childhood, I am able to discuss neighborhood effects on teenage childbearing and fathering more comprehensively.

Neighborhood disadvantage was not a significant predictor of teenage childbearing and fathering in any of the models I tested. This included models using a continuous disadvantage index as well as the disadvantage typologies which compared disadvantaged and average neighborhoods to advantaged neighborhoods relative to Denver metropolitan means. Since Wilson's (1987) identification of spatial concentration of poverty as an important risk factor for individual problem behavior, the extant literature has focused on various indicators of disadvantage (i.e., neighborhood poverty, unemployment, female headship, etc.) as neighborhood-level risk factors for teenage childbearing (Billy & Moore 1992; Crane 1991; Evans, Oates & Schwab 1992; Hogan & Kitagawa 1985; Massey & Shibuya 1995; Mayer 1991; Plotnick & Hoffman 1999; South & Crowder 1999; Sucoff & Upchurch 1998). These common measures of disadvantage serve as proxies for social disorder or as a way of capturing collective socialization. In contrast to previous studies, my study did not find neighborhood disadvantage predictive of teenage childbearing and fathering among Black and Latino youth in Denver. Possible explanations for this unanticipated finding will be discussed below.

A number of neighborhood effects studies utilize Chicago-based data (Browning, Burrington, Leventhal, & Brooks-Gunn, 2008; Crane, 1991; Hogan & Kitigawa, 1985), so it is important to note that Denver is drastically different as a metropolitan area. In 2000, there were only two Census tracts with extreme-poverty concentrations defined as more than 40% of Census tract residents living in poverty (Berube & Katz, 2005). Based on 2000 Census data, the *Piton*

Foundation (2004) reported that there was only one distinct neighborhood (Sun Valley) in Denver that exceeded this poverty threshold concentration of 40%. There were, however, 22 Denver neighborhoods in 2000 with poverty rates between 20% and 40% (Piton Foundation, 2004). The city of Chicago on the other hand, had 110 extreme-poverty Census tracts (Berube & Katz, 2005). Although not all neighborhood effect studies on teenage childbearing utilize Chicago-based data, a great number do. While it was surprising to find that neighborhood disadvantage did not predict teenage childbearing and fathering in my sample, it stands to reason that this has something to do with the relative absence of extreme-poverty concentration in Denver.

Additionally, the racial/ethnic composition of Denver is quite different from Chicago. The largest minority group in Denver is Latino, and according to 2000 Census data, only 4% of Latinos in Denver lived in concentrated poverty neighborhoods (Berube & Katz, 2005). Conversely the largest minority group in Chicago is Black, and in 2000, 32% of Blacks in Chicago lived in concentrated poverty neighborhoods (Berube & Katz, 2005). Nonetheless, the youth in my sample represented a relatively disadvantaged cross-section of youth in Denver, their mean neighborhood disadvantage scores were relatively high compared to the Denver metropolitan area. Across their life-courses, the youth in my sample resided in neighborhoods with an average disadvantage index score of 187 on a scale of 0 to 500. Neighborhood disadvantage was not extreme in my sample and this might explain why I did not find evidence of thresholds for neighborhood disadvantage. With only one neighborhood in Denver with extremely concentrated poverty, it may be difficult to determine the "tipping point" or critical threshold for neighborhood disadvantage. At-risk neighborhoods in Denver (with poverty rates

between 20 and 40%) may simply not have reached a critical threshold wherein one would observe nonlinear effects on teenage childbearing and fathering.

Foreign Born Context

Given the remarkable consistency and strength of neighborhood percentage of foreign born predicting teenage childbearing and fathering, I discuss at length the potential theoretical explanations for this finding. First, I provide an overarching discussion on how neighborhoods have been thought to influence teenage childbearing and fathering and situate foreign born concentration in the larger literature. Then, I revisit data presented in Chapter 1 by discussing the changing context of Denver and shifting patterns in immigrant concentration in Denver neighborhoods. Following this, I discuss how foreign born related variables (i.e., generation status, acculturation, cultural family values) may operate at the individual-level. Finally, and most importantly, I discuss how concentration of foreign born persons in the neighborhood might serve as a protective factor for teenage childbearing and fathering. This discussion focuses on the strengths of Mexican immigrant enclaves evident in the social-interactive processes found in these neighborhoods.

Potential theoretical explanations. Youth who reside in disadvantaged neighborhoods are at increased risk for early sexual initiation, lower contraceptive use, higher number of sexual partners, and more frequent casual sex (Baumer & South, 2001; Brewster, 1994a; Brewster, 1994b; Browning, Burrington, Leventhal, & Brook-Gunn, 2008). According to Wilson (1987), concentrated structural disadvantage may lead to a developed subculture where norms around sexual risk-taking and early childbearing prevail. Generally, there are three mechanisms by which neighborhoods have been thought to affect teenage sexuality and fertility: (1) social contagion (see Crane, 1991); (2) collective socialization (see Brewster, 1994); and (3) social

cohesion and control (see Way, Finch, & Cohen, 2009). Often times these neighborhood effect mechanisms are represented by structural neighborhood characteristics, such as neighborhood disadvantage, residential instability, and the like. For example, in the Browning et al. (2008) study, structural disadvantage may be thought of as a proxy variable for the social processes that would foster a normative climate toward sexual risk taking.

As discussed in Chapter 3, results from the *Toledo Adolescent Relationship Study* (TARS) suggest that neighborhood normative climates toward sexuality (aggregated measures of attitudes and behaviors) predict adolescent sexual risk above and beyond that of structural disadvantage measures (Warner, Giordano, Manning, & Longmore, 2011). The authors find evidence that supports the neighborhood effect mechanism of collective socialization. In Warner et al.'s (2011) study, youth attitudes about sexual behavior were measured and aggregated to the neighborhood-level. These aggregations represented a normative climate that predicted individual sexual behavior. In theory, norms regarding sex that were being observed in the neighborhood were conformed to in practice—a process characterized as collective socialization.

While my study did not have any measure of attitudes toward early childbearing, the results from Warner et al., (2011) point to the idea that attitudes regarding sexuality, and in my case, early childbearing, may create a neighborhood normative climate. A normative climate in a largely Mexican foreign born neighborhood might be characterized by an emphasis on childbearing within marriage and a respect for social hierarchies. This may, in turn, decrease risk for teenage childbearing. These neighborhood-level attitudes, in addition to increased social cohesion and informal social control inherent in ethnic enclaves, may combine to serve as neighborhood-level protective factors.

On the other hand, early nonmarital childbearing among Latinas, especially immigrant Latinas, is culturally discouraged (Erickson, 1998). As noted in Chapter 2, although Latinas have the highest teenage birth rate, they also have a substantially higher marriage rate than White and Black youth. Further, Latina teenage birth rates become a bit more complicated when considering immigrant status. In a nationally representative sample, it was found that 41% of U.S.-born Mexican, unmarried women had a teenage birth compared to 32% of foreign born Mexican women (Hummer & Hamilton, 2010) suggesting that as they assimilate into U.S. culture, the adherence to norms that discourage nonmarital childbearing diminishes.

