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Civic Community, Structural Disadvantage, and Suicide: An Ecological Analysis of Middle-Age Non-Hispanic White Male Suicide Across the Rural-Urban Continuum

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CIVIC COMMUNITY, STRUCTURAL DISADVANTAGE, AND SUICIDE: AN ECOLOGICAL ANALYSIS OF MIDDLE-AGE NON-HISPANIC WHITE MALE SUICIDE ACROSS THE RURAL-URBAN CONTINUUM

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ABSTRACT

This dissertation is a county-level sociological examination of middle-age (35-64) non-Hispanic white male suicides. Although an extensive amount of literature exists on ecological suicide, studies have largely ignored the correlates of suicide among this population group because this stage of the life course has historically demonstrated relatively low and stable rates of suicide. However, suicide rates among middle-age adults have increased dramatically over the last decade, calling for an examination of the correlates of suicide specific to this group. Moreover, the extant suicide literature has largely ignored the possibility of a structural disadvantage-suicide link, as well as the influence of macro-structural characteristics of the social and economic environment on variations in ecological suicides. Guided by these issues, the objectives of this dissertation have been to examine whether variations in county-level middle-age non-Hispanic white male suicides can be explained by the differential presence of indicators of civic communities and/or by structural disadvantage and how these relationships vary across the rural-urban continuum.

The results show an association between bridging congregations and lower levels of middle-age non-Hispanic white male suicide across micropolitan counties, an association between civic and social organizations and lower rates of suicide across non core counties, and an association between structural disadvantage and higher rates of suicide across all urbanization levels except non core counties.

CHAPTER 1: INTRODUCTION AND STATEMENT OF THE PROBLEM

This study is a sociological investigation of the factors influencing ecological variation in suicides within the United States. After declining for more than a decade, the suicide rate has been steadily increasing since 1999. According to the Centers for Disease Control and Prevention (CDC), suicide was the 10th leading cause of death in 2010, responsible for over 38,000 deaths (CDC 2010). However, while the national suicide rate has been increasing, a recently released report from the CDC (CDC 2013) found that the increase between 1999 and 2010 (from 10.5 to 12.4 per 100,000) was driven by an increase in suicides by middle-aged adults—defined in the report as individuals 35 to 64 years old. For example, the report showed that between 1999 and 2010 the suicide rate among this age group increased 28.4 percent (from 13.7 to 17.6 per 100,000). Although the report found that rates for both men and women aged 35 to 64 increased during this time, men continue to exhibit much higher suicide rates than women. For example, the suicide rate for middle-age men in 2010 was 27.3 per 100,000, compared to 8.1 per 100,000 among women. When further disaggregated by race/ethnicity, the report showed that among middle-aged men, non-Hispanic whites had the highest suicide rate in 2010 with a rate of 34.2 per 100,000, an increase of approximately 40 percent from 1999.

The findings in this report are troubling and underscore the need to identify factors influencing suicide among this age group, particularly non-Hispanic white males. Because this stage of the life cycle has historically demonstrated relatively low and stable levels of suicide, researchers have primarily focused on high-risk groups such as adolescents and the elderly (Phillips et al. 2010). As a result, the extent to which prevailing sociological theories and empirical findings can explain ecological variation in suicide for this group is unknown. However, the rise in suicide levels among this group along with the concomitant decline in this demographic

group's attachment to core social institutions (e.g., marriage and the labor force) (Phillips et al. 2010) strongly suggests a sociological explanation.

To date, most sociological research on suicide has focused on factors that affect levels of social integration/regulation following Durkheim's (1951 [1897]) seminal work in *Suicide* (see Stack 2000 for a review). According to Durkheim, the variability in suicide rates across geographic areas is the result of societies' differential ability to integrate members into society and engender social control through regulation. The key idea being that too much integration or regulation or too little would result in higher aggregate levels of suicide. However, Durkheim maintained that in modern (i.e., industrialized) society, suicides were primarily the result of too little integration (egoistic suicide) and ineffective regulation (anomic suicide). This assertion was largely predicated on the observation of increasing levels of suicide as societies shifted from being largely agrarian (with strong family, community and religious ties) to predominately urban (with increasing levels of individualism). In other words, Durkheim suggested that individualism strongly contributed to suicide as it reduced attachment to core societal institutions and groups, thereby reducing society's ability to deter deviant behaviors such as suicide.

Building on Durkheim's work, researchers have sought to determine how various indicators of social integration and regulation influence the considerable amount of variation in suicide displayed across geographic areas. It is important to note that although Durkheim distinguished between the effects of social integration and regulation on suicide, suicide scholars have generally employed an integration-regulation (I-R) framework. As pointed out by O'Brien and Stockard (2006), distinguishing between the two concepts is problematic both theoretically and empirically due to the high correlation between the two concepts. Critics of Durkheim's work also point out that he uses the two concepts interchangeably (Davis 2008). Despite this criticism,

Durkheim's work has generated considerable scholarly attention to the distribution of suicide across space.

Although numerous studies have found support for the I-R thesis, the handful of studies employing the framework to examine the phenomenon of rural suicide (e.g., Davis 2008; Faupel, Kowalski, and Starr 1987; Kowalski, Faupel, and Starr 1987), suggest that the traditional measures of social integration/regulation often employed in the sociological literature hold little explanatory power across nonmetropolitan settings. Moreover, given that nonmetropolitan settings generally rate higher on traditional indicators of social integration than metropolitan areas (Beggs, Haines, and Hurlbert 1996), the I-R thesis predicts that rural areas, on average, should exhibit lower levels of suicide than urbanized areas.[1] However, research has demonstrated that the highest levels of suicide occur in rural areas (Eberhardt and Pamuk 2004; Singh and Siapush 2002; Eberhardt et al. 2001).

More recently, researchers have expanded on the traditional sociological indicators of social integration/regulation by examining features of communities which facilitate civic engagement among residents. Civic community scholars contend that a strong civic infrastructure and a local economic orientation positively influence civic welfare "through an enhanced quality of life, more civic engagement by the citizenry, and a strong capacity for local problem solving" (Tolbert 2005:1311). In other words, the social and economic organization of civic communities provides an environment which fosters community cohesion and facilitates collective action on behalf of the community. These scholars have found that communities characterized by a strong presence of civically-oriented religious denominations, secular civic and social organizations, and

[1] Throughout this dissertation, I use the terms "rural" and "nonmetropolitan" interchangeably. Likewise, "urban" and "metropolitan" are used interchangeably throughout.

a small business climate have demonstrably better outcomes across a variety of important socioeconomic indicators compared to their less civically robust counterparts (e.g., Tolbert, Lyson, and Irwin 1998; Tolbert et al. 2002; Lee 2006, 2008, 2010; Lee and Bartkowski 2004a, 2004b; Blanchard, Tolbert, and Mencken 2011).

It should be noted that there is significant overlap between the I-R thesis and the civic community perspective. Both are heavily influenced by Durkheim's work, and social integration/regulation is a key element of both perspectives. However, the focus of I-R research to date has been on the relationship between traditional measures of social integration/regulation such as the family, religion, and labor force participation. In contrast, civic community scholars have typically operationalized social integration/regulation as a function of the community-level institutional infrastructure such as churches, organizations, and local business establishments.

One study specifically examined the link between civic community measures and suicide and found that higher levels of civic community were strongly associated with lower levels of suicide across rural areas (Cutlip, Bankston, and Lee 2010). Although this study is informative and suggests that this conceptual framework, in contrast to the I-R thesis, is able to explain ecological suicide across nonmetropolitan areas, the study is limited in two ways. First, the authors used a composite indicator of civic engagement which (among other indicators) combined a religious measure and a measure of civic and social organizations. As a result, it is unclear whether the religious measure used in the analysis is contributing to the lower levels of suicide or if the other indicators of civic engagement are responsible for the findings. Given the important role that the religious climate plays in less urbanized areas (Lee 2006), and previous ecological I-R studies (e.g., Davis 2008; Faupel et al. 1987; Kowalski et al. 1987) which found no relationship between religious indicators and rural suicide, it seems important to determine the distinct influence of religion on levels of suicide across rural areas.

Additionally, restricting the analysis to nonmetropolitan settings provides an incomplete picture of how the civic community-suicide relationship holds across more urbanized contexts. As other researchers have noted (e.g., Blanchard 2007; Lee 2006), the effect of religion on community outcomes may be more pronounced in nonmetropolitan settings compared to more urbanized areas because churches and congregations play a key role in rural communities. Given that urban environments offer citizens the opportunity to participate in a multitude of secular voluntary associations (compared to less urbanized areas) (Hooghe and Botterman 2012), and that a competition may exist between religious institutions and secular civic associations for members' participation in voluntary activities (Becker and Dhingra 2001), it seems reasonable to assume that in environments where institutional access to secular forms of civic participation is greater, religious institutions may play less of a role in influencing community outcomes.

Support for this assertion can be found in the ecological studies conducted by Faupel et al. (1987) and Kowalski et al. (1987). These authors found that within urbanized areas, religion had a stronger protective influence against elevated suicide rates in "middle urban" counties compared to "most urban" counties. The authors attributed these findings to the increased opportunity to participate in secular activities (and therefore form non-religious ties and social networks) in more densely urbanized areas. Thus, these studies suggest that in urban settings, religious institutions may play less of a role in reducing levels of suicide compared to secular civic and social organizations. In short, research is needed to examine the unique influence of religious versus secular social institutions on variations in suicide across different levels of urbanization.

In addition, research is also needed to examine the relationship between structural disadvantage and suicide rates. Although previous studies have demonstrated an association between aggregate levels of suicide and measures of area socioeconomic status such as median income, unemployment, and income inequality (e.g., Stack 2000; Faupel et al. 1987; Kowalski et

al. 1987), very few studies have explicitly examined the relationship between economic disadvantage and suicide (Behkopf and Buka 2006; Kubrin, Wadsworth, and DiPietro 2006).

Given the findings of an association between higher levels of community resource deprivation and a variety of negative health outcomes (e.g., higher mortality rates, poorer self-reported health, and adverse mental health outcomes) (Diez Roux and Mair 2010), and the well-established association between structural disadvantage and externalized violence, it seems likely that structural disadvantage would also be a factor influencing ecological variation in suicide rates. One study that explicitly examined the disadvantage-suicide link found a strong correlation between an index measure of structural disadvantage and suicide rates among white and black urban teenagers across large U.S. cities (Kubrin et al. 2006). To date, however, no study has examined the influence of structural disadvantage on suicide among other population groups or across other urban or rural contexts.

The purpose of this dissertation is to address the shortcomings in the literature identified above. Specifically, this study theoretically and empirically adds to the sociological literature on suicide in four ways. First, to date, no sociological investigation has examined the structural correlates of middle-age suicide rates. Historically, middle-age adults have exhibited relatively low suicide rates compared to other groups (e.g., teenagers, young adults, and elderly populations) and, as a result, there is a lack of research on the structural correlates of suicide among this age group. This study begins to address this gap in the literature by examining county-level factors associated with suicide patterns among non-Hispanic white males aged 35-64. This specific demographic group was chosen due to the high levels of suicide committed by this group relative to other groups.

Second, this study advances our knowledge of the correlates of ecological suicide by investigating the influence that the community institutional structure plays in the geographic

patterning of suicides. Rather than focus on individual-level indicators of social integration/regulation prevalent in the current suicide literature, this dissertation explores macro-level features of the social and economic environment that affect community levels of suicide. In other words, the objective of the analysis is to ascertain how the social and economic contexts of areas influence their levels of suicide. This study builds on the work of civic community scholars by investigating the relationship between secular civic and social organizations, religious institutions, the local economic climate, and ecological variation in suicides.

Third, this study contributes to the sociological literature by investigating the link between structural disadvantage and suicide. Although studies have demonstrated that higher socioeconomic status areas generally experience lower suicide rates, these investigations have largely ignored the role of poverty and the multiple forms of disadvantage that coexist in impoverished areas (Wilson 1987). Based on Kubrin et al.'s (2006) findings of a strong relationship between structural disadvantage and higher levels of suicide among white and black urban teenagers, I expect to find a similar relationship between higher levels of socioeconomic disadvantage and levels of middle-age suicides. Finally, this study contributes to the sociological literature on suicide by examining how the relationship between the social and economic environment and ecological suicide varies across the rural-urban continuum. To do this, I employ the 2006 National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties (discussed in more detail in a later section) that was specifically developed to allow researchers the ability to study the relationship between community characteristics and health outcomes at different levels of urbanicity.