Changing context of Denver. As discussed in Chapter 1, there was a large influx of Latinos in Denver County between the years of 1990 and 2000. Latinos accounted for 79% of new population growth between these decennial years (70,000 of 87,000 new residents). By 2000 there were 21 distinct Latino neighborhoods with concentrations exceeding 50%. By 2000, there were 13 distinct neighborhoods in Denver where immigrant concentrations were more than 30%. In 2000, one sixth of Denver's population was foreign born, and Mexican immigrants accounted for two-thirds of the entire foreign born population (Piton Foundation, 2004).

In addition to demographic shifts noted above, the state of Colorado has seen a large increase in the number of Latino-owned businesses in recent decades. In 2007, there were 33,963 Latino-owned businesses in the State, up from 21,520 in 2002 (Svaldi, 2009; U.S. Census Bureau, 2012). Denver has a very active Hispanic Chamber of Commerce (HCC) that has been in operation since 1978 (Hispanic Chamber of Commerce of Metro Denver, 2012). In 2009, Denver's HCC reported that they were seeing 20% growth in new members annually, many of whom were Latinas (Svaldi, 2009). As of 2007, 9% of Denver County businesses were owned by Latinos (U.S. Census Bureau, 2012). Sal Gomez, a Denver native and the founder of the

National Hispanic Business Information Clearinghouse, noted that "Many immigrants that come to the United States come from environments that are entrepreneurial. When people come to the United States they carry that same [entrepreneurial] spirit with them" (as cited in Queen, 2008).

Denver neighborhoods that are distinctly Latino have seen a growth in businesses owned by Latinos that serve a wide base from Spanish-speaking Latinos to the larger metropolitan population (Svaldi, 2009). With increasing numbers of female and Latino immigrant-owned businesses, Latino populated neighborhoods in Denver have experienced a degree of economic revitalization. In addition to the economic benefits of Latino business growth for these neighborhoods, it is reasonable to assume that there may be some social benefits for neighborhood residents. For instance, the increased prevalence of female and immigrant-owned businesses might provide youth who reside in these neighborhoods with visible adult role models. As Brewster (1994a) suggests, female employment status in the neighborhood may serve to protect female youth from teen pregnancy by modeling an alternative pathway to adulthood through education and employment. It is likewise possible that Denver neighborhoods with increasing numbers of female and immigrant-owned businesses similarly give root to this mechanism of collective socialization.

How foreign born status may protect at the individual-level. Although this is a study of neighborhood influence, it is helpful to discuss the potential individual-level pathways by which factors that are related to nativity status such as acculturation may impact teenage childbearing and fathering. Neighborhoods do not merely represent an aggregation of individual- and family-level processes. Rather, "the environmental characteristics of the neighborhood and relationships between residents in the neighborhood are inextricably linked and reciprocally

influence each other, and in turn, influence the development of adolescents" (Antonishak, Sutfin, & Repucci, 2005, p. 67).

Latino paradox. Within the public health literature, it has repeatedly been noted that generational status is related to various health outcomes such as asthma, obesity, diabetes, heart disease (Cagney, Browning, Wallace, 2005; Stephen, Foote, Hendershot, & Schoeborn, 1994). The healthy immigrant effect (also referred to as the immigrant or Latino paradox) is defined as "an observed time path in which the health of immigrants just after migration is substantially better than that of comparable native-born people, but worsens with additional years in the country" (McDonald & Kennedy, 2003, p. 1613). This is conceptualized as paradoxical for two reasons: (1) foreign born immigrants are often among the most socioeconomically disadvantaged, and low socioeconomic status is generally linked to poorer health outcomes; and (2) classic assimilation theory would suggest that the longer one is in the U.S., the more social capital, English speaking proficiency, and human capital one accumulates (Alba, Logan, & Stults, 2000; Guarini et al., 2011).

The Latino paradox has been extended to study social and behavioral outcomes as well (Cota-Robles, 2002; Luther, Coltran, Parke, Cookston, & Adams, 2011; Samaniego & Gonzalez, 1999). One study examined youth delinquency in the framework of the Latino paradox (Luther, et al., (2011). The authors found that generational status was related to youth risk behaviors including externalizing behaviors, risky sexual behavior, drug use, and involvement with police or the juvenile justice system. Further, this study identified parental monitoring and familism as protective factors for youth delinquency. According to results from the National Longitudinal Survey of Youth 1997-2003, indicators of acculturation (e.g., generation status, language, and country of origin) are related positively to early sexual initiation, and negatively to contraceptive

use at first sex, consistent contraceptive use at age 17, and becoming a teen parent (The National Campaign to Prevent Teen Pregnancy, 2008). Consistent with prior research, the authors found that first generation Latinos were at greater risk for teenage childbearing and fathering, but at comparatively lower risk for early sexual initiation. Several studies have cited increased sexual risk-taking among more acculturated Latino adolescents compared to foreign born or first generation adolescents (Guilamo-Ramos, V. et al, 2005; Jimenez, J. Potts, M. K., Jimenez, D. R., 2002; Raffaelli, Zamboanga, & Carlo, 2005).

How foreign born status may operate at the neighborhood-level. The public health literature suggests that neighborhoods with high concentrations of immigrants may mirror the individual-level healthy immigrant paradox (Cagney, Browning, & Wallace, 2005; Espinosa de los Monteros, Gallo, Elder, Talavera, 2008). Above and beyond the independent effects of generation status and other individual measures of acculturation, residents who live in neighborhoods with higher fractions of foreign born may have better health outcomes than residents who live in less concentrated immigrant neighborhoods (Cagney, Browning, & Wallace, 2005; Espinosa de los Monteros et al., 2008). The mechanisms that are thought to be at play at the neighborhood level involve social and cultural capital, such as social cohesion, norms that promote health, and practices that model good health (Cagney, Browning, & Wallace, 2005). Although these studies focus on physical health outcomes, there is reason to believe these frameworks could be extended to understand teen fertility outcomes. Though this area of study is only emerging, there is some work that considers the concentration of foreign born in neighborhood as it relates to sexual risk behavior (Browning et al., 2008). Theories of ethnic enclaves, social organization, and collective efficacy may provide an explanatory framework for

the observed protective nature of neighborhood foreign born percentage on teenage childbearing and fathering.

Latino immigrant enclaves. In *Urban Enclaves,* Abrahamson (2006) describes enclaves as a dynamic relationship between a distinctive group of people and a physical place. He notes, "An enclave has some characteristics of a subculture, in which a group of people shares common traditions and values that are ordinarily maintained by a high rate of interaction within the group" (p.3). Further, he suggests that "enclaves typically grow by serving as a magnet that attracts other people who share the same significant quality as the pioneers" (p. 4). It should be noted that an enclave is not necessarily defined by a particular percentage of a distinct group in a geographic area. If there is not a competing distinctive group present in a neighborhood, and the distinctive group that does populate the neighborhood has established institutions (i.e., churches, grocers, and restaurants), then an enclave may be present at a neighborhood percentage as low as 25% (Abrahamson, 2006). Wilson and Portes (1980) first defined ethnic enclaves as a minority community within the inner-city that is self enclosed. Later, Wilson and Martin (1982) discussed the ethnic enclaves as geographically clustered areas where businesses and other institutions were minority operated and own. In a Mexican immigrant enclave, institutions might include Spanish-speaking Roman Catholic parishes or Mexican supermarkets and restaurants. The presence of these ethnic institutions in a neighborhood may increase social networks and social cohesion by providing tangible ways for neighborhood residents to first, interact with one another and second, relate to each other's lived experiences.

Beginning with Shaw and McKay's (1942) work, there has been a long documented relationship between social cohesion and ethnic heterogeneity. Neighborhoods with greater ethnic heterogeneity may have lower levels of social cohesion. Putnam (2007) suggested that

heterogeneous communities may actually cause residents to keep to themselves and withdraw from community life. Greater neighborhood diversity may lead to reduced levels of social cohesion, trust, and informal social control (Twigg, Taylor, & Mohan, 2010). As Goodhart (2004) noted, individuals may be less likely to intervene on the behalf of someone who is different from them. With lower incentive to act on the behalf of the collective, a natural consequence may be decreased social cohesion. The converse is that more homogeneous neighborhoods will have greater levels of social cohesion, collective efficacy, and social control. This is presumably due to a collective sense of identity that is more easily perceived by observable characteristics of "sameness." People may be more likely to act in accordance with collective efficacy if they perceive that they can culturally relate to those in their community. This may be what is happening in Denver. Given the large influx of Mexican immigrants in Denver, and the relative concentration of these immigrants in 13 Denver neighborhoods, it seems plausible that these neighborhoods have developed a recognizable cultural and ethnic identity.

According to Browning et al. (2008), "[…] ethnic and racial heterogeneity may hinder informal communication within neighborhoods, affecting the development of network ties across groups" (p. 271). Discrimination and racism between minority groups (Morin, 2008) may not foster social cohesion and informal social control due to unwillingness on the behalf of the residents to work together. This theory of ethnic heterogeneity informs speculations regarding the protective nature of foreign born for Black youth in Denver. If there is racial tension between Blacks and Latinos in Denver, it would follow a risk-model of ethnic heterogeneity that Black youth in concentrated immigrant (and therefore Latino) neighborhoods would experience social isolation. This social isolation may actually lead to decreased opportunities for engaging in risky sexual behaviors with one's peers (Santiago, et al., 2012).

Features of Latino immigrant enclaves relevant for teenage childbearing and fathering.
In Latin American countries, there is a cultural expectation that females embody the value of
marianismo, the emulation of the Virgin Mary (Raffaelli & Iturbide, 2009). Under the premise of
this cultural value, females are expected to remain virgins until marriage (Upchurch,
Aneschensel, Mudgal, & McNeely, 2002). In a study of cumulative sexual risk of Latino
adolescents, female sexual risk increased over time or in tandem with U.S. acculturation
(Guarini, Marks, Patton, & Garcia Coll, 2011). The authors cited a possible explanation for this
increased sexual risk as a cultural shedding of the value of *marianismo.* It would stand to reason
that neighborhoods dominated by Latino immigrant norms and cultural values would still operate
by the cultural values of their country of origin. These cultural values may not necessarily dictate
that teenage childbearing is unacceptable, but rather that nonmarital teenage childbearing is
(Erickson, 1998).

Placing the Latino paradox in a sexual behavior context, Guarini et al. (2011) state, "[…]
behaviors that are low in prevalence for a population in its native country will be high in
prevalence post-migration due to the removal of punishers that previously inhibited the
behaviors" (p. 207). Warner, Giordano, Manning, and Longmor (2011) discuss the influence that
normative environment (neighborhood-level aggregations of individual sexual attitudes) has on
adolescent sexual risk behaviors even after controlling for neighborhood disadvantage. This
same framework could be extended to the Latino immigrant enclave wherein attitudes and
beliefs about the inappropriateness of early childbearing, especially pre-marital childbearing,
may represent an aggregate normative climate that does not condone early childbearing.

Other relevant Latino cultural values are *familismo* and *respeto. Familismo* refers to the
strong Latino emphasis and obligation to family as well as the value of childbearing as an

integral part of family life (Raffaelli & Iturbide, 2009). *Respeto* refers to the hierarchal nature of social relationships within the Latino culture and the respect that is transmitted upward in this hierarchy, particularly toward elders and those in higher social positions (Raffaelli & Iturbide, 2009). Both of these cultural values may be more dominant in Latino immigrant enclaves where acculturation to normative U.S. values has not occurred. *Familismo* has been found to be a protective factor for early sexual initiation among other youth risk behaviors such as substance use (Gil, Wagner, & Vega, 2000; Padilla, & Baird, 1991; Ramirez, Crano, Quist, Burgoon, Alvarao, & Grandpre, 2004). In a study that examined the neighborhood contexts associated with adolescent sexual risk behavior in Chicago neighborhoods, immigrant concentration (measured by a combination of percent Latino and percent foreign born in the neighborhood) was found to be nonlinearly related to number of sexual partners an adolescent had (Browning, et al., 2008). Using a quadratic term for immigrant concentration, the authors found that at higher levels of neighborhood immigrant concentration, the likelihood of having had no sexual partners increased exponentially. This finding suggests that "at high levels of immigrant concentration, i.e., in ethnic 'enclaves,' adolescents may benefit from high degrees of social homogeneity and cohesion around more traditional normative orientations toward sexual behavior" (Browning et al., 2008, p. 271).

As noted in Chapter 3, Way Finch and Cohen (2009) examined the effects of Latino concentration and collective efficacy on teenage childbearing and found that Latino concentration moderated the relationship between collective efficacy and teenage childbearing. The authors found that in neighborhoods with a Latino concentration less than 50%, collective efficacy was associated with decreased risk for unmarried teenage childbearing. Conversely, in neighborhoods with a Latino concentration greater than 50%, collective efficacy was not related

to unmarried teenage childbearing, but it was positively related to married teenage childbearing. Although the Way et al. (2009) findings seem to be contrary to my key finding that percentage of foreign born in the neighborhood was negatively related to teenage childbearing, these authors looked at Latino concentration rather than foreign born concentration. Given the conflicting results of their study and mine, future studies might attempt to parse out the potential shared and independent effects of foreign born and Latino concentration on teenage childbearing.

Clearly Latino concentration is not synonymous with foreign born concentration, but neighborhoods with high proportions of foreign born in Denver are typically comprised of higher proportions of Latinos (Piton Foundation, 2004). In order to decipher between neighborhood effects that are attributable to Mexican foreign born concentration compared to Latino concentration at large, it might be necessary to identify neighborhoods where the majority of Latinos are foreign born. In this case, it may be safer to assume that any effect evidenced by the fraction of foreign born in the neighborhood would be a feature of foreign born concentration rather than a more multifaceted Latino concentration. Interestingly, Browning et al. (2008) combines the two measures (percent Latino and percent foreign born) to represent immigrant concentration. This may be inflating the independent effects of these two variables. Individual Latinos within a predominantly Latino neighborhood may be more or less acculturated. Given the individual-level link between acculturation and adolescent sexual behavior, it is possible that there is a link between neighborhood-level acculturation and teenage childbearing.