One of the key benefits of this classification scheme is that it distinguishes between large "urban core" counties and large "fringe" (suburban) counties. This is important because recent research (using a previous version of this classification scheme) found that large suburban

counties have lower levels of suicide than any of the other categories (Eberhardt and Pamuk 2004; Eberhardt et al. 2001). Moreover, there is an increasing awareness among scholars interested in examining health disparities across the rural-urban continuum that a distinction needs to be made between large, inner-city areas and their neighboring (more affluent) suburban areas (Hartley 2004; Eberhardt and Paumk 2004). The social and economic characteristics of large inner cities is fundamentally different from large suburban areas which can disguise important factors contributing to differential health outcomes. Although other rural-urban classification schemes exist, to my knowledge, the NCHS scheme is the only one that differentiates large central counties from large fringe counties and therefore is the classification scheme used in this analysis.[2]

In sum, this dissertation provides a conceptual framework that explains how secular civic and social organizations, religious institutions, the small business climate, and structural disadvantage influence ecological variation in suicide across counties grouped by urbanization level. In the next section, I provide a brief review of the I-R literature on suicide beginning with the work of Emile Durkheim. I then review the literature on the civic community perspective and discuss why I expect that communities with a robust civic infrastructure and a local economic organization will generally experience lower levels of suicide among this demographic group. Next, I suggest that the influence of religious institutions will have a stronger dampening effect on suicides in less urbanized areas. In contrast, the presence of secular social institutions should exert a stronger influence in more urbanized settings. Following this, I discuss structural disadvantage

[2] Classification schemes such as the often-used Rural-Urban Continuum Codes (RUCC) developed by the Economic Research Service of the U.S. Department of Agriculture that were based on the 1990 Office of Management and Budget (OMB) standards for defining metropolitan statistical areas distinguished between large central and large fringe metro counties; however, changes in the OMB standards resulted in a single "large metro" category being used for the 2003 and 2013 RUCC.

and suggest two pathways through which socioeconomic deprivation can influence a community's middle-age non-Hispanic white male suicide rate. Finally, I provide a rationale for understanding why the influence of structural disadvantage on county levels of suicide may be stronger in less urbanized geographies.

CHAPTER 2: LITERATURE REVIEW

Emile Durkheim and the Integration-Regulation Thesis

The study of suicide has held a prominent position within the field of sociology since its inception. In his classic study of suicide, Durkheim (1951 [1897]) observes that suicide rates are highest in geographic locales that lack adequate levels of social integration and social regulation. Central to his conceptualization of the link between macro-social forces and suicide was the role that religion played in influencing patterns of suicide. After observing lower rates of suicide where church participation was higher—with Catholics exhibiting lower rates than Protestants—Durkheim argued that the church plays an important role in integrating individuals into the fabric of society and maintaining social control by regulating behavior. He contended that Catholics exhibit lower rates of suicide than Protestants because the Catholic Church facilitates social integration through ritualized activities and regulates behavior through a centralized religious hierarchy. The Protestant tradition, on the other hand, de-emphasizes ritualized practices and encourages individualism, thus limiting its integrative/regulative capacity.

Most of the early sociological work on suicide focused on attempting to replicate these findings, with mixed results (Burr, McCall, and Powell-Griner 1994). Some research found evidence that supported Durkheim's assertion (e.g., Breault 1986; Burr et al. 1994); however, other research demonstrated little support (e.g., Bainbridge and Stark 1981; Pope and Danigelis 1981; Stack 1980). Pescosolido and Georgianna (1989) argued that the mixed findings are the result of changes that have occurred in religious denominations since Durkheim's writings. These researchers maintain that these changes have altered the relationship between religious groups and society thus calling for a re-evaluation of the nature of the religion-suicide link.

Although Durkheim's Catholic-Protestant differential assertion has received mixed support, his assertion that low levels of integration/regulation are associated with higher levels of aggregate suicide is generally supported. Scholars have examined the relationship between levels of suicide and various indicators of social integration/regulation including divorce rates, family structure, population stability, income inequality, unemployment rates, and urbanization (e.g., Kowalski et al. 1987; Faupel et al. 1987; Chuang and Huang 1997; Burr, Hartman, and Matteson 1999; Breault 1986; Stack 2000; Quinney 1965). Although the indicators of social integration/regulation vary across studies, the general finding is that communities that are characterized by higher levels of integration/regulation, on average, display lower suicide rates. These results, however, are largely restricted to urban areas. As indicated previously, the few studies that have examined rural suicide rates have generally found that the I-R thesis holds little explanatory power across rural areas (Davis 2008; Faupel et al. 1987; Kowalski et al. 1987). This could be because the traditional indicators of social integration/regulation often included in studies of suicide do not take into consideration structural characteristics of the community that may influence patterns of suicide. The next section focuses on these community-level characteristics and how they may influence middle-age non-Hispanic white male suicide.

Civic Community Perspective and Suicide

Civic community scholars maintain that a robust civic infrastructure, high levels of participation among residents, and a locally-oriented economic base positively shape community outcomes because they create dense networks throughout the community which fosters community cohesion, creates high stocks of community social capital, and promotes collective problem-solving capabilities. Communities with a strong presence of civic and social organizations (e.g., Kiwanis club, Rotary Club, Lions Club, American Legion, etc.), provide residents increased

opportunities to interact, form social networks, and participate in activities that benefit the community compared to less civically-strong communities. Put simply, a strong secular community institutional base provides residents more opportunities to interact and form social networks than communities without these structures in place. Moreover, the presence of a strong secular institutional base encourages civic participation among community members which numerous studies have demonstrated leads to positive community outcomes.

Churches and congregations also serve as an important forum for civic engagement and the development of social capital. In his seminal work *Bowling Alone*, Robert Putnam (1995) defined social capital as a community resource that exists because of the norms of reciprocity and trustworthiness that arises out of the social cohesion of residents in the community. He maintained that religious institutions are an important source of civic engagement and social capital in the U.S. The social networks that develop through religious participation may also lead to higher levels of community involvement and participation in secular forms of civic engagement such as volunteering (Beyerlein and Hipp 2006; Lam 2002; Park and Smith 2000; Wuthnow 1998, 2002; Greely 1997).

However, scholars have noted that religious denominations vary in the degree to which they encourage civic participation. Recognizing this, Tolbert et al. (1998) develop a measure of civically-engaged denominations by identifying denominations whose members exhibit above average membership in voluntary associations. Their findings show that communities with higher levels of adherents in civically-engaged denominations have lower levels of poverty, unemployment, and income inequality, and higher median family income compared to communities with lower levels of these religious denominations. More recently, Lee and Bartkowski (2004a) demonstrate that this civically-engaged denominations measure reduces family-related juvenile homicide in rural counties.

Other scholars maintain that the structural and cultural aspects of community religious institutions need to be considered when examining community outcomes. For example, Blanchard et al. (2008) explicate a religious environment thesis to explain variations in county-level mortality outcomes. Certain denominations, they argue, stress the importance of improving social conditions while others are more concerned with the afterlife and individual salvation. Denominations concerned with improving societal conditions, they assert, are more likely to invest in the community and build ties with the broader community.

It is important to note that these researchers focused on the religious institutional infrastructure present in communities. In contrast, the civically-engaged denominations measure focuses on the religious denominations whose adherents exhibit above average civic participation. This is an important distinction because the investments made by religious institutions (e.g., support for the poor, educational and training programs) benefit both religious and nonreligious community members. In other words, the civically-engaged denominations approach suggests that communities experience positive outcomes because they cultivate a high level of participation among adherents; however, the benefits accrue primarily to the members of these networks. A 'bridging congregations' approach, in contrast, suggests that communities experience positive outcomes because the presence of these religious institutions benefit all community members—irrespective of church affiliation.

In addition to secular civic and social institutions and religious institutions, another key dimension of the civic community perspective is the role that the economic climate plays in community outcomes. Civic community scholars assert that positive community outcomes are experienced when the economic climate is largely comprised of small, local establishments rather than dominated by a few large enterprises. The assumption is that this type of economic environment enhances community welfare because business owners are embedded in the

community and have a financial interest in ensuring that the community flourishes. Tolbert et al. (1998:405) maintain that: "This embeddedness helps ensure that small producers are less likely to pull out of the local community during economic downturns and more likely to provide support, membership, and direction for local institutions." Small business environments are said to foster community cohesion by nurturing trust and cooperation among members of the community. This, in turn, contributes to the community's ability to solve problems without outside assistance (Tolbert et al. 2002).

The association between positive community outcomes and small, locally-oriented economic climates has long been documented. Mills and Ulmer 1970 [1946] demonstrated that among manufacturing communities, those comprised of smaller, locally-oriented firms fared better in terms of social, economic and political outcomes than those dominated by large manufacturing firms. Goldschmidt (1946) found similar results in a study of agricultural communities. More recent studies have also demonstrated how small business climates can influence community outcomes. For example, Blanchard et al. (2011) demonstrated that small business communities experienced better population health outcomes (lower levels of mortality, obesity, and diabetes) compared to communities dominated by large business establishments. They maintain that a small business environment encourages the development of collective efficacy, which is essentially the ability of communities to mobilize collectively to address community issues. As a result, communities are able to establish and maintain adequate public health infrastructure, obtain other health promoting programs and services, and influence health behaviors (Blanchard 2011). Thus, small-business communities are said to be more cohesive, stable, and effective at identifying and addressing community issues than communities with large-scale economies. These characteristics, in turn, positively shape community outcomes.

Several studies have now demonstrated that civic communities have lower levels of poverty, less inequality, lower levels of unemployment, higher median incomes, lower levels of crime, and better population health outcomes than civically-weak communities (e.g., Tolbert et al. 1998; Tolbert et al. 2002; Lee 2006, 2008, 2010; Lee and Bartkowski 2004a, 2004b; Blanchard et al. 2011). Although previous studies applying the civic community perspective have demonstrated that civically-involved communities fare better across a number of community outcomes, only one study has linked civic institutions and local orientation to community levels of suicide.

Cutlip et al. (2010) demonstrate that an index measure of civic community (percentage of eligible voters who voted in the 2000 presidential election, small manufacturers per 1,000 people, family-owned farms per capita, civic and social organizations per 1,000 population, and bridging denominations per 1,000 people), a measure of the independent middle class (percentage of workers working at home and percentage self employed), and residential stability each were significantly associated with lower ecological nonmetropolitan suicides for white males and white females aged 20-54 and 55 and older. These results support the assertion that a robust civic infrastructure and local orientation to the economic base will reduce ecological variations in suicide.

How might a community's civic infrastructure influence the level of middle-age non-Hispanic white male suicides present in the community? A civic community has a robust secular and religious institutional base which provides community members ample opportunities to interact and form ties to other members in the community. The small-business climate further contributes to community connectedness. Because customers and employees are also neighbors and friends, small-business owners strive to ensure a prosperous and safe community for all. As a result of these characteristics, community members are integrated into the community, there is a general understanding of the behaviors that are acceptable in the community, and residents share

an understanding of core community values. Community members feel a sense of belonging and purpose. They also ascribe to the belief that they have a civic duty to participate in community affairs to ensure that the community is successful. Members of civic communities are not disillusioned by the political process. They see evidence that their collective action can bring about important and necessary changes in the community. For example, civic communities are able to organize quality medical services, provide important resources that facilitate good health, and reinforce healthy behavior. Moreover, civic communities generally have higher median incomes and lower levels of poverty, unemployment, and income inequality compared to less civically robust communities which should translate into lower aggregate levels of suicide.

In sum, a strong presence of secular civic and social organizations, a religious environment comprised of bridging religious institutions, and a small business climate create dense community networks that foster trust, collectively-held values, and problem-solving capabilities. Based on the previous studies, I hypothesize that:

H1: The presence of civic and social organizations will be associated with lower levels of middle-age non-Hispanic white male suicides.

H2: The presence of bridging congregations will be negatively associated with middle-age non-Hispanic white male suicides.

H3: Locally-oriented business climates will be associated with lower levels of middle-age non-Hispanic white male suicides.

However, although it is expected that a robust civic institutional base will be associated with lower levels of suicide, there is evidence in the extant literature to suggest that the influence of religious and secular institutions will vary depending on level of urbanicity. Researchers have noted that churches play a particularly important role in rural areas due to the limited number of secular institutions present in less densely populated areas (Blanchard 2007; Lee 2006). Thus, in rural

areas churches may constitute the primary integrative social institution and therefore play a key role in influencing levels of suicide.

Moreover, researchers are beginning to challenge the traditional view within sociology that urban environments are less integrated and not conducive to fostering community and civic engagement (Hooghe and Botterman 2012). Scholars such as Durkheim (1951 [1897]) and Wirth (1938) maintained that urban environments were characterized by anonymity, individualism, and a lack of integration and regulation. Urbanization was thought to be deleterious to integration and civic engagement due to lower levels of religious, family, and community ties that encouraged participation in civic life. However, recent scholars suggest that urban environments are comprised of extensive friendship-based social networks and that urban residents regularly participate in civic activities (Hooghe and Botterman 2012; Haddad 2004; Fischer 1982).

Additionally, there is an ongoing debate in the literature concerning whether or not civic engagement has declined over the last several decades. Putnam (2000, 1995) maintains that there has been a precipitous decline in social capital and civic engagement; however, other scholars argue that rather than declining, civic engagement remains high but has changed over time and now—rather than being engendered through membership in traditional associations—participation in civic life is fostered through less structured forms of voluntary associations (Hooghe and Botterman 2012; Becker and Dhingra 2001; Skocpol 2004, 1996; Wuthnow 1998). Put another way, individuals are no longer participating in civic engagement by joining traditional membership-based associations. Rather, individuals are participating in volunteer activities through multiple voluntary associations.

Thus, in urbanized areas, residents are able to engage in civic life through a number of voluntary associations due to the concentration of a variety of secular civic and social organizations. In contrast, rural communities often rely on churches and congregations as their

primary civic and integrative institution. This suggests that there may be a religious versus secular institutional influence on levels of suicide across the rural-urban continuum. The findings from a few studies offer support for this assertion.

Drawing on the I-R thesis, Faupel et al. (1987) examined the influence of Catholicism (measured as proportion of the population Catholic) on suicide disaggregated by population density (rural, middle urban, most urban). Their analysis revealed a protective effect of Catholicism in the middle and most urban counties, but found that Catholicism has the strongest effect in the middle urban category. They attribute these findings to the interplay between Catholicism and the availability of other integrating institutions present in the broader community. For example, they contend that the stronger effect of Catholicism in middle urban areas than in highly urban areas is likely the result of fewer competing social institutions providing opportunities for integration in middle urban areas. Surprisingly, their study found no influence of Catholicism in rural areas. They attribute this finding to the strong kinship ties characteristic of rural areas. These familial ties, they assert, are more influential in reducing suicides in low-density areas where non-family social institutions are limited.

Similarly, Kowalski et al. (1987) also examine the influence of religion on suicide rates disaggregated by population density. In addition to the proportion Catholic in the population, they also examined the influence of the percent Protestant adherents in the community. They find a protective effect of Catholicism and Protestantism in middle urban counties, an aggravating effect of Protestantism in most urban areas, and no effect of either religious measure in rural counties. These authors conclude that "urban life does not necessarily weaken the community or moral order but instead helps to sustain a plurality of relations and bonds between individuals and groups. Such linkages, in turn, may provide stronger conduits for the influence of social groups on the behavior of urbanites than do linkages in rural environments" (Kowalski et al. 1987:97). In

other words, highly urbanized areas provide more opportunity to participate in non-religious activities due to the stronger presence of secular institutions in these areas compared to less urbanized areas. Moreover, Lee and Ousey (2005) found that civic and social organizational access had a greater influence on depressing homicides across large urban counties compared to access to churches. Based on these findings, it seems logical that secular social institutions and associations may offer more protection from higher levels of suicide in more urbanized areas. In contrast, religious institutions should exert more influence in less urbanized areas where communities are often organized around churches and congregations. To date, no sociological study on suicide has examined this possibility. Based on these studies, I expect that:

> H4: The presence of civic and social organizations will exert a stronger influence on reducing middle-age non-Hispanic white male suicides in densely populated areas compared to religious institutions.
>
> H5: The presence of bridging congregations will exert a stronger influence on reducing middle-age non-Hispanic white male suicides in less densely populated areas compared to secular institutions.

In sum, civically-robust communities have the infrastructure in place to facilitate social integration/regulation and, conversely, areas with weak civic infrastructures are assumed to be more socially isolated. However, social isolation can also arise in the presence of acute structural disadvantage. The next section turns to the relationship between structural disadvantage and middle-age non-Hispanic white male suicide.

Structural Disadvantage and Suicide

To date, very little research has explored the effect of socioeconomic disadvantage on suicide rates. Durkheim (1951 [1897]) contended that poverty imposes self restraint and therefore lowers suicides rates, however, the emerging evidence suggests that this is not the case. For example, Chuang and Huang (1997) found that per capita income was negatively associated with suicide and, in fact, was a stronger correlate of suicide than traditional measures of integration/regulation (e.g., divorce rates, percentage of the population living alone). Other studies have reported a similar inverse relationship between median family income and suicide rates (Rehkopf and Buka 2006; Faupel et al. 1987; Kowalski et al. 1987).

Although these studies suggest that area socioeconomic characteristics influence suicide rates the studies are limited in that they usually focus on a single measure to capture the economic conditions present in the community. However, as Wilson's (1987) work demonstrates, areas characterized by high levels of poverty often experience numerous forms of disadvantage with important implications for the welfare of citizens.

In his seminal book, *The Truly Disadvantaged*, William Julius Wilson (1987) argued that a number of changes occurred during the 1970s and 1980s that resulted in high poverty urban areas that were isolated from mainstream society and often lacking an institutional base necessary for maintaining stability and social control. He argued that historical discrimination left blacks without the human capital to compete in the labor market when the manufacturing sector declined. Wilson maintained that black males who would have been employed in low skill (but good paying) manufacturing jobs dropped out of the labor force when jobs requiring more education and skills became the predominant form of employment available. Wilson then linked the deterioration in black male economic prospects to the rise in female-headed households.

Compounding the problem, Wilson argued, was that blacks with more education and skills benefited from this economic restructuring and the reduced discrimination in housing and lending markets. This resulted in middle- and working-class blacks leaving the inner cities which removed positive role models from the cities, undermined community institutions, and removed informal job networks from the community. As a result, many of these inner-city neighborhoods were characterized by extreme levels of poverty, low rates of employment, high crime rates, and large proportions of households headed by single females.

Wilson's thesis has contributed much to the discussion of the economic and social conditions in inner cities. In particular, a significant amount of research has examined how conditions in these areas influence crime and violence. Most of this work maintains that structural disadvantage impedes a community's ability to effectively control residents through informal control mechanisms and thus creates an environment in which crime, in particular violent crime, can flourish. However, conspicuously absent in the literature is a discussion of the relationship between structural disadvantage and suicide. This likely stems from the fact that most sociological research is heavily influenced by Durkheim's work. Based on the extant literature, it appears that researchers have followed his lead in focusing on social integration/regulation and dismissing structural disadvantage as a possible correlate of suicide.

An exception to this is a study conducted by Kubrin et al. (2006). To investigate the relationship between structural disadvantage and suicide, these researchers draw on Wilson's thesis to explore the relationship between disadvantage and suicide rates among young black males aged 15 to 34 across large U.S. cities. In addition, they performed similar analyses for young white males in order to determine whether the effects of economic disadvantage influenced suicide rates among this group in a similar manner. Their study revealed a strong correlation between an index measure of structural economic disadvantage and variations in suicide rates for

both groups. They speculate that the effects of structural economic disadvantage on suicide may be indirect through its adverse influence on integrative social institutions, however, their study did not specifically test this assertion.

Compared to the volume of literature examining metropolitan structural disadvantage, research on nonmetropolitan resource deprivation has received much less attention (Tickamyer and Duncan 1990). Although rural poverty has been consistently higher than urban poverty, most research efforts have focused on urban environments (Jensen, McLaughlin, and Slack 2003). Structural explanations of rural poverty typically focus on factors associated with the local labor market and low aggregate levels of human capital in rural communities (Jensen et al. 2003; Cotter 2002; Tickamyer and Duncan 1990). Specifically, rural scholars suggest that economic restructuring and the decline in traditional rural industries (e.g., resource extraction, agriculture, manufacturing) during the 1980s exacerbated already poor social and economic conditions in many nonmetropolitan settings. Moreover, social isolation, limited infrastructure, and low levels of human capital have made it difficult for rural communities to attract businesses to improve labor market conditions and stimulate economic development.

With respect to suicide, no study to date has explored whether the structural disadvantage-suicide link found by Kubrin et al. (2006) applies in less urbanized areas. However, the fact that suicide rates are lowest in the more affluent, large suburban areas and highest in the more economically disadvantaged rural areas (Eberhardt and Pamuk 2004; Singh and Siapush 2002; Eberhardt et al. 2001) strongly suggests that economic disadvantage may be an important correlate of ecological variation in rural suicides.

What is the conceptual link between structural disadvantage and community levels of middle-age non-Hispanic white male suicide? One pathway through which structural disadvantage can influence suicide rates suggested in the extant literature is through its influence on

psychosocial factors. Suicide has been closely linked with depression (American Foundation for Suicide Prevention 2012) and depression has been linked with neighborhood structural disadvantage (Ross, Reynolds, and Geis 2000; Ross and Mirowsky 2001; Galeo et al. 2005). In addition, disadvantage and high levels of crime often go hand in hand, and living in an environment fraught with danger can lead to increased levels of stress, anxiety, and depression among residents.

In turn, these psychosocial stressors can lead to high-risk behaviors such as excessive alcohol consumption, which research has also demonstrated to be highly correlated with suicide at the individual level (Rehkopf and Buka 2006). Ecological research has also found a higher density of stores selling alcohol in areas with higher poverty rates (Duncan, Duncan, and Strycker 2002). With respect to nonmetropolitan settings, research has found that rural residents exhibit higher levels of depression and excessive alcohol consumption compared to urban areas (Probst et al. 2006).

Another mechanism through which structural disadvantage can influence ecological levels of suicide is through its influence on community social institutions. Social institutions are important because they allow residents to build ties with other members, establish networks, and build trust and shared values within the community. Structural disadvantage makes it difficult for communities to maintain a strong institutional base which, in turn, impedes the development of community cohesion and informal social control mechanisms.

One of the most important studies to highlight the importance of community institutions can be found in Wilson's (1987) influential work on conditions in the inner city. Wilson argued that the exodus of core social institutions following the out-migration of the black middle class from inner cities—combined with deteriorating economic conditions in inner cities—resulted in communities plagued by many negative social conditions. Building on this work, Lee and Ousey

(2005) maintain that a weak institutional base can affect community levels of homicide because it limits the ability of residents to form social networks, participate in civic activities, and reduces the ability of communities to collectively solve problems. They found that greater access to mainstream social institutions (e.g., churches and civic and social organizations) was associated with lower levels of black homicide across 310 large urban counties.

In short, structural disadvantage can lead to higher levels of suicide because residents may feel depressed, fearful, or anxious due to the conditions of their environment. This, in turn, can lead to high-risk behavior such as excessive alcohol consumption. Additionally, a weak institutional infrastructure reduces the ability of residents to establish ties with other members of the community and participate in activities that can potentially alleviate some of poor conditions within the community. Based on previous findings that demonstrate that structural disadvantage adversely influences a number of indicators of population health, including levels of suicide, I predict that:

> H6: Structural disadvantage will be positively related to middle-age non-Hispanic white male suicides across the rural-urban continuum.

However, although I anticipate finding a strong association between structural disadvantage and ecological suicide across all geographic categories, I expect that the influence of structural disadvantage on suicide will be more pronounced in less densely populated areas. In order to maximize available resources, need-based assistance programs and social service providers are often located in inner-city urban environments because these areas have large concentrations of low-income populations within spatial proximity (Allard 2004). Because of this, studies have found that access to social and health care services designed to assist low-income populations are much less available in poor suburban areas compared with poor inner cities (Allard 2004; Felland, Lauer, and Cunningham 2009). Low-income rural areas face an even greater impediment to

providing access to assistance services to their residents than suburban areas, with rural residents often having to travel extended distances to receive assistance (Jones et al. 2009). Thus, in geographically remote areas, low-income residents may need to travel long distances to obtain treatment for depression and may instead choose to forego treatment and instead 'self-medicate' with alcohol or non-prescription drugs. This, in turn, may increase the likelihood that suicide would be seen as a viable alternative solution. Therefore, I hypothesize that:

H7: Structural disadvantage will exert a stronger influence on middle-age non-Hispanic white male suicides in less densely populated areas compared to more urbanized areas.

Summary and Hypotheses

Although an extensive amount of sociological research has examined the correlates of ecological suicide, four key issues have been identified in the extant literature that warrant further investigation. First, little is known about the structural correlates of middle-age non-Hispanic white male suicides. Second, previous studies have rarely examined the influence of social and economic institutional features of communities on their levels of suicide. Third, the relationship between structural disadvantage and suicide has received little attention in the extant literature. Finally, how these relationships vary across levels of urbanicity is unclear. This dissertation aims to contribute to the sociological literature on suicide by examining these issues. Based on the preceding literature review, I hypothesize that:

H1: The presence of civic and social organizations will be associated with lower levels of middle-age non-Hispanic white male suicides.

H2: The presence of bridging congregations will be negatively associated with middle-age non-Hispanic white male suicides.

H3: Locally oriented business climates will be associated with lower levels of middle-age non-Hispanic white male suicides.

H4: The presence of civic and social organizations will exert a stronger influence on reducing middle-age non-Hispanic white male suicides in densely populated areas compared to religious institutions.

H5: The presence of bridging congregations will exert a stronger influence on reducing middle-age non-Hispanic white male suicides in less densely populated areas compared to secular institutions.

H6: Structural disadvantage will be positively related to middle-age non-Hispanic white male suicides.

H7: Structural disadvantage will exert a stronger influence on middle-age non-Hispanic white male suicides in less densely populated areas compared to more urbanized areas.

CHAPTER 3: DATA, MEASURES, AND METHODS

In this dissertation, I test the preceding hypotheses using indicators of civic community, measures of structural disadvantage, and various controls derived from the suicide literature. This section describes the data and analytical methods that are employed to investigate the research questions of interest in the analysis. I first describe the data sources from which the outcome variable, predictor variables, and control variables are drawn. I then specify and define the various measures included in the analysis. I conclude this section with a discussion of the analytical techniques that are employed in the analysis.

Data Sources

The data for this analysis are drawn from multiple sources. Suicide data are obtained from the CDC's Compressed Mortality File (CMF; 1999-2010 version) available from the online CDC Wonder database. The CMF contains county-level mortality data for the nation from which the number of deaths—including those due to suicide—can be obtained and utilized in analyses.