For my study, percentage of foreign born in the neighborhood may only be a proxy measure for ethnic enclaves, but it is reasonable to assume that the consistently protective nature of foreign born in the neighborhood is due in large part to the unique strengths, social cohesion, and informal social control that may be present in ethnic enclaves (Matute-Bianchi, 1986; Gold,

1992). Latino cultural values may dominate the collective's landscape and protect against early childbearing and fathering.

Neighborhood Effects by Gender and Ethnicity

Bivariate statistics indicated that females were much more likely to become teen parents than males. The interaction between race and gender showed that Latinas were the most likely to become teen parents, with Black females trailing shortly behind. This finding is consistent with national teenage birth rates that indicate Latinas as being the highest risk group for teenage childbearing (Guttmacher Institute, 2012). There were no significant differences in the probability of teen fathering between Black and Latino males. According to difference in means tests for survey and Census indicators of neighborhood, males and females generally lived in neighborhoods with similar conditions. Multivariate gender stratifications did not indicate any differences in neighborhood effects between males and females. This is likely due to inadequate sample size in gender stratifications. An analysis of the *Moving to Opportunity* demonstration found that neighborhoods do, in fact, differentially influence males and females (Kling & Liegman, 2004). Results from the *Moving to Opportunity* experiment show that females were positively affected by moving to lower poverty neighborhoods whereas males were not. While there were not any significant differences between males and females in my study, this should not be ruled out. Given the prevailing notion of traditional gender scripts regarding sexuality (i.e., frequent and or casual sexual activity is more acceptable for males than females) one might consider if neighborhoods serve to reinforce these gendered scripts (Kreager & Staff, 2009; Manning, Giordano, & Longmore, 2006).

The results of my study suggest that neighborhood effects did not differ greatly between Black and Latino youth. Surprisingly, the percentage of foreign born in the neighborhood across

all model specifications decreased the odds of teenage childbearing and fathering for Black youth. This is to say, the protective nature of Latino immigrant enclaves may actually extend to the Black youth who reside in these neighborhoods. We see in the results comparing ethnic groups by foreign born quartiles that the Black youth across their lifetimes tended live in the lowest quartile of foreign born concentrated neighborhoods more than Latino youth. Similarly, Latino youth tended to live in the upper quartile more often than Black youth. As noted in Chapter 5, it could be that the protective nature of foreign born neighborhoods extends to Black youth even at very low concentrations, though further testing of this theory would be necessary.

Latinos who live in ethnic enclaves may be better able to identify with their ethnic heritage. The dominant cultural identity present in ethnic enclaves may actually serve to protect neighborhood residents from experiencing feelings of oppression that the larger ethnic group may experience in more heterogeneous settings. If Latino youth are benefiting from higher fractions of foreign born (the majority of whom are Mexican) due to a sense of ethnic solidarity, one might question why this effect is similarly present for Black adolescents. According to a study conducted by the Pew Research Center, Latinos tend to view the race relations between Blacks and Latinos less positively than do Blacks (Morin, 2008). Latinos also view residential integration less favorably than do Blacks and are more likely to have residential preferences for ethnically homogeneous neighborhoods (Clark, 1992).

A possible alternate explanation for the protective nature of percentage foreign born for Black youth has to do with race relations (Santiago et al., 2012). It may be the case that a Black youth who lives in a neighborhood with higher concentration of Latino foreign born will experience some level of social isolation and may not be as socially engaged with their neighborhood peers. Though this is speculative, it could very well be the case that Black youth

are at decreased risk for teenage childbearing and fathering in neighborhoods with higher fractions of foreign born simply because there is less opportunity to engage in risky sexual behavior. With fewer same-ethnic peers in the neighborhood there may be fewer potential sex partners and therefore fewer opportunities to become a teen parent. It is also possible on the other hand, the normative climate that discourages risky sexual behavior and nonmarital early childbearing in Latino immigrant enclaves actually extends to protect Black youth from teenage childbearing and fathering.

Practice and Policy Implications

This study has implications for social work practice and social welfare policy geared toward preventing teenage childbearing and fathering. In particular, by examining the neighborhood-level risk and protective factors for teenage childbearing, this study helps inform prevention and intervention efforts for changing an individual-level behavior (teenage childbearing) that is influenced by neighborhood-level mechanisms. Since the 1990s there has been a proliferation of teen pregnancy prevention programs and publicly funded campaigns aimed at increasing awareness of teen pregnancy and adolescent sexual decision-making (Farber, 2009). Though there has been a consistent decline in the teen birth rate since 1990, there is not a consensus regarding the reasons behind this decline. Teenage pregnancy remains an issue at the forefront of adolescent risk behavior, and this is evident by the continued policy and programmatic focus in the United States.

Just as the ecological model provided an overarching theoretical context for my study's research questions and hypotheses, it provides a useful framework for conceptualizing prevention approaches for teenage childbearing (see Figure 6.1).

Figure 6.1 Teenage Childbearing Prevention Approaches in the

Context of the Ecological Model

The Ecological Model

Family Planning Services

Family Background

Neighborhood/Communities | Peers | Teen Pregnancy, Childbearing | Partners/Relationships | Social Policies

Individuals

School Sex Education
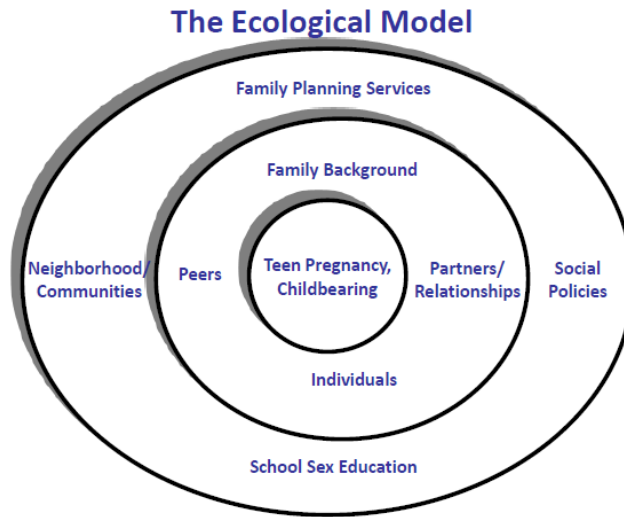
Figure 6.1 Provides a visual representation of Bronfenbrenner's (1979) ecological model for teenage childbearing including various and interactive system levels by which prevention approaches can be modeled. Adapted from "Trends in Teen Pregnancy: What the Data Say" by Anderson, K., & Manlove, J. (2008). Presentation to Office of Adolescent Health Teenage Pregnancy Prevention Tier 1 Grantee Conference, p. 22.