Data concerning religious institutional access are obtained from the Religious Congregations and Membership Study, 2000 (Counties File) produced by the Association of Statisticians of American Religious Bodies (ASARB). This study includes the number of congregations present in each county in the nation during the 1999-2001 period.[3] Data are also drawn from three surveys produced by the U.S. Census Bureau: the 2007 County Business

[3] Although a 2010 version of this dataset has been released, the decision was made to use the 2000 version because the data collection period for the new release was 2009-2011. This means that two years of data for the dependent variable (2007 and 2008) were collected prior to the collection period of the 2010 version. This may be problematic as one of the goals of this dissertation is to examine how religious congregations affect levels of suicide. Therefore, the data collection period for the independent variables should be collected prior to, or concurrently with, the dependent variable.

Patterns (CBP) survey, the 2007 Nonemployer Statistics survey, and the 2006-2010 5-Year American Community Survey (ACS). Information pertaining to the number of civic and social organization establishments are obtained from the CBP survey, and data concerning local business establishments are obtained from the CBP survey and the Nonemployer Statistics survey.

Various county-level characteristics—including measures of structural disadvantage—are obtained from the 2006-2010 ACS. The 2006-2010 ACS 5-year estimates represent the average characteristics of the county (or county equivalent) over the data collection period. The 2006-2010 ACS data were collected from January 1, 2006 through December 31, 2010.

Measurement

Dependent Variable

Middle-Age Non-Hispanic White Male Suicide

The dependent variable in the analysis is the number of non-Hispanic white male deaths (aged 35-64) in each county (or county equivalent) that were identified on death certificates as being the result of suicide, summed for the 2007-2010 period. Because suicide is a statistically rare event, it is common practice in the literature to average multiple years of data to ensure statistical reliability. Following Kubrin et al. (2006), four years of data were included in the current analysis. Additionally, the analytical methodology (discussed below) which is commonly employed in suicide research calls for suicide count data to be used as the outcome variable rather than suicide rates. It should also be noted that the CDC suppresses suicide data when the number of deaths is less than ten. As with other studies (e.g., Chauvin 2013), these missing values are set to zero for the purpose of this analysis.

Primary Explanatory Variables

In this analysis, I regress middle-age non-Hispanic white male suicide counts on the following structural characteristics of counties:

Civic Community

The civic nature of communities has been measured in a number of ways. The current study includes three measures drawn from previous studies: civic and social organizations, bridging congregations, and local economic orientation.

The number of civic and social organization establishments in each county are obtained from the 2007 U.S. Census Bureau's County Business Patterns data. It should be noted that these data are based on administrative records provided by the Internal Revenue Service, and therefore do not include informal associations (e.g., neighborhood watches or local community leagues). While a more robust measure would be ideal, this measure is commonly employed in the civic community literature and therefore the measure used in this dissertation. The number of civic and social organizations are then transformed into a rate per 1,000 population.

The measure of bridging congregations is derived from Blanchard et al.'s (2008) conceptualization of the religious environment. These researchers identified Catholic, Mainline Protestant, and certain Evangelical Protestant denominations as those which build ties with the broader community.[4] The number of these congregations in each county (or equivalent) are obtained from the Religious Congregations and Membership Study, 2000 (Counties File). The total sum of these are then transformed into a rate per 1,000 population.

[4] Appendix A provides a list of the Mainline and Evangelical Protestant denominations which are considered bridging denominations.

In line with Blanchard et al. (2011), local economic orientation is measured as the number of establishments in each county (or equivalent) employing 0-4 employees per 1,000 residents. These data are drawn from the 2007 County Business Patterns and the 2007 Nonemployer Statistics.

Structural Disadvantage

As noted previously, studies examining the relationship between area socioeconomic status and suicide have generally included a measure of per capita income (Chuang and Huang 1997) or median family income (Faupel et al. 1987; Kowalski et al. 1987). Following Kubrin et al. (2006), this analysis measures structural disadvantage by including the percentage of the population living below the poverty line, percentage of the population aged 25 and older with less than a high school diploma (or equivalent), percentage of households headed by single females with children present, and the percentage of the population aged 16 and older who are unemployed. These data are drawn from the 2006-2010 5-year ACS.

Control Variables

In order to assess the effects of the key explanatory variables identified above on middle-age non-Hispanic white male suicide, it is necessary to control for other variables identified in previous research to influence suicide rates. Based on prior research (see Stack 2000 for a review), these measures include the percentage of the population who are divorced, percentage of the population living alone, a measure controlling for residential stability (the percentage of the population that either resided in the same house or the same county one year ago), the Gini index of income inequality, and the logged size of the population at risk (i.e., the log of non-Hispanic white males aged 35-64). These variables are drawn from the 2006-2010 ACS. Previous research has also shown that suicide rates are highest in the western region of the United States, and

therefore a regional control variable to statistically account for higher levels of suicide in the western region is also included in the analysis.[5]

In addition to these variables that have been identified as important correlates of suicide in previous ecological studies, another factor that has not previously been explored in ecological studies is the proportion of the population that are veterans. However, a study conducted by the Department of Veterans Affairs (based on data collected from 21 states in the 1999 – 2009 period) found that of all suicides reported, approximately 22 percent were committed by veterans. These results suggest that areas with large veteran populations may exhibit higher levels of suicide. As a result, the proportion of the population who are veterans is also controlled for in the current analysis. These data are also drawn from the 2006-2010 ACS.

Analytical Methods

The units of analysis in this dissertation are counties (or county equivalents) located within the 48 contiguous states with complete data on measures included in the analysis.[6] In addition to examining all counties within the contiguous U.S., this study disaggregates counties into separate categories based on urbanization level using the 2006 Urban-Rural Classification Scheme for Counties developed by the National Center for Health Statistics (NCHS). The scheme classifies counties into six categories based on the 2005 Office of Management and Budget (OMB) delineation of metropolitan and micropolitan statistical areas (derived from the 2000 OMB

[5] The United States is divided into four Census Regions. The West Census Region is comprised of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah Washington, Wyoming. Counties within Alaska and Hawaii will not be included in the analysis.

[6] Broomfield County, Colorado and Loving County, Texas are not included in analyses due to missing church data.

standards), population cutoffs from the Rural-Urban Continuum Codes developed by the Economic Research Service of the U.S. Department of Agriculture, 2004 postcensal population estimates, and classification criteria developed by the NCHS (see Ingram and Franco 2012).

The 2006 NCHS scheme includes four metropolitan statistical area (MSA) categories: large central metropolitan, large fringe metropolitan, medium metropolitan, and small metropolitan. The large central metropolitan category includes the 63 most urban counties within MSAs of one million or more total population. The large fringe metropolitan category includes the 354 large suburban counties within MSAs of one million or more. The medium metropolitan category includes the 332 counties in MSAs of 250,000 to 999,999 population. The small metropolitan category includes the 341 counties within MSAs of less than 250,000.

The 2006 NCHS scheme also includes two nonmetropolitan categories—micropolitan (694 counties) and noncore (1,358 counties). These categories are derived from the 2005 OMB designation of micropolitan or non core status. The OMB defines micropolitan statistical areas as core areas which include at least one urban cluster of 10,000 to 49,999 population. Non core counties are nonmetropolitan counties which are not part of a micropolitan statistical area (i.e., have no cluster of at least 10,000 population).

Descriptive Statistics

The descriptive statistics for the dependent, independent, and control variables are presented in Tables 1 – 7. Table 1 shows an average suicide count of 15.27 for all counties in the contiguous U.S. for the 2007-2010 period. With respect to the primary variables of interest, Table 1 shows that counties in the contiguous U.S. had, on average, 1.17 bridging congregations per 1,000 population, 0.13 civic and social organizations per 1,000 residents, and 84 small business establishments per 1,000 population. Among the indicators of structural disadvantage, the poverty

rate for all counties was 15.55 percent, the average percentage of female-headed households was 6.51 percent, the percentage of the population with less than a high school diploma (or equivalent) was 16.94, and the unemployment rate was 4.46 percent. The descriptive statistics for the control variables indicated that for all counties, the average Gini index was 0.43, 11.52 percent of the population were veterans, 10.95 percent of the population were divorced, 27.03 percent lived alone, and 93.05 percent of the population either lived in the same house or the same county in the previous year.

Table 1: Descriptive Statistics for All Contiguous U.S. Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	15.27	42.54	0.00	835.00
Bridging Congregations, 2000	1.17	1.01	0.00	8.86
Civic and Social Organizations, 2007	0.13	0.16	0.00	2.04
Small Business Establishments, 2007	84.00	25.22	20.19	456.03
Poverty Rate, 2006-2010	15.55	6.37	0.00	53.50
Female-headed Households, 2006-2010	6.51	2.51	0.00	21.70
High School Dropouts, 2006-2010	16.94	7.34	0.70	52.10
Unemployment Rate, 2006-2010	4.46	1.80	0.00	20.00
Gini Index, 2006-2010	0.43	0.04	0.31	0.65
Proportion Veteran, 2006-2010	11.52	2.86	2.90	32.40
Proportion Divorced, 2006-2010	10.95	2.32	1.60	24.72
Proportion Living Alone, 2006-2010	27.03	4.48	10.84	49.88
Residential Stability, 2006-2010	93.05	3.18	53.57	100.00
Population at risk (ln), 2007-2010	9.83	1.43	4.38	14.78
Dummy West	0.13	0.34	0.00	1.00

N=3107

Tables 2 – 7 presents the descriptive statistics for counties disaggregated into the six categories. Of notable interest with respect to the variables of interest, the number of bridging congregations per population steadily increases with declining levels of urbanization. For example, the average number of bridging congregations per 1,000 residents increases from 0.29 in the most urbanized counties (i.e., large central metropolitan counties) to 1.72 per 1,000 residents in the least urbanized counties (i.e., non core counties). The average number of civic and social

organization establishments ranges from a low of 0.08 per 1,000 residents in large suburban metropolitan counties to a high of 0.15 per 1,000 residents in both micropolitan counties and non core counties.

Tables 2 – 7 also show that, as expected, the lowest average poverty rate (10.41%) was found in large suburban metropolitan counties, while the average highest rate was found in non core counties (16.80%). The lowest average for female-headed households was found in non core counties (5.92%) and large central metropolitan counties had the highest average (8.58%). Tables 2 – 7 show that non core counties had the highest average high school drop out rate (18.41%), followed by micropolitan counties (17.49%). Large suburban metropolitan counties had the lowest average high school drop out rate (13.54%). Unemployment was lowest in non core counties (4.08%) and highest in large central metropolitan counties (5.69%). Income inequality, as measured by the Gini index, was highest in large central metropolitan counties (0.48) and lowest in large suburban metropolitan counties (0.41). The proportion of the population who were veterans ranged from a low of 8.49 percent in large central metropolitan to a high of 11.78 percent in non core counties. The average divorce rate was lowest in large suburban counties (10.41%) and highest in micropolitan counties (11.21%). The average proportion of the population living alone ranged from a high of 31.65 percent in large central metropolitan counties to a low of 23.40 percent in large suburban metropolitan counties. In general, residential stability across categories reflected a similar picture of stability as shown for the nation overall (Table 1) with approximately 93 percent remaining either in the same house or same county as the previous year.

Table 2: Descriptive Statistics for Large Central Metropolitan Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	190.13	164.66	13.00	835.00
Bridging Congregations, 2000	0.29	0.11	0.08	0.61
Civic and Social Organizations, 2007	0.10	0.06	0.01	0.39
Small Business Establishments, 2007	86.69	20.60	51.82	177.35
Poverty Rate, 2006-2010	15.69	4.41	6.80	28.40
Female-headed Households, 2006-2010	8.58	2.37	3.40	19.30
High School Dropouts, 2006-2010	15.43	4.55	7.50	31.20
Unemployment Rate, 2006-2010	5.69	1.15	3.00	9.70
Gini Index, 2006-2010	0.48	0.03	0.40	0.60
Proportion Veteran, 2006-2010	8.49	3.12	3.10	20.10
Proportion Divorced, 2006-2010	10.62	1.79	6.63	15.55
Proportion Living Alone, 2006-2010	31.65	6.09	20.41	48.19
Residential Stability, 2006-2010	93.48	2.76	84.12	97.10
Population at risk (ln), 2007-2010	12.97	0.78	10.98	14.78
Dummy West	0.22	0.42	0.00	1.00

N=63

Table 3: Descriptive Statistics for Large Suburban Metropolitan Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	35.44	47.67	0.00	360.00
Bridging Congregations, 2000	0.56	0.39	0.00	2.95
Civic and Social Organizations, 2007	0.08	0.07	0.00	0.40
Small Business Establishments, 2007	85.00	20.14	37.38	209.54
Poverty Rate, 2006-2010	10.41	4.49	2.90	27.40
Female-headed Households, 2006-2010	6.51	1.93	2.20	17.40
High School Dropouts, 2006-2010	13.54	5.94	2.40	32.20
Unemployment Rate, 2006-2010	4.76	1.31	1.50	9.30
Gini Index, 2006-2010	0.41	0.03	0.33	0.54
Proportion Veteran, 2006-2010	11.16	2.66	5.00	23.10
Proportion Divorced, 2006-2010	10.41	1.89	6.29	18.09
Proportion Living Alone, 2006-2010	23.40	4.34	14.17	42.20
Residential Stability, 2006-2010	92.66	2.84	73.60	97.86
Population at risk (ln), 2007-2010	11.04	1.28	7.79	13.81
Dummy West	0.08	0.27	0.00	1.00

N=353

Table 4: Descriptive Statistics for Medium Metropolitan Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	33.18	37.52	0.00	206.00
Bridging Congregations, 2000	0.63	0.41	0.03	2.64
Civic and Social Organizations, 2007	0.09	0.07	0.00	0.32
Small Business Establishments, 2007	78.05	15.09	23.67	144.52
Poverty Rate, 2006-2010	14.12	4.80	1.10	34.70
Female-headed Households, 2006-2010	7.00	2.06	1.50	14.20
High School Dropouts, 2006-2010	15.03	6.11	3.10	39.80
Unemployment Rate, 2006-2010	4.82	1.21	1.30	10.30
Gini Index, 2006-2010	0.43	0.03	0.33	0.54
Proportion Veteran, 2006-2010	11.58	2.68	5.20	21.40
Proportion Divorced, 2006-2010	11.08	1.88	4.85	16.10
Proportion Living Alone, 2006-2010	26.01	4.18	12.02	38.94
Residential Stability, 2006-2010	92.98	3.26	53.57	97.42
Population at risk (ln), 2007-2010	10.99	1.17	7.65	13.26
Dummy West	0.11	0.32	0.00	1.00

N=329

Table 5: Descriptive Statistics for Small Metropolitan Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	16.14	16.63	0.00	88.00
Bridging Congregations, 2000	0.78	0.59	0.09	4.09
Civic and Social Organizations, 2007	0.12	0.10	0.00	0.64
Small Business Establishments, 2007	75.57	17.11	34.81	140.47
Poverty Rate, 2006-2010	15.14	5.20	1.50	33.50
Female-headed Households, 2006-2010	7.13	2.22	3.00	16.50
High School Dropouts, 2006-2010	15.72	6.58	4.40	38.60
Unemployment Rate, 2006-2010	4.60	1.49	1.10	11.10
Gini Index, 2006-2010	0.43	0.03	0.36	0.51
Proportion Veteran, 2006-2010	11.53	2.91	3.70	26.50
Proportion Divorced, 2006-2010	11.04	2.07	5.60	16.65
Proportion Living Alone, 2006-2010	26.46	4.08	13.71	38.04
Residential Stability, 2006-2010	92.38	3.60	69.24	100.00
Population at risk (ln), 2007-2010	10.46	1.02	6.99	12.09
Dummy West	0.14	0.35	0.00	1.00

N=340

Table 6: Descriptive Statistics for Micropolitan Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	7.44	10.67	0.00	91.00
Bridging Congregations, 2000	0.96	0.61	0.07	5.01
Civic and Social Organizations, 2007	0.15	0.13	0.00	1.47
Small Business Establishments, 2007	78.57	21.17	36.45	240.60
Poverty Rate, 2006-2010	16.66	6.05	2.40	43.40
Female-headed Households, 2006-2010	6.92	2.49	0.00	19.40
High School Dropouts, 2006-2010	17.49	7.22	0.70	52.10
Unemployment Rate, 2006-2010	4.71	1.56	0.00	11.80
Gini Index, 2006-2010	0.43	0.03	0.31	0.55
Proportion Veteran, 2006-2010	11.45	2.83	2.90	26.00
Proportion Divorced, 2006-2010	11.21	2.19	2.25	17.50
Proportion Living Alone, 2006-2010	27.03	3.60	10.84	39.04
Residential Stability, 2006-2010	92.98	3.06	67.81	100.00
Population at risk (ln), 2007-2010	9.97	0.90	4.38	12.01
Dummy West	0.14	0.35	0.00	1.00

N=688

Table 7: Descriptive Statistics for Non Core Counties

	Mean	Std. Dev.	Min	Max
Suicide Count, 2007-2010	1.07	3.67	0.00	24.00
Bridging Congregations, 2000	1.72	1.21	0.00	8.86
Civic and Social Organizations, 2007	0.15	0.21	0.00	2.04
Small Business Establishments, 2007	89.99	30.26	20.19	456.03
Poverty Rate, 2006-2010	16.80	6.85	3.70	53.50
Female-headed Households, 2006-2010	5.92	2.67	0.00	21.70
High School Dropouts, 2006-2010	18.41	7.83	2.40	49.50
Unemployment Rate, 2006-2010	4.08	2.13	0.00	20.00
Gini Index, 2006-2010	0.43	0.04	0.31	0.65
Proportion Veteran, 2006-2010	11.78	2.85	4.20	32.40
Proportion Divorced, 2006-2010	10.93	2.62	1.60	24.72
Proportion Living Alone, 2006-2010	28.16	4.34	12.06	49.88
Residential Stability, 2006-2010	93.37	3.15	75.92	99.91
Population at risk (ln), 2007-2010	8.84	0.98	5.42	11.02
Dummy West	0.14	0.35	0.00	1.00

N=1333

Principal Components Analysis

In order to test for the presence of multicollinearity between the independent variables, I first conducted an ordinary least squares regression analysis to obtain variance inflation factors. The results indicated that, as expected, the indicators of socioeconomic disadvantage were correlated and therefore combining them into an index was necessary. Following Kubrin et al. (2006), I performed principal components factor analysis with varimax rotation. The factor analysis generated a single index with an eigenvalue of 2.46, accounting for 61.6 percent of the variance. The factor loadings of the variables were as follows: poverty rate (0.87), female-headed households (0.80), high school dropouts (0.77), and unemployment rate (0.70). An index measure of socioeconomic disadvantage was then created from the standardized factor scores produced from the factor analysis.

Spatial Autocorrelation Analysis

Research has also shown that when conducting ecological research, it is important to test for the presence of spatial autocorrelation. Spatial dependency, or spatial autocorrelation, occurs when the value of one area is influenced by the values of surrounding areas. If present and unaccounted for, spatial autocorrelation can result in biased regression coefficients and misleading standard errors. To test for the presence of spatial autocorrelation, I first conducted an exploratory spatial diagnostics test by using the software program GeoDa to calculate the Moran's I for the dependent variable in the analysis. Moran's I measures the degree to which geographic areas are located near similar areas and is a commonly used measure to test for the presence of spatial dependence (Anselin 1992). In order to calculate the Moran's I, I first created a Queen-based contiguity spatial

weight file.[7] Essentially, this file is a matrix of the average values of neighboring units for each county. This file is then used to calculate the Moran's I which tests for clustering in the dependent variable. The exploratory analysis revealed a statistically significant degree of clustering (Moran's $I = 0.36$; $p < 0.01$). Figure 1 shows which areas are exhibiting a high degree of clustering. Red areas on the map indicate counties with high suicide values which are adjacent to areas which also have high values. The blue areas in Figure 1 indicate areas with low values adjacent to low-value neighbors.

If these exploratory diagnostics reveal clustering in the dependent variable, the next step is to perform regression analysis with the spatial weights file created in the previous step to test whether spatial clustering is present in the model. The results of this test indicated that spatial clustering was present in the model and that including a spatial lag of the dependent variable was appropriate (Moran's $I = 0.30$; $p < .001$). Therefore, the spatial lag of the dependent variable used to calculate the Moran's I was exported and used in each of the negative binomial regression models discussed below.[8]

[7] A Queen-based contiguity spatial weight file defines neighbors as those having any boundary or point in common.

[8] Because the spatial regression diagnostics available in Geoda are based on Ordinary Least Squares regression, it was necessary to create the spatially-lagged dependent variable in Geoda and export it for use with negative binomial regression.

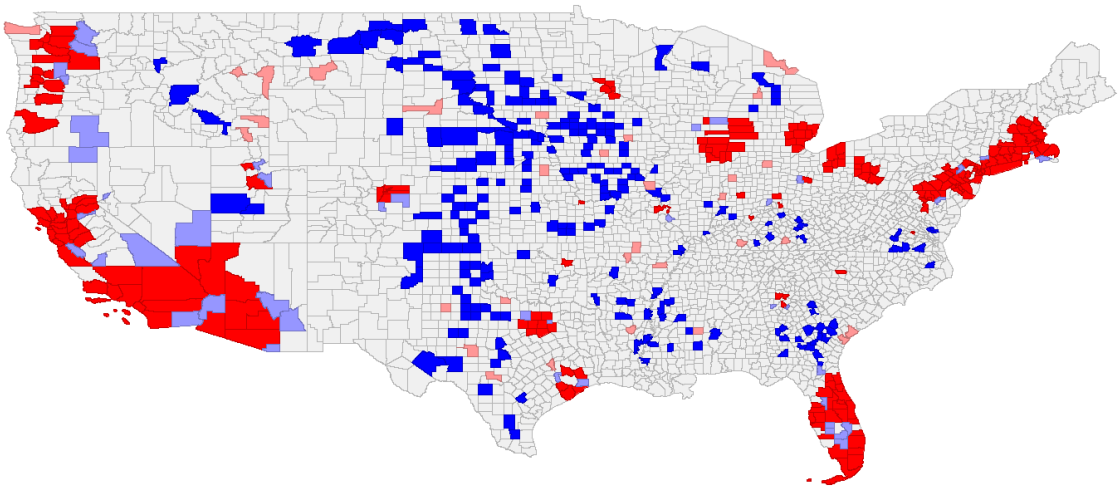

Figure 1. Univariate LISA Cluster Map of Middle-Age Non-Hispanic White Male Suicide

Negative Binomial Regression Analysis

This dissertation follows convention when examining statistically rare outcomes such as suicide by using negative binomial regression analysis (Burr et al. 1999; Kubrin et al. 2006; Kubrin and Wadsworth 2009; Cutlip et al. 2010). Negative binomial regression adjusts for overdispersion of the outcome variable (i.e., the variance of the dependent variable exceeds the mean of the dependent variable). When overdispersion is present, analysis results can be misleading as standard errors may be underestimated (Molla and Muniswamy 2012). Therefore, as is appropriate with negative binomial regression, I employ suicide counts rather than rates and include the log of the population at risk (i.e., non-Hispanic white males aged 35-64) as a control variable. This allows for analysis results to be interpreted as per capita suicide rates (Cutlip et al. 2010; Kubrin et al. 2006).

CHAPTER 4: RESULTS

In this chapter, I examine the relationship between county-level structural factors and middle-age non-Hispanic white male suicide by estimating a series of negative binomial regression models. The regression results for all counties in the contiguous U.S. and for each of the six categories are presented in separate tables. Each of these tables (Tables 8 – 14) includes four models: a baseline model (the control variables only), a civic community model (civic community variables and the control variables), a structural disadvantage model (disadvantage index and the control variables), and the full model (contains all variables).[9] These tables test whether indicators of civic communities are associated with lower suicide rates (Hypotheses 1-3) and whether structural disadvantage is associated with higher suicide rates (Hypothesis 6). Table 15 includes the regression results from the full models of each of the six categories (Tables 9 – 14, Model 4) to test Hypothesis 4 (civic and social organizations will exert a stronger reductive influence on suicide rates in more urbanized areas compared to religious institutions), Hypothesis 5 (bridging congregations will have a stronger influence on reducing suicide rates in less urbanized areas compared to civic and social organizations), and Hypothesis 7 (structural disadvantage will exert a stronger influence on suicide rates in less urbanized areas compared to more urbanized areas).

The coefficients presented in the tables are unstandardized negative binomial regression coefficients. For interpretive purposes, these coefficients are first multiplied by their respective standard deviations, this value is then exponentiated, subtracted from 1, and then multiplied by

[9] In addition to the variables included in the models for each of the six categories (Tables 9 – 14), models for all counties in the contiguous U.S. (Table 8) also include dummy variables representing the urban-rural categories to control for variations in levels of urbanization.

100.[10] Goodness-of-fit indicators (pseudo R-squared and negative log-likelihood (-2LL)) are also included in the tables for each model. The log-likelihood ratio test statistic is also presented in the tables. This statistic compares the civic community model, structural disadvantage model, and the full model to the baseline model and tests whether the additional variables improve the fit of the baseline model.

Sensitivity analyses are also conducted to investigate the unique relationship between each of the variables comprising the structural disadvantage index and suicide. These results are presented in Appendix B.

All Contiguous U.S. Counties

Table 8 displays the negative binomial regression results predicting middle-age non-Hispanic white male suicide for all counties in the contiguous U.S. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.1772. This model shows that, on average, middle-age non-Hispanic white suicide rates are higher in counties with higher levels of income inequality, larger shares of the population who are veterans, larger proportions of divorced residents, in the western region, and micropolitan counties. Conversely, suicide rates for this group are lower in counties with larger shares of the population living alone and those classified as large central metropolitan.

[10] For recent examples of studies using this technique to interpret negative binomial coefficients, see Lee and Bartkowski (2004a) and Cutlip et al. (2010).