According to Figure 6.1, neighborhoods, social policy, family planning services, and school-based sex education are dynamically interacting at the macro-level. Each of these domains have a great deal of influence on teenage childbearing. A youth's neighborhood may be the context in which she or he is socialized to be more or less at risk for teenage childbearing or fathering. However, social policies related to teenage childbearing have typically addressed sex education and family planning services. Type of sex education (comprehensive or abstinence-only) and accessibility of family planning services (e.g., proximity to reproductive health care providers, cost of and access to contraceptives), also exert a great deal of influence on teenage childbearing (Farber, 2009).

Reproductive and sexual health is one of *Healthy People 2020's* leading health indicators. There are many objectives that fall under this health indicator including the objective

of reducing pregnancy rates among adolescent females (*Healthy People 2020*, 2012). *Healthy People* is a U.S. federal interagency initiative that sets goals every decade (since 1980) for improving the health of the country. *Healthy People* is an evidence-based initiative that seeks to encourage community collaborations, empower individuals toward health, and measure prevention efforts (*Healthy People 2020*, 2012). In 2011, the *Communities of Color Teenage Pregnancy Prevention Act of 2011* (H.R.2678) was introduced in the House. As of March, 2012, this bill has not been passed. As the name suggests, the purpose of H.R.2678 is to "[…] support research and demonstration projects for racial and ethnic communities with disproportionately high rates of teen pregnancy" (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2011, p. 1).

As has been described in earlier chapters, teenage childbearing is often more pervasive in neighborhoods which are considered to be disadvantaged. Although it would be ideal if concentrated poverty was ameliorated, it is not altogether realistic. A number of theories posit why neighborhood contexts may contribute to early childbearing (discussed in Chapter 3); however, there is little application of these neighborhood contexts in intervention and prevention strategies. Dickson, (2004) notes that

> Many influential family, community, cultural, and individual factors - such as growing up in a poor community, failing at school, and being depressed – are not directly related to sex but are closely associated with teen pregnancy. Some programs with strong evidence for success in reducing teen pregnancy concentrate on the non-sexual antecedents of teen pregnancy: youth development programs, service learning, and vocational education and employment programs (p. 4).

Many existing youth development programs have a problem or prevention focus on teenage pregnancy. However, when employing a positive youth development framework, teenage sexuality is viewed as healthy, normative, and developmentally appropriate (Russell & Andrews, 2003). In this framework, teenage sexuality is distinguished from teenage sexual risk behavior. Russell and Andrews (2003) argue that positive youth development programming leads to a reduction in teen pregnancy by emphasizing education, employment, and life options while simultaneously acknowledging that sexuality is a core aspect of youth's lives.

Community acceptance of youth development programming is paramount for its success (Dickson, 2004; Farber, 2009; Russell & Andrews, 2003). To facilitate success, it is important to identify community stakeholders or those with a vested interest in the issue. These stakeholders might include community leaders, local funders, community organizations, educators, parents, and youth (Russell & Andrews, 2003). In addition to having buy-in from stakeholders, a community-based youth development program that aims to reduce teen pregnancy in targeted neighborhoods must have a clear understanding of the demographic composition of the neighborhoods and the specific risks and strengths that accompany them.

In their review of youth development programs, Kirby and Coyle (1997) found programs that were most effective at reducing teenage pregnancy were age, experience, and culturally appropriate. Additionally, effective programs were ongoing and comprehensive with diverse leaders and methods. *¡Cuídate!*, a community-based prevention program, was identified by *Advocates for Youth (*2008) as an evidence-based pregnancy prevention program specifically for Latino youth. The primary goals of *¡Cuídate!* were to:

1) Influence attitudes, beliefs, and self-efficacy regarding HIV risk reduction, especially abstinence and condom use;
2) Highlight cultural values that support safer sex practices;
3) Reframe cultural values that might be perceived as barriers to safer sex; and

4) Emphasize how cultural values influence attitudes and beliefs in ways that affect sexual risk behaviors (Advocates for Youth, 2008, p. 2).

Warner, et al. (2011) reported that neighborhood normative climates influenced youth sexual risk behavior. One of *¡Cuídate!'s* objectives was to highlight supportive cultural values for safe sex practices that would, in turn, decrease teenage pregnancy. In highly concentrated Latino immigrant neighborhoods, normative climates may be heavily influenced by traditional Latino cultural values. As *¡Cuídate!* delineates, it would be beneficial to reinforce these protective aspects of the cultural and neighborhood contexts in which youth are residing. These potential strengths and assets of immigrant neighborhoods are discussed below.

Given the protective nature of the proportion of foreign born in the neighborhood identified in my study, community-based prevention strategies would benefit by uncovering the particular strengths and resiliencies that immigrant neighborhoods cultivate. Higher levels of parental monitoring among Latinos have been shown to decrease sexual risk behavior among youth (Borawski, Ievers-Landis, Lovegreen, Trapl, 2003; Kerr, Beck, Shattuck, Kattar, Uriburu, 2003; Velez-Patrana, Gonzales-Rodriguez, & Borges-Hernandez, 2005). This heightened parental monitoring may carry over into the entire neighborhood and thus create an environment where youth are more accountable to a larger network of adults and elders. In turn, these adult role model relationships may then protect youth from engaging in risky sexual behavior.

In addition, strong and traditional cultural values, such as *familismo* and *respeto* typically thought to operate within the family, may extend to the neighborhood and thus protect all youth that reside in these neighborhoods. *Familismo* emphasizes the primacy of strong family ties and the interdependence among immediate and extended family members (Dinh, Roosa, Tein, & Lopez, 2002). The collectivistic underpinnings of these cultural values may actually foster collective efficacy or a sense of community and care within neighborhoods.

Most neighborhood-level interventions involve building neighborhood social resources (Brown, 1996). One study suggests that community adherence to more traditional Latino cultural norms (e.g., commitment to family and the presence of intergenerational families) may protect youth from teen pregnancy (Denner, Kirby, Coyle, Brindis, 2001). Another neighborhood-level study indicates that high concentrations of Latino families are protective against early sexual inititation (Cubbin, Santelli, Brindis, & Braveman, 2005). Conversely, Way, Finch, and Cohen (2009) provide evidence that collective efficacy protects against teenage childbearing, but only in neighborhoods with less concentrated Latino populations. My research did not find support for the protective nature of collective efficacy, but it does suggest that there may be unique strengths present in Mexican immigrant enclaves.

Policies and initiatives seem to be focused on supporting evidence-based approaches. There is recognition that prevention efforts should not be uniform in application as evidenced by the recent *Communities of Color Teen Pregnancy Prevention Act*. However, the report from *Advocates for Youth* on programs that work to prevent teen pregnancy makes little mention of neighborhood. While there is discussion of community-based youth development, there is little acknowledgement of the significance of neighborhood residence in the best practices for preventing teenage childbearing (Advocates for Youth, 2008). We know that community context can be influential in the lives of adolescents. In discussing adolescent problem behavior prevention in the context of the ecological model, Antonishk, Sutfin and Repucci (2005) note,

> The inclusion of both proximal and distal influences in research about adolescent problem behavior, in conjunction with individual level characteristics, enhances our ability to understand the mechanisms that affect the development of problem behaviors and how to utilize the potential within the community to promote healthy development" (p. 73).