Table 8. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across All Contiguous U.S. Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		-0.307***		-0.191*
		(0.081)		(0.084)
Civic and Social Organizations, 2007		-0.813*		-0.601
		(0.337)		(0.337)
Small Business Establishments, 2007		-0.001		0.004*
		(0.001)		(0.002)
Disadvantage Index, 2006-2010			0.292***	0.321***
			(0.047)	(0.061)
Gini index, 2006-2010	3.043**	1.149	-0.009	-1.960
	(1.066)	(1.138)	(1.155)	(1.271)
Proportion Veteran, 2006-2010	0.036**	0.044***	0.056***	0.061***
	(0.012)	(0.012)	(0.013)	(0.013)
Proportion Divorced, 2006-2010	0.117***	0.095***	0.080***	0.062**
	(0.017)	(0.017)	(0.018)	(0.018)
Proportion Living Alone, 2006-2010	-0.041***	-0.020*	-0.030**	-0.014
	(0.009)	(0.010)	(0.009)	(0.010)
Residential Stability, 2006-2010	-0.008	0.005	-0.011	-0.002
	(0.011)	(0.011)	(0.011)	(0.011)
Population at risk (ln), 2007-2010	2.089***	2.034***	2.160***	2.125***
	(0.048)	(0.051)	(0.050)	(0.054)
Dummy West	0.282**	0.221*	0.388***	0.277**
	(0.093)	(0.098)	(0.094)	(0.098)
Dummy Large Central MSA Counties	-0.713**	-0.859***	-0.928***	-1.016***
	(0.228)	(0.228)	(0.229)	(0.228)
Dummy Large Fringe MSA Counties	0.025	-0.084	0.051	-0.024
	(0.116)	(0.118)	(0.115)	(0.118)
Dummy Medium MSA Counties	-0.027	-0.146	-0.064	-0.102
	(0.108)	(0.111)	(0.108)	(0.110)
Dummy Small MSA Counties	0.153	0.084	0.115	0.134
	(0.107)	(0.110)	(0.107)	(0.110)
Dummy Micropolitan Counties	0.343***	0.296**	0.300***	0.311***
	(0.083)	(0.087)	(0.083)	(0.086)
Spatial Lag	-0.271***	-0.271***	-0.296***	-0.290***
	(0.051)	(0.050)	(0.050)	(0.049)
Constant	-21.554***	-21.294***	-20.874***	-20.792***
	(1.209)	(1.209)	(1.216)	(1.213)
Pseudo R2	0.1772	0.1790	0.1796	0.1808
LL	-6449.06	-6434.82	-6429.80	-6444.9
LR		28.46***	38.51***	57.00***

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 2 extends the baseline model by adding the three indicators of civic community. Both the bridging congregations and civic and social organizations measures have statistically significant relationships with this group's suicide rate. A one standard deviation (1.01) increase in the number of bridging congregations is expected to result in a 26.7 percent decrease $\{[(\exp^{(-0.307*1.01)}) - 1]*100\}$ in suicide rates. A one standard deviation (0.16) increase in the number of civic and social organizations is expected to result in a 12.2 percent decrease $\{[(\exp^{(-0.813*0.16)}) - 1]*100\}$ in suicide rates. The control variables all maintain their statistical significance with the exception of the Gini index which is no longer significant with the addition of the civic community measures. In terms of model fit, the inclusion of the civic community indicators in Model 2 increases the pseudo R-squared from 0.1772 (Model 1) to 0.1790. Additionally, the log-likelihood ratio test statistic (28.46) indicates that the inclusion of the civic community measures significantly improves the fit of the baseline model ($p < 0.001$).

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that structural disadvantage has the expected positive effect on middle-age non-Hispanic white male suicide. Counties are expected to experience a 33.9 percent increase $\{[(\exp^{(0.292*1)}) - 1]*100\}$ in suicide rates for every one standard deviation increase in structural disadvantage. As with Model 2, the control variables all maintain statistical significance as in the baseline model with the exception of the Gini index which again loses statistical significance. The addition of the disadvantage index improves the pseudo R-squared from 0.1772 (Model 1) to 0.1796. The log-likelihood ratio test statistic (38.51) indicates that the disadvantage index significantly improves the fit of the control model ($p < 0.001$).

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that, on average, middle-age non-Hispanic white male suicide rates are lower in counties with bridging congregations, larger shares of the population

living alone, and those which are classified as large central counties. Conversely, suicide rates for this group are higher in counties with higher levels of structural disadvantage, larger veteran populations, higher divorce rates, counties in the western portion of the U.S. and those which are micropolitan. With respect to the primary variables of interest, results suggest that—net of controls and structural disadvantage—a one standard deviation increase in the number of bridging congregations should translate into a 17.5 percent reduction $\{[(\exp^{(-0.191*1.01)}) - 1]*100\}$ in this group's suicide rate. Structural disadvantage, net of control variables and civic community indicators, is expected to increase this group's suicide rate by 37.9 percent $\{[(\exp^{(0.321*1)}) - 1]*100\}$ for every one standard deviation increase in structural disadvantage.[11]

Comparing pseudo R-squared values across models shows that the full model (0.1808) provides a better fit than either the civic community model (0.1790) or the structural disadvantage model (0.1796) alone. This suggests that both the civic nature of communities and structural disadvantage play a role in shaping this group's suicide rate across all U.S. counties. Additionally, the log-likelihood ratio test statistic (57.00) is statistically significant ($p < 0.001$), indicating that the model is a significant improvement over the baseline model.

With respect to the hypotheses, the results from the full model support Hypothesis 2 which states that the presence of bridging congregations would be associated with lower levels of suicide. However, the results do not support Hypotheses 1 and 3, as no significant relationship between civic and social organizations or small business establishments across all contiguous U.S. counties is found. These results also provide support for Hypothesis 6, which asserted that a

[11] When each variable comprising the structural disadvantage index was independently included in the full models, poverty, high school dropouts, and unemployment were each significantly associated with this group's suicide rate. Female-headed households did not demonstrate a significant relationship (see Appendix B).

positive relationship would be found between structural disadvantage and suicide rates for this group.

Large Central Metropolitan Counties

Table 9 presents the negative binomial regression results for large central metropolitan counties. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.2403. This model shows that middle-age non-Hispanic white male suicide rates are higher in counties with higher divorce rates and counties in the western region. Income inequality, veteran population, proportion living alone, and residential stability, however, do not exhibit a statistically significant association with this group's suicide rate across large central metropolitan counties.

Model 2 extends the baseline model by adding the three indicators of civic community. Results show that suicide rates for this group are lower in large central metropolitan counties with a larger presence of bridging congregations. More specifically, a one standard deviation increase (0.11) in the number of bridging congregations per 1,000 residents should translate into a 7.4 percent reduction $\{[(\exp^{(-0.698*0.11)}) - 1]*100\}$ in this group's suicide rate. Likewise, suicide rates for this group are lower in counties with more small business establishments. Large central metropolitan counties, on average, can expect a 9.8 percent reduction in suicide rates for every one standard deviation increase (20.6) in small business establishments $\{[(\exp^{(-0.005*20.6)}) - 1]*100\}$. The civic and social organizations measure, however, shows no significant relationship with suicide. Both the proportion divorced and western region control variables maintain their statistical significance. In terms of model fit, the pseudo R-squared value increases to 0.2547 from the baseline model (0.2403). Additionally, the log-likelihood ratio test statistic (11.23) indicates that the inclusion of the civic community measures significantly improves the fit of the baseline model ($p < 0.05$).

Table 9. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across Large Central Metropolitan Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		-0.698*		-0.317
		(0.348)		(0.362)
Civic and Social Organizations, 2007		0.159		0.489
		(0.630)		(0.617)
Small Business Establishments, 2007		-0.005***		-0.001
		(0.002)		(0.002)
Disadvantage Index, 2006-2010			0.164***	0.154**
			(0.037)	(0.055)
Gini index, 2006-2010	0.199	1.375	-1.093	-0.915
	(1.309)	(1.266)	(1.205)	(1.472)
Proportion Veteran, 2006-2010	0.002	-0.008	0.010	0.009
	(0.013)	(0.013)	(0.011)	(0.014)
Proportion Divorced, 2006-2010	0.105***	0.114***	0.090***	0.091***
	(0.017)	(0.016)	(0.015)	(0.018)
Proportion Living Alone, 2006-2010	-0.004	-0.000	-0.001	-0.001
	(0.006)	(0.008)	(0.006)	(0.008)
Residential Stability, 2006-2010	0.001	-0.008	-0.019	-0.015
	(0.014)	(0.014)	(0.013)	(0.014)
Population at risk (ln), 2007-2010	0.958***	0.984***	1.037***	1.029***
	(0.047)	(0.046)	(0.046)	(0.047)
Dummy West	0.215**	0.179**	0.262***	0.244***
	(0.072)	(0.067)	(0.065)	(0.068)
Spatial Lag	0.009	0.012	-0.000	-0.000
	(0.016)	(0.014)	(0.014)	(0.014)
Constant	-8.685***	-8.288***	-7.365***	-7.620***
	(1.404)	(1.333)	(1.284)	(1.303)
Pseudo R2	0.2403	0.2547	0.2632	0.2646
LL	-295.565	-289.952	-286.633	-286.092
LR		11.23*	17.86***	18.95**

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that structural disadvantage has the expected positive effect on middle-age non-Hispanic white male suicide. Large central metropolitan counties are expected to experience a 17.8 percent increase $\{[(\exp^{(0.164*1)}) - 1]*100\}$ in suicide rates for every one standard deviation increase in structural disadvantage. The proportion divorced and the western region control variables again maintain statistical significance. The addition of the disadvantage index improves

the pseudo R-squared value from 0.2403 (Model 1) to 0.2632. Additionally, the log-likelihood ratio test statistic (17.86) indicates that the inclusion of the disadvantage index significantly improves the fit of the control model ($p < 0.001$).

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that, on average, suicide rates for this group are higher in large central metropolitan counties with higher levels of structural disadvantage, higher divorce rates, and counties in the western portion of the U.S. Although Model 2 shows that bridging congregations and small business establishments reduce this group's suicide rate, these relationships are not statistically significant in the full model. The relationship between structural disadvantage and suicide, however, remains significant. All else being equal, large central metropolitan counties should, on average, exhibit a 16.4 percent $\{[(\exp^{(0.154*1)}) - 1]*100\}$ increase in their suicide rates for every one standard deviation increase in structural disadvantage.[12]

Comparing pseudo R-squared values across models shows that the full model (0.2646) provides a better fit than either the civic community model (0.2547) or the structural disadvantage model (0.2632) alone. This suggests that although the relationships between bridging congregations and small business establishments and suicide are no longer significant in the full model, they still play a role in shaping this group's suicide rate across large central metropolitan counties. The log-likelihood ratio test statistic (18.95) is statistically significant ($p < 0.01$), indicating that the model with all variables is a significant improvement over the baseline model.

[12] When each variable comprising the structural disadvantage index was independently included in the full models, poverty and high school dropouts were each significantly associated with this group's suicide rate. Female-headed households and unemployment did not demonstrate a significant relationship (see Appendix B).

With respect to the hypotheses, there is no evidence to support Hypothesis 1 which stated that civic and social organizations would be associated with lower suicide rates. Some support is found that bridging congregations and small business establishments are associated with lowering suicide rates (Hypotheses 2 and 3, respectively); however, these variables lose significance when structural disadvantage is taken into consideration. The results also support Hypothesis 6, which asserted that a positive relationship would be found between structural disadvantage and suicide rates for this group.

Large Suburban Metropolitan Counties

Table 10 displays the negative binomial regression results predicting middle-age non-Hispanic white male suicide for large suburban metropolitan counties. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.1618. This model shows that suicide rates are higher in counties with larger shares of the population who are veterans and larger proportions of divorced residents. Conversely, suicide rates are lower in large suburban metropolitan counties with larger shares of the population living alone. Income inequality, residential stability, and western region, however, exhibit no significant association with middle-age non-Hispanic white male suicide across large suburban metropolitan counties.

Model 2 extends the baseline model by adding the three indicators of civic community. Counter to expectations, none of these indicators show a statistically significant relationship with this group's suicide rate. Importantly, the log-likelihood ratio test statistic (5.51) indicates that the inclusion of the civic community measures does not statistically significantly improve the fit of the baseline model. This suggests that the indicators of civic communities included in the analysis have no relationship with this group's suicide rate across large suburban metropolitan counties.

Table 10. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across Large Suburban Metropolitan Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		-0.281		-0.119
		(0.170)		(0.167)
Civic and Social Organizations, 2007		0.818		1.193
		(0.676)		(0.655)
Small Business Establishments, 2007		0.003		0.009***
		(0.002)		(0.002)
Disadvantage Index, 2006-2010			0.166**	0.327***
			(0.061)	(0.076)
Gini index, 2006-2010	-0.508	-1.228	-1.210	-3.504*
	(1.354)	(1.463)	(1.340)	(1.489)
Proportion Veteran, 2006-2010	0.030*	0.029	0.039**	0.052***
	(0.015)	(0.015)	(0.015)	(0.015)
Proportion Divorced, 2006-2010	0.139***	0.142***	0.103***	0.082**
	(0.023)	(0.024)	(0.026)	(0.026)
Proportion Living Alone, 2006-2010	-0.025*	-0.021	-0.025*	-0.020
	(0.011)	(0.012)	(0.010)	(0.012)
Residential Stability, 2006-2010	-0.015	-0.006	-0.014	-0.010
	(0.015)	(0.016)	(0.014)	(0.015)
Population at risk (log), 2007-2010	1.424***	1.376***	1.449***	1.456***
	(0.051)	(0.058)	(0.051)	(0.061)
Dummy West	0.121	0.058	0.181	0.101
	(0.137)	(0.137)	(0.136)	(0.130)
Spatial Lag	-0.086	-0.076	-0.092	-0.073
	(0.050)	(0.050)	(0.050)	(0.048)
Constant	-12.701***	-12.941***	-12.397***	-12.699***
	(1.494)	(1.518)	(1.463)	(1.443)
Pseudo R2	0.1618	0.1636	0.1642	0.1698
LL	-1256.28	-1253.52	-1252.6	-1244.19
LR		5.51	7.35**	24.18**

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that structural disadvantage has the expected positive effect on middle-age non-Hispanic white male suicide. Large suburban metropolitan counties are expected to experience an 18.1 percent increase $\{[(\exp^{(0.166*1)}) - 1]*100\}$ in suicide rates for every one standard deviation increase in structural disadvantage. The control variables all maintain their statistical significance

as in the baseline model. The addition of the disadvantage index improves the pseudo R-squared from 0.1618 (Model 1) to 0.1642. Additionally, the log-likelihood ratio test statistic (7.35) indicates that the inclusion of the disadvantage index significantly improves the fit of the control model ($p < 0.01$).