Study Limitations

My study has a number of limitations. First, the results from my study can be generalized to youth in Denver and potentially to low-income Black and Latino youth in urban areas. Given the aforementioned unique metropolitan characteristics of Denver, it is less clear as to the extent to which my findings are similar to those in metropolitan areas. Although my study uses data from a naturally occurring experiment that overcomes the challenge of selection bias, sample size restrictions prevented me from only examining those youth who had resided in DHA for the majority of their childhood and were thereby unaffected by geographic selection bias. Children who only spent a small portion of their childhood in DHA may have moved to better neighborhoods, and most likely, to neighborhoods that their caregivers chose for a particular reason (e.g., better schools, closer to family, superior amenities). We see in the comparison of neighborhood conditions that "ever in DHA" children lived in slightly less disadvantaged neighborhoods than "majority in DHA" children. Although initial assignment to DHA was random, some families may have moved out of DHA into a neighborhood of their choice, and in possibly a more advantaged neighborhood. In these cases, there is some bias introduced due to selectivity. Essentially, if only considering the "ever in DHA" sample, I might mistakenly conclude that neighborhood effects were not being conflated with unmeasured caregiver characteristics. These unmeasured caregiver characteristics may have been the driving force behind neighborhood choice. However, given the robustness of the results across both samples, the threat of this selectivity is minimized substantially.

Additionally, sample size was inadequate in the gender stratifications of my empirical models, as evidenced by poor model fit for the random effects logit models. Because only 25% of those who had borne or fathered children in their teen years were male, I did not have

sufficient cell counts in the dependent variable to adequately test for gender differences. My study groups males and females together in the outcome measure of teenage childbearing and fathering, and therefore there are some limitations in interpreting the results and drawing implications. One major limitation in interpreting the results is the inability I have to determine how neighborhood contexts may differentially impact males and females and their likelihoods of becoming teen parents. In terms of study implications, this joint examination of childbearing and fathering does not lead to conclusions that might inform gender-specific policy and practice efforts. On a related note, the potential for underestimation of teenage fathering by primary caregiver reports may bias the results.

Another noted weakness of this study is the inconclusive interpretation of results. While the fraction of foreign born in the neighborhood proved to be a meaningful protective factor across children's life-courses and cumulatively, the explanations for this finding vary from positive aspects of ethnic enclaves (social cohesion, informal social control) to neighborhood norms regarding sexuality and fertility (collective socialization).

Future Directions

Future research in this area includes developing alternative ways of measuring neighborhood contexts (as opposed to averages). While few studies have examined the cumulative nature of neighborhood effects, there may be ways to improve and refine the methods in doing so. For example, a closer examination of residential mobility, and the accompanying changes in neighborhood conditions, may reveal that certain life-course patterns of neighborhood exposure are more predictive of teenage childbearing than others. Lifetime neighborhood averages of percentage foreign born in the neighborhood might yield similar concentrations but reflect vastly different experiences. Consider first a child who lived in one or two neighborhoods

over the course of their life with an average foreign born percentage of 15%. This child would clearly have different experiences than a child who lived in eight neighborhoods, some with very high and very low percentages of foreign born. The second child may still have an average lifetime foreign born in the neighborhood percentage of 15%, but questions of developmental timing and durability of neighborhood effects arise. Additionally, more sophisticated modeling of thresholds, including a closer examination of immigrant concentration thresholds are warranted.

Finally, future work might include various neighborhood measures related to percentage of foreign born. As noted in Chapter 2, studies in public health have measured neighborhood-level acculturation as a composite of Spanish-speaking households, length of time in U.S., and foreign born status (Espinosa de los Monteros et al., 2008). Future studies on teenage childbearing and fathering might benefit from more nuanced measures of ethnic enclaves (e.g., neighborhood thresholds of immigrant concentration) and neighborhood-level acculturation.

Conclusion

My study findings allude to the operative neighborhood mechanism of collective socialization. The fraction of foreign born in the neighborhood may represent a couple of things: (1) it may be a proxy for an ethnic enclave wherein social cohesion and informal social control help protect youth from teenage childbearing and fathering; or (2) it may similarly be a proxy for a normative climate that discourages risky sexual behavior and promotes cultural values such as *familism, marianismo*, and *respeto*. Both of these explanations fall under the mechanism of collective socialization, and both have their own caveats. First, given that percentage of foreign born in the neighborhood appears to operate in a linear fashion, it is risky to conclude that this proxies an ethnic enclave which is characterized by a critical concentration of ethnic groups.

Rather, my study findings suggest that the benefits derived from immigrant concentration are gained by any increase, whether at low or high ends of the spectrum. Second, the explanation of normative Latino cultural values as a deterrent for sexual risk behavior among nonmarried teens is complicated. It is wrought with complicated conceptualizations of how adolescent sexual behavior relates to acculturation, country of origin, generational status, and language. Despite the inconclusiveness of the interpretation of results, one conclusion is clear: the percentage of foreign born in the neighborhood was a meaningful predictor of teenage childbearing for contemporaneous, lagged, and cumulative models. This effect was consistently strong for each developmental stage of neighborhood exposure, and it was magnified when considered cumulatively, suggesting duration of neighborhood exposure is an important consideration in neighborhood effects studies on teenage childbearing and fathering. Further work that attempts to disentangle the underlying protective features of neighborhood foreign born concentration is warranted.

APPENDIX A

VARIABLE SCALES AND THEIR CALCULATIONS

This appendix describes the scales that were calculated for the study. With one exception listed last, all were based on based on Denver Child Study survey data. All of the scales detailed below are comprised of a number of individual variables which were aggregated to produce the resulting scale, which measures a single underlying construct. In each case, missing data, "don't know" responses, and refusals to answer were coded as "0" and thus do not contribute any value to the scale. In some situations, specific component variables of a scale were reverse-coded so that higher values on the variable always indicate more agreement with a question or a higher rating on the resulting scale. All of the variables that were reverse-coded are noted.

- **Depression Scale**—comprised of 20 items which inquire about the respondent's feelings and behaviors in the past week. The underlying construct measured by this scale is the respondent's level of depression. Possible responses to each item (followed by their associated score) were rarely (0), some of the time (1), occasionally (2), and most of the time (3). Scores for the resultant scale could vary from 0 to 60, with higher values indicating a higher level of depressive symptoms. Component variables include:
  - o How often in the past week respondent was bothered by things that usually don't bother her or him
  - o How often in the past week respondent did not feel like eating; his or her appetite was poor
  - o How often in the past week respondent felt that she or he could not shake off the blues even with the help from friends or family

- o How often in the past week respondent felt that she or he was just as good as other people (*reverse-coded*)

- o How often in the past week respondent had trouble keeping her or his mind on what she or he was doing

- o How often in the past week respondent felt depressed

- o How often in the past week respondent felt that everything she or he did was an effort

- o How often in the past week respondent felt hopeful about the future (*reverse-coded*)

- o How often in the past week respondent thought her or his life had been a failure

- o How often in the past week respondent felt fearful

- o How often in the past week respondent's sleep was restless

- o How often in the past week respondent was happy (*reverse-coded*)

- o How often in the past week respondent talked less than usual

- o How often in the past week respondent felt lonely

- o How often in the past week people were unfriendly to respondent

- o How often in the past week respondent enjoyed life (*reverse-coded*)

- o How often in the past week respondent had crying spells

- o How often in the past week respondent felt sad

- o How often in the past week respondent felt that people disliked her or him

- o How often in the past week respondent could not get going

- **Parenting Efficacy Scale**—developed by Santiago and Galster (2004) is comprised of 10 items reflecting the degree of parental confidence in parenting skills and abilities. These include items related to parenting skills; maintaining work/school/parenting balance; and handling the stress of raising children as well as their abilities to provide for their child's

needs; raising a healthy child; helping their child achieve his or her goals; setting a good example for the child; protecting the child from negative influences at school; protecting the child from negative influences in the neighborhood; and keeping the child out of trouble.

Possible responses to each item were not confident at all (0), somewhat confident (1), and very confident (2). Scores range from 0 to 30, with higher values indicating a higher level of parenting confidence.

- **Social Capital Index**—derived by the authors and is comprised of 6 items which measure the degree of social capital available to the respondent in times of need. Items refer to the presence of people in the neighborhood who could get together to solve neighborhood problems; who would watch out for their children and property; who knew them and their children by name; were adults who they and their children could look up to; or were people they could count on in times of trouble. An additional item noted respondent activity in any organizations located in the neighborhood (e.g., block clubs, tenant groups, religious organizations and the like).

Possible responses to each item were 1indicating either the presence of a given neighborhood quality; 0 otherwise.. Scores for the resultant index ranged from 0 to 6, with higher values indicating the presence of higher levels of social capital in the neighborhood.

- **Social Disorder Index**—developed by the authors and is comprised of 7 items which document the extent of of social disorganization within one's neighborhood. Items included in the index reflect the presence of people selling drugs; gang activity; homes broken into by burglars; people being robbed or mugged; children or teens who got into trouble; people getting beaten or raped; and people who did not accept me or my children because of our race, ethnicity, or income.

Possible responses to each item were 1 indicating either the presence or absence of a certain neighborhood problem; 0 otherwise. Scores ranged from 0 to 7, with higher values indicating a greater degree of neighborhood problems.

- **Household Stressors Index**—developed by the authors and is comprised of 7 items which measure the magnitude of stressors facing the household in terms of finances, employment, health and health insurance, housing and utilities. Possible responses to each item were 1, indicating either the presence or absence of a certain stressor; 0 otherwise. Scores ranged from 0 to 7, with higher values indicating a greater degree of family stress.

APPENDIX B

ADDITIONAL MULTIVARIATE TABLES

Table B.1 Comparisons of Clustered Robust, Random Effects, and Unadjusted Logit Models: Elementary School Developmental Stage Neighborhood Exposure Predicting Teenage Childbearing and Fathering (N=690).

	Clustered Robust Logit Model[1]				Random Effects Logit Model[2]				Unadjusted Logit Model[3]			
	OR	SE	95% CI		OR	SE	95% CI		OR	SE	95% CI	
Age 16 dummy	0.08*	0.08	0.01	0.61	0.05*	0.06	0.0	0.53	0.08*	0.08	0.01	0.59
Age 17 dummy	0.29*	0.15	0.10	0.79	0.26*	0.18	0.07	0.98	0.29*	0.15	0.1	0.82
Age 18 dummy	0.23*	0.14	0.07	0.74	0.19*	0.14	0.05	0.77	0.23*	0.13	0.08	0.71
Age 19 dummy	1.57	0.51	0.84	2.97	2.08	0.99	0.82	5.29	1.57	0.54	0.80	3.09
Black x Female	3.30*	1.31	1.51	7.18	4.61*	2.48	1.60	13.25	3.30*	1.19	1.62	6.69
Black x Male	0.69	0.30	0.29	1.62	0.54	0.33	0.16	1.79	0.69	0.31	0.29	1.65
Latino x Female	3.45*	1.12	1.83	6.52	6.04*	2.81	2.42	15.04	3.45*	1.08	1.87	6.38
School Honors	1.16	0.27	0.73	1.84	1.22	0.41	0.64	2.36	1.16	0.27	0.73	1.84
School Involvement	0.99	0.30	0.55	1.8	0.89	0.35	0.42	1.92	0.99	0.26	0.59	1.67
Religious Participation												
Some	0.65	0.25	0.31	1.37	0.72	0.39	0.25	2.11	0.65	0.24	0.32	1.35
All	1.54	0.44	0.89	2.70	1.77	0.74	0.78	4.02	1.54	0.41	0.92	2.60
Pubertal Timing	0.97	0.35	0.48	1.97	0.92	0.45	0.35	2.40	0.97	0.32	0.51	1.86
Sibling Teen Parent	0.53*	0.16	0.29	0.97	0.24*	0.13	0.08	0.71	0.53	0.19	0.26	1.06
Household Stressors	0.99	0.11	0.80	1.22	0.97	0.13	0.74	1.27	0.99	0.09	0.83	1.17
Parenting Efficacy	0.99	0.04	0.92	1.07	0.99	0.05	0.89	1.11	0.99	0.04	0.92	1.06
Mother Teen Birth	1.47	0.37	0.90	2.41	1.49	0.52	0.75	2.94	1.47	0.36	0.91	2.38
Primary Caregiver Education												
GED	0.57	0.23	0.25	1.26	0.43	0.24	0.14	1.31	0.57	0.20	0.29	1.12
HS Diploma	0.41*	0.14	0.20	0.82	0.31*	0.16	0.11	0.86	0.41*	0.14	0.21	0.79
Tech/Certificate	0.44*	0.17	0.21	0.93	0.37	0.22	0.11	1.20	0.44*	0.17	0.21	0.95
College	0.93	0.44	0.37	2.33	1.12	0.71	0.32	3.86	0.93	0.36	0.43	1.99
Primary Caregiver Depression												
Borderline	1.23	0.43	0.61	2.45	1.26	0.65	0.46	3.44	1.23	0.39	0.66	2.27
Clinical	2.62*	1.15	1.11	6.18	4.03*	2.69	1.09	14.89	2.62*	1.10	1.15	5.96
Proportion of Time with 2 Parents in the Home	1.33	0.37	0.77	2.29	1.66	0.68	0.75	3.69	1.33	0.34	0.8	2.2