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that counties with a stronger presence of small business establishments, higher levels of structural disadvantage, larger veteran populations, and higher divorce rates are expected to exhibit higher rates of suicide, on average, than counties with lower levels of these characteristics. In contrast, results indicate that counties with higher levels of income inequality are expected to experience significantly lower levels of suicide than counties with lower levels. With respect to the primary variables of interest, results suggest that—net of controls and structural disadvantage—a one standard deviation increase in the number of small business establishments should translate into a 18.1 percent increase $\{[(\exp^{(-0.009*20.14)}) - 1]*100\}$ in this group's suicide rate. Structural disadvantage, net of control variables and civic community indicators, is expected to increase this group's suicide rate by 38.7 percent $\{[(\exp^{(0.327*1)}) - 1]*100\}$ for every one standard deviation increase in structural disadvantage.[13]

Comparing pseudo R-squared values across models shows that the full model (0.1698) provides a better fit than either the civic community model (0.1636) or the structural disadvantage model (0.1642) alone. This suggests that although the civic indicators model did not significantly improve the baseline model according to the log likelihood test statistic, when they are considered

[13] When each variable comprising the structural disadvantage index was independently included in the full models, poverty, high school dropouts, and unemployment were each significantly associated with this group's suicide rate. Female-headed households did not demonstrate a significant relationship (see Appendix B).

in tandem with the other measures included in the model, they do play a role in shaping this group's suicide rate across large suburban metropolitan counties. The log-likelihood ratio test statistic (24.18) is significant ($p < 0.01$), indicating that the model with all variables is a significant improvement over the baseline model.

With respect to the hypotheses, the results from the full model do not support Hypotheses 1 or 2 as no significant relationship between civic and social organizations or bridging congregations and suicide was found. Additionally, counter to expectations (Hypothesis 3), the presence of small business establishments has a positive relationship with the group's suicide rate. Support was found for Hypothesis 6, which asserted that a positive relationship would be found between structural disadvantage and suicide rates for this group.

Medium Metropolitan Counties

Table 11 displays the negative binomial regression results predicting middle-age non-Hispanic white male suicide across medium metropolitan counties. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.1470. This model shows that counties with larger proportions of divorced residents are expected to experience significantly higher suicide rates than those with smaller shares of the population who are divorced. Income inequality, veteran population, proportion living alone, residential stability, and western region, however, show no significant association with middle-age non-Hispanic white male suicide across medium metropolitan counties.

Model 2 extends the baseline model by adding the three indicators of civic community. Of these measures, only the bridging congregations measure has a statistically significant relationship with this group's suicide rate. A one standard deviation (0.41) increase in the number of bridging congregations is expected to result in a 15.9 percent decrease $\{[(\exp^{(-0.419*0.41)}) - 1]*100\}$ in

suicide rates. With the addition of the civic community measures, the coefficient for the divorce rate is no longer significant. In terms of model fit, the inclusion of the civic community indicators in Model 2 increases the pseudo R-squared from 0.1470 (Model 1) to 0.1505. Additionally, the log-likelihood ratio test statistic (9.67) indicates that the inclusion of the civic community measures significantly improves the fit of the baseline model ($p < 0.05$).

Table 11. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across Medium Metropolitan Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		-0.419*		-0.248
		(0.194)		(0.197)
Civic and Social Organizations, 2007		-1.134		-1.035
		(0.695)		(0.684)
Small Business Establishments, 2007		-0.003		0.002
		(0.003)		(0.003)
Disadvantage Index, 2006-2010			0.248***	0.254**
			(0.068)	(0.083)
Gini index, 2006-2010	3.081	1.606	0.119	-1.578
	(1.680)	(1.809)	(1.786)	(2.033)
Proportion Veteran, 2006-2010	0.024	0.035	0.036	0.041*
	(0.020)	(0.020)	(0.019)	(0.019)
Proportion Divorced, 2006-2010	0.074*	0.045	0.044	0.025
	(0.029)	(0.030)	(0.029)	(0.030)
Proportion Living Alone, 2006-2010	-0.021	0.003	-0.008	0.010
	(0.013)	(0.015)	(0.013)	(0.015)
Residential Stability, 2006-2010	-0.004	0.016	-0.009	0.006
	(0.018)	(0.020)	(0.018)	(0.019)
Population at risk (ln), 2007-2010	1.443***	1.374***	1.474***	1.438***
	(0.055)	(0.066)	(0.055)	(0.070)
Dummy West	0.131	0.104	0.119	0.083
	(0.144)	(0.143)	(0.138)	(0.138)
Spatial Lag	-0.074	-0.064	-0.057	-0.063
	(0.062)	(0.061)	(0.060)	(0.059)
Constant	-14.781***	-15.046***	-13.511***	-14.040***
	(2.013)	(2.000)	(1.948)	(1.963)
Pseudo R2	0.147	0.1505	0.1518	0.1539
LL	-1183.39	-1178.55	-1176.78	-1173.87
LR		9.67*	13.22***	19.04**

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that structural disadvantage has the expected positive effect on middle-age non-Hispanic white male suicide. Counties are expected to experience a 28.1 percent increase $\{[(\exp^{(0.248*1)}) - 1]*100\}$ in suicide rates for every one standard deviation increase in structural disadvantage. As with Model 2, the proportion of the population divorced again loses statistical significance. The addition of the disadvantage index improves the pseudo R-squared from 0.1470 (Model 1) to 0.1518. The log-likelihood ratio test statistic (13.22) indicates that the inclusion of the disadvantage index significantly improves the fit of the control model ($p < 0.001$).

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that counties with higher levels of structural disadvantage and larger veteran populations are expected to exhibit higher rates of suicide than counties with lower levels of disadvantage and smaller veteran populations. With respect to the primary variables of interest, results suggest that structural disadvantage, net of control variables and civic community indicators, is expected to increase this group's suicide rate by 28.9 percent $\{[(\exp^{(0.254*1)}) - 1]*100\}$ for every one standard deviation increase in structural disadvantage.[14]

Comparing pseudo R-squared values across models shows that the full model (0.1539) provides a better fit than either the civic community model (0.1505) or the structural disadvantage model (0.1518) alone. This suggests that although the civic indicators did not reach statistical significance in the full model, when all factors are considered, they do play a role in shaping this group's suicide rate across large medium metropolitan counties. The log-likelihood ratio test

[14] When each variable comprising the structural disadvantage index was independently included in the full models, poverty and high school dropouts were each significantly associated with this group's suicide rate. Female-headed households and unemployment did not demonstrate a significant relationship (see Appendix B).

statistic (19.04) is statistically significant ($p < 0.01$), indicating that the model with all variables is a significant improvement over the baseline model.

With respect to the hypotheses, there is no evidence to support Hypothesis 1 which stated that civic and social organizations would be associated with lower suicide rates or Hypothesis 3 which stated that small business establishments would be associated with lower suicide rates for this group. Some support is found that bridging congregations are associated with lowering suicide rates (Hypotheses 2); however, this measure loses significance when structural disadvantage is taken into consideration. The results also support Hypothesis 6, which asserted that a positive relationship would be found between structural disadvantage and suicide rates for this group.

Small Metropolitan Counties

Table 12 displays the negative binomial regression results predicting middle-age non-Hispanic white male suicide for small metropolitan counties. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.1969. This model shows that counties with higher levels of income inequality, larger proportions of divorced residents, and counties in the western region are expected to experience significantly higher suicide rates than their more egalitarian counterparts, those with smaller shares of the population who are divorced, and nonwestern counties. Proportion veteran, proportion living alone, and residential stability, however, show no significant association with middle-age non-Hispanic white male suicide across small metropolitan counties.

Model 2 extends the baseline model by adding the three indicators of civic community. Counter to expectations, none of these exhibit a statistically significant relationship with this group's suicide rate. Among the control variables, proportion divorced and the western region dummy variable both remain statistically significant; however, the coefficient for the Gini index is no longer significant. In terms of model fit, the inclusion of the civic community indicators in

Model 2 increased the pseudo R-squared from 0.1969 (Model 1) to 0.1979. However, the log-likelihood ratio test statistic (2.44) indicates that the inclusion of the civic community measures does not statistically significantly improve the fit of the baseline model.

Table 12. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across Small Metropolitan Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		-0.136		-0.053
		(0.137)		(0.141)
Civic and Social Organizations, 2007		0.173		0.235
		(0.479)		(0.480)
Small Business Establishments, 2007		-0.003		0.002
		(0.002)		(0.003)
Disadvantage Index, 2006-2010			0.162*	0.184*
			(0.064)	(0.086)
Gini index, 2006-2010	3.398*	3.210	1.488	0.930
	(1.583)	(1.724)	(1.756)	(2.033)
Proportion Veteran, 2006-2010	-0.005	-0.003	0.000	0.001
	(0.016)	(0.016)	(0.016)	(0.016)
Proportion Divorced, 2006-2010	0.062**	0.059*	0.040	0.035
	(0.023)	(0.024)	(0.025)	(0.026)
Proportion Living Alone, 2006-2010	-0.003	0.000	0.009	0.009
	(0.012)	(0.015)	(0.013)	(0.015)
Residential Stability, 2006-2010	-0.020	-0.015	-0.020	-0.020
	(0.013)	(0.014)	(0.013)	(0.014)
Population at risk (ln), 2007-2010	1.849***	1.816***	1.886***	1.872***
	(0.073)	(0.082)	(0.076)	(0.088)
Dummy West	0.249*	0.246*	0.294**	0.276*
	(0.105)	(0.109)	(0.107)	(0.110)
Spatial Lag	-0.102	-0.109	-0.133*	-0.133*
	(0.060)	(0.059)	(0.060)	(0.060)
Constant	-17.742***	-17.560***	-17.444***	-17.210***
	(1.555)	(1.567)	(1.554)	(1.576)
Pseudo R2	0.1969	0.1979	0.1996	0.1999
LL	-968.047	-966.825	-964.797	-964.496
LR		2.44	6.5*	7.1

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that structural disadvantage has the expected positive effect on middle-age non-Hispanic white male suicide. Counties are expected to experience a 17.6 percent increase $\{[(\exp^{(0.162*1)}) - 1]*100\}$ in suicide rates for every one standard deviation increase in structural disadvantage. Among the control variables, both the Gini index and proportion divorced lose statistical significance with the inclusion of the structural disadvantage index. The addition of the disadvantage index improves the pseudo R-squared from 0.1969 (Model 1) to 0.1996. Additionally, the log-likelihood ratio test statistic (6.5) indicates that the inclusion of the disadvantage index improves the fit of the control model ($p < 0.05$).

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that counties with higher levels of structural disadvantage and counties in the western portion of the U.S. are expected to exhibit higher rates of suicide than those with lower levels of disadvantage and nonwestern counties. With respect to the primary variables of interest, results suggest that structural disadvantage, net of control variables and civic community indicators, is expected to increase this group's suicide rate by 20.2 percent $\{[(\exp^{(0.184*1)}) - 1]*100\}$ for every one standard deviation increase in structural disadvantage.[15]

Comparing pseudo R-squared values across models shows that the full model is 0.1999, the civic community model is 0.1979, and the structural disadvantage model is 0.1996. Importantly, the log-likelihood ratio test statistic for the full model (7.1) is not statistically significantly different from the baseline model. The structural disadvantage model, however, is

[15]When each variable comprising the structural disadvantage index was independently included in the full models, high school dropouts was the only variable which showed a significant relationship with this group's suicide rate (see Appendix B).

significantly different from the baseline model ($p < 0.05$), suggesting the indicators of civic community included in the analysis play no role in influencing this group's suicide rate across small metropolitan counties.

With respect to the hypotheses, the results do not support Hypotheses 1-3 as no significant relationship between bridging congregations, civic and social organizations, or small business establishments and this group's suicide rate across small metropolitan counties is found. However, support was found for Hypothesis 6, which asserted that a positive relationship would be found between structural disadvantage and suicide rates for this group.

Micropolitan Counties

Table 13 displays the negative binomial regression results predicting middle-age non-Hispanic white male suicide for micropolitan counties. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.1159. This model shows that counties with higher levels of income inequality, larger shares of the population who are veterans, larger proportions of divorced residents, and counties in the western region are expected to experience significantly higher suicide rates. Conversely, counties with larger shares of the population living alone are expected to experience significantly lower occurrences of suicide. Residential stability, however, shows no significant association with middle-age non-Hispanic white male suicide across micropolitan counties.