	Clustered Robust Logit Model[1]				Random Effects Logit Model[2]				Unadjusted Logit Model[3]			
	OR	SE	95% CI		OR	SE	95% CI		OR	SE	95% CI	
Parent Foreign Born	1.03	0.50	0.40	2.67	1.32	0.85	0.37	4.67	1.03	0.41	0.48	2.23
Primary Caregiver Income	1.00	0.0	1.00	1.00	1.00	0.0	1.00	1.00	1.00	0.0	1.00	1.00
Peers who get into Trouble in Neigh'd	1.00	0.01	0.98	1.01	0.99	0.01	0.98	1.01	1.00	0.01	0.99	1.01
Social Capital	1.06	0.08	0.92	1.22	1.1	0.12	0.89	1.37	1.06	0.08	0.92	1.22
Neigh'dProblems	1.04	0.09	0.89	1.22	0.99	0.12	0.78	1.26	1.04	0.08	0.89	1.21
Neigh'd Disadvantage	1.00	0.0	1.00	1.01	1.00	0.0	0.99	1.01	1.00	0.0	1.00	1.01
Neigh'd Less than High School Education	1.05	0.03	1.00	1.10	1.06	0.04	0.99	1.14	1.05[*]	0.03	1.00	1.10
Neigh'd College Education	1.02	0.03	0.97	1.07	1.01	0.03	0.95	1.07	1.02	0.02	0.97	1.06
Neigh'd Kids 5 to 17	0.97	0.04	0.90	1.05	0.92	0.06	0.82	1.04	0.97	0.04	0.90	1.04
Neigh'd Move in 1 Year	1.03	0.02	1.00	1.07	1.06[*]	0.03	1.00	1.12	1.03	0.02	0.99	1.07
Neigh'd Foreign Born	0.94[*]	0.02	0.9	0.97	0.91[*]	0.03	0.86	0.97	0.94[*]	0.02	0.9	0.98
_cons	0.07	0.10	0.0	1.09	0.04	0.08	0.0	3.03	0.07	0.10	0.0	1.17

Notes: [1]Standard Error adjusted for 365 clusters, Pseudo R^2=.21, Wald χ^2=123.14, Model is significant at the $p<.001$ level; [2]Wald χ^2=50.56, Likelihood-ratio test is significant at the $p<.001$ level; [3]Pseudo R^2=0.21, χ^2=123.14, Model is significant at the $p<.001$ level; [*]$p<.05$; [**]$p<.01$.

Table B.2 Cumulative Random Effects Model with Neighborhood
Disadvantage Typologies, N=740

	OR	SE	95% CI	
Age 16 dummy	0.03[*]	0.04	0	0.41
Age 17 dummy	0.28	0.19	0.07	1.09
Age 18 dummy	0.2[*]	0.15	0.05	0.88
Age 19 dummy	2.62[*]	1.27	1.01	6.78
Majority in DHA of Childhood	0.7	0.27	0.33	1.49
Black x Female	3.57[*]	2.09	1.13	11.27
Black x Male	0.38	0.25	0.1	1.41
Latino x Female	7.32[**]	3.62	2.77	19.31
School Honors	0.87	0.31	0.44	1.73
School Involvement	0.61	0.29	0.24	1.57
Religious Participation				
Some	0.63	0.31	0.24	1.66
All	0.97	0.51	0.35	2.7
Pubertal Timing	0.67	0.36	0.23	1.92
Sibling Teen Parent	0.19[**]	0.11	0.06	0.59
Household Stressors	1.06	0.18	0.76	1.49
Parenting Efficacy	1.03	0.06	0.91	1.15
Mother Teen Birth	1.48	0.55	0.71	3.07
Primary Caregiver Education				
GED	0.48	0.3	0.14	1.64
HS Diploma	0.56	0.31	0.19	1.64
Tech/Certificate	0.47	0.31	0.13	1.73
College	1.4	0.98	0.36	5.52
Primary Caregiver Depression				
Borderline	1.32	0.73	0.44	3.89
Clinical	6.01[*]	4.46	1.4	25.71
Proportion of Time with 2 Parents in the Home	1.22	0.66	0.42	3.54
Parent Foreign Born	1.33	0.91	0.35	5.07
Primary Caregiver Income	1.0	0.0	1.0	1.0
Negative Peer Influence	0.96	0.29	0.53	1.73
Social Capital	1.14	0.16	0.87	1.49
Social Disorder	1.03	0.05	0.94	1.13
Neighborhood Disadvantage Typology				
Disadvantaged	0.72	0.59	0.15	3.54
Average	0.51	0.4	0.11	2.35
<High School Educated	1.08	0.05	0.99	1.17
College Educated	0.96	0.04	0.88	1.05
Children Aged 5 to 17	0.84[*]	0.07	0.72	0.99
Residential Instability	1.05	0.04	0.98	1.13
Foreign Born	0.86[**]	0.03	0.8	0.93
_cons	1.32	3.75	0.01	346.28

Notes: [*]Indicates significance at the $p < .05$ level, [**]Indicates significance at the $p <.01$ level.

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ABSTRACT

NEIGHBORHOOD RISK AND PROTECTIVE FACTORS FOR TEENAGE CHILDBEARING AND FATHERING

by

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May 2012

Advisors: Dr. Arlene N. Weisz and Dr. Anna M. Santiago

Major: Social Work

Degree: Doctor of Philosophy

Background and Purpose

Informed by ecological systems theory, social disorganization theory and social capital theory, this study investigates the neighborhood contexts associated with teenage childbearing and fathering for Latino and Black adolescents who resided in Denver public housing for a substantial period of time during their childhood. Specifically, I examine the extent to which teenage childbearing/fathering (between the ages of 15 and 19) are statistically related to various conditions in the neighborhoods in which these youth were raised. The purpose of this study is to examine how neighborhood effects may vary according to the timing and duration of neighborhood exposure.

Methods

This study utilized a secondary data source, the *Denver Child Study*, a large-scale, mixed-methods study of current and former residents of the Denver (CO) Housing Authority (DHA). Quasi-random assignment to neighborhoods offers a natural experiment for overcoming selection bias in the measurement of neighborhood effects. Data include (1) survey data from parent/caregivers; and (2) administrative data from the U.S.Census Bureau and the Piton

Foundation. Data gathered from parent/caregivers were geocoded for each year of their child(ren)'s life thereby providing a rare opportunity to comprehensively examine neighborhood exposure. The study sample (N=781) is approximately half Latino and half Black, and nearly one fifth of the sample birthed or fathered a child between the ages 15 and 19.

Results

Using a two-level random effects logit model to account for clustering at the family level, I found that neighbborhoods with higher fractions of foreign born residents protected Black and Latino youth from teenage childbearing andfathering. This was true for contemporaneous, lagged, and cumulative models. In the cumulative model of neighborhood exposure, percentage of foreing born in the neighborhood evinced a larger effect on teenage childbearing/fathering than in separate developmental stages suggesting that neighborhood conditions across the lifecourse were magnified.

Conclusions and Implications

Study findings are discussed in terms of their contributions to the literature regarding the magnitude of cumulative neighborhood effects and the existence of lagged and/or developmental stage specific effects of immigrant concentration on teenage childbearing/fathering for low-income Latino and Black youth. Study findings also are discussed in the context of expanding current policy and intervention efforts for teenage childbearing/fathering from focusing only on changing individual behavior to focusing on changeable social aspects of neighborhood. Finally recommendations for future research are made.

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