Model 2 extends the baseline model by adding the three indicators of civic community. Of these measures, only the bridging congregations measure has a statistically significant relationship with this group's suicide rate. A one standard deviation (0.61) increase in the number of bridging congregations is expected to result in a 28.2 percent decrease $\{[(\exp^{(-0.543*0.61)}) - 1]*100\}$ in suicide rates. Among the control variables, the inclusion of the civic community measures reduces

the association between the Gini index and suicide to nonsignificance. Proportion veteran, divorce rate, proportion living alone, and western region all maintain statistical significance with suicide. In terms of model fit, the log-likelihood ratio test statistic (8.8) indicates that the inclusion of the civic community measures significantly improves the fit of the baseline model ($p < 0.05$ level).

Table 13. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across Micropolitan Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		-0.543*		-0.450*
		(0.222)		(0.227)
Civic and Social Organizations, 2007		-0.278		-0.004
		(0.719)		(0.731)
Small Business Establishments, 2007		-0.003		0.001
		(0.003)		(0.004)
Disadvantage Index, 2006-2010			0.315**	0.288*
			(0.109)	(0.146)
Gini index, 2006-2010	6.523**	3.901	2.612	0.640
	(2.433)	(2.715)	(2.745)	(3.162)
Proportion Veteran, 2006-2010	0.068*	0.068*	0.083**	0.078**
	(0.027)	(0.027)	(0.028)	(0.028)
Proportion Divorced, 2006-2010	0.098**	0.081*	0.074	0.062
	(0.037)	(0.038)	(0.038)	(0.039)
Proportion Living Alone, 2006-2010	-0.089***	-0.065*	-0.070**	-0.054*
	(0.023)	(0.026)	(0.024)	(0.026)
Residential Stability, 2006-2010	0.003	0.017	0.002	0.010
	(0.022)	(0.022)	(0.022)	(0.023)
Population at risk (ln), 2007-2010	2.760***	2.730***	2.898***	2.833***
	(0.151)	(0.155)	(0.161)	(0.165)
Dummy West	0.620**	0.469*	0.744***	0.578**
	(0.200)	(0.212)	(0.205)	(0.220)
Spatial Lag	-0.462*	-0.525**	-0.535**	-0.560**
	(0.200)	(0.196)	(0.191)	(0.193)
Constant	-29.601***	-29.188***	-29.709***	-28.891***
	(2.764)	(2.809)	(2.828)	(2.844)
Pseudo R2	0.1159	0.1185	0.1183	0.1196
LL	-1514.23	-1509.83	-1510.12	-1507.9
LR		8.8*	8.22**	12.66*

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that structural disadvantage has the expected positive effect on middle-age non-Hispanic white male suicide. Counties are expected to experience a 37.0 percent increase $\{[(\exp^{(0.315*1)}) - 1]*100\}$ in suicide rates for every one standard deviation increase in structural disadvantage. The inclusion of the disadvantage index reduces the associations between the Gini index and proportion divorced and this group's suicide rate to nonsignificance. Proportion veteran, proportion living alone, and western regional all remain significant predictors of suicide. The addition of the disadvantage index improves the pseudo R-squared from 0.1159 (Model 1) to 0.1183. Additionally, the log-likelihood ratio test statistic (8.22) indicates that the inclusion of the disadvantage index significantly improves the fit of the control model ($p < 0.01$).

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that counties with bridging congregations and larger shares of the population living alone are expected to experience significantly lower levels of suicide than counties lacking these characteristics. Conversely, counties with higher levels of structural disadvantage, larger veteran populations, and counties in the western portion of the U.S. are expected to exhibit higher rates of suicide. With respect to the primary variables of interest, results suggest that—net of controls and structural disadvantage—a one standard deviation increase in the number of bridging congregations should translate into a 24.0 percent reduction $\{[(\exp^{(-0.450*0.61)}) - 1]*100\}$ in this group's suicide rate. Structural disadvantage, net of control variables and civic community indicators, is expected to increase this group's suicide rate by 33.4

percent {[(exp$^{(0.288*1)}$) – 1]*100} for every one standard deviation increase in structural disadvantage.[16]

Comparing pseudo R-squared values across models shows that the full model (0.1196) provides a better fit than either the civic community model (0.1185) or the structural disadvantage model (0.1183) alone. This suggests that both play a role in shaping this group's suicide rate across micropolitan counties. The log-likelihood ratio test statistic (12.66) is significant ($p < 0.05$), indicating that the model with all variables is a significant improvement over the baseline model.

With respect to the hypotheses, the results from the full model support Hypothesis 2 which states that the presence of bridging congregations would be associated with lower levels of suicide. However, the results do not support Hypotheses 1 and 3, as no significant relationship between civic and social organizations or small business establishments across micropolitan counties is found. Support was also found for Hypothesis 6, which asserted that a positive relationship would be found between structural disadvantage and suicide rates for this group.

Non Core Counties

Table 14 displays the negative binomial regression results predicting middle-age non-Hispanic white male suicide for non core counties. Model 1 includes the baseline model only and has a pseudo R-squared value of 0.1852. This model shows that, on average, middle-age non-Hispanic white suicide rates are higher in counties with higher levels of income inequality and higher shares of the population who are residentially stable. Proportion veteran, divorce rate, proportion of the

[16] None of the variables comprising the structural disadvantage index was independently associated with this group's suicide rate (see Appendix B).

population living alone, and western region, however, show no significant association with middle-age non-Hispanic white male suicide across non core counties.

Table 14. Negative Binomial Regression Models Predicting Suicide for White Males Aged 35-64 Across Non Core Counties

	Model 1	Model 2	Model 3	Model 4
Bridging Congregations, 2000		0.021		0.085
		(0.288)		(0.301)
Civic and Social Organizations, 2007		-5.135**		-4.905**
		(1.609)		(1.645)
Small Business Establishments, 2007		-0.002		0.002
		(0.005)		(0.007)
Disadvantage Index, 2006-2010			0.429	0.258
			(0.263)	(0.365)
Gini index, 2006-2010	9.919*	10.586*	7.161	9.021
	(4.664)	(5.125)	(4.893)	(5.574)
Proportion Veteran, 2006-2010	0.042	0.134	0.082	0.149*
	(0.062)	(0.069)	(0.067)	(0.072)
Proportion Divorced, 2006-2010	0.163	0.101	0.111	0.075
	(0.085)	(0.087)	(0.091)	(0.095)
Proportion Living Alone, 2006-2010	0.012	0.019	0.018	0.022
	(0.054)	(0.054)	(0.054)	(0.054)
Residential Stability, 2006-2010	0.150*	0.145	0.132	0.137
	(0.073)	(0.075)	(0.074)	(0.076)
Population at risk (ln), 2007-2010	5.248***	5.457***	5.319***	5.474***
	(0.471)	(0.487)	(0.477)	(0.488)
Dummy West	0.635	0.942	0.950	0.963
	(0.466)	(0.562)	(0.511)	(0.567)
Spatial Lag	-0.976	-1.566*	-1.128	-1.499
	(0.756)	(0.795)	(0.751)	(0.791)
Constant	-72.653***	-74.512***	-70.649***	-73.611***
	(9.414)	(9.521)	(9.425)	(9.564)
Pseudo R2	0.1852	0.1925	0.1868	0.1928
LL	-680.395	-674.289	-679.057	-674.038
LR		12.21**	2.68	12.71*

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Model 2 extends the baseline model by adding the three indicators of civic community. Of these measures, only the civic and social organizations measure has a statistically significant relationship with this group's suicide rate. A one standard deviation (0.21) increase in the number

of civic and social organizations is expected to result in a 66.0 percent decrease {[($\exp^{(-5.135*0.21)}$) – 1]*100} in suicide rates. With the addition of the civic community measures, the Gini index remains significant, however, the coefficient for residential stability is no longer significant. In terms of model fit, the inclusion of the civic community indicators in Model 2 increase the pseudo R-squared from 0.1852 (Model 1) to 0.1925. Additionally, the log-likelihood ratio test statistic (12.21) indicates that the inclusion of the civic community measures significantly improves the fit of the baseline model ($p < 0.01$).

Model 3 extends the baseline model by adding the socioeconomic disadvantage index. This model shows that, counter to expectations, structural disadvantage does not have the expected positive effect on middle-age non-Hispanic white male suicide. While both the Gini index and residential stability are significant in the baseline model, neither is significant in this model. The addition of the disadvantage index improves the pseudo R-squared from 0.1852 (Model 1) to 0.1868. However, the log-likelihood ratio test statistic (2.68) indicates that the inclusion of the disadvantage index does not statistically significantly improve the fit of the baseline model.

Model 4, the full model, contains the baseline model, civic community measures, and the disadvantage index. These results indicate that counties with more civic and social organizations are expected to experience significantly lower levels of suicide than counties with fewer of these establishments. Conversely, non core counties with larger veteran populations are expected to exhibit higher rates of suicide than non core counties with smaller veteran populations. With respect to the primary variables of interest, results suggest that—net of controls and structural disadvantage—a one standard deviation increase in the number of civic and social organizations

should translate into a 64.3 percent reduction $\{[(\exp^{(-4.905*0.21)}) - 1]*100\}$ in this group's suicide rate.[17]

Comparing pseudo R-squared values across models shows that the full model is 0.1928, the civic community model is 0.1925, and the structural disadvantage model is 0.1868. The log-likelihood ratio test statistic for the full model (12.71) is significantly different ($p < 0.05$) from the baseline model. Importantly, the structural disadvantage model is not significantly different from the baseline model and contributes very little to the overall model fit as suggested by the pseudo R-squared values of the civic community model and the full model. This suggests that structural disadvantage plays a minor role, if any, in influencing this group's suicide rate across non core counties.

With respect to the hypotheses, the results from the full model support Hypothesis 1 which states that the presence of civic and social organizations would be associated with lower levels of suicide. However, the results do not support Hypotheses 2 and 3, as no significant relationship between bridging congregations or small business establishments across non core counties is found. Additionally, no support was found for Hypothesis 6, which asserted that a positive relationship would be found between structural disadvantage and suicide rates for this group.

Full Models to Assess Variation across Categories

Table 15 displays the negative binomial regression results of the full models predicting middle-age non-Hispanic white male suicide for the six categories. With respect to Hypothesis 4, which asserts that civic and social organizations should exert more of a protective influence in more

[17] When each variable comprising the structural disadvantage index was independently included in the full models, only the high school dropouts variable showed a significant association with this group's suicide rate (see Appendix B).

urbanized areas compared to bridging congregations, no support was found. Although not statistically significant, civic and social organizations had a positive relationship with suicide across large central metropolitan counties, large suburban metropolitan counties, and small metropolitan counties. The relationship across medium metropolitan counties and micropolitan counties was again not significant, but was in the expected direction. Thus, counter to expectations, the least urbanized category—non core counties—exhibited the expected inverse relationship between civic and social organizations and this group's suicide rate.

With respect to Hypothesis 5, which asserted that bridging congregations would exert a stronger influence on depressing suicide rates in less urbanized areas compared to civic and social organizations, the results are mixed. The results suggest that across the four metropolitan categories, bridging congregations are associated with a negative—but not statistically significant—relationship with suicide rates. Among three of the four metropolitan categories, civic and social organizations exhibit a positive—but again insignificant—relationship with suicide rates for this group. Thus, the conclusion to be drawn from these results is that bridging congregations exhibit a stronger inverse relationship with suicide rates compared to civic and social organizations, irrespective of metropolitan urbanization level.[18] However, the results from the two nonmetropolitan categories run counter to expectations. Table 15 shows that bridging congregations exert a statistically significant relationship across the more urbanized category and no significant relationship in the least urbanized category. In fact, though not significant, the coefficient for bridging congregations is positive. This suggests that bridging congregations may

[18] I include medium metropolitan counties in this statement because Table 11 (Model 2) shows a statistically significant relationship between bridging congregations and suicide and no relationship between civic and social organizations and suicide.

play a role, albeit a minor one, in positively influencing this group's suicide rate in non core counties.

Because the structural disadvantage index is significant in five of the six categories, Hypothesis 7, which states that structural disadvantage would exhibit a stronger relationship with suicide as urbanization level declined, requires testing for significant differences between the coefficients. To do this, I use the statistical test recommended by Paternoster, Mazerolle, and Piquero (1998).[19] The results of these tests show that a statistically significant difference exists between the coefficients from the large central metropolitan category and the large suburban metropolitan category ($Z = 1.84$ $p < 0.05$). This suggests that the relationship between structural disadvantage and suicide is stronger across large suburban metropolitan counties than it is across large central metropolitan counties. However, it is important to note that in the least urbanized category, no relationship was found between structural disadvantage and suicide. Therefore, with the exception of the differential between the two large metropolitan categories, no support is found for Hypothesis 7.

[19] The formal formula for the equation is: $Z = b1 - b2 \,/\, \sqrt{SEb1^2 + SEb2^2}$

Table 15. Negative Binomial Regression Models Predicting Suicide Full Models

	Large Central	Large Suburban	Medium	Small	Micropolitan	Non Core
Bridging Congregations, 2000	-0.317	-0.119	-0.248	-0.053	-0.450*	0.085
	(0.362)	(0.167)	(0.197)	(0.141)	(0.227)	(0.301)
Civic and Social Organizations, 2007	0.489	1.193	-1.035	0.235	-0.004	-4.905**
	(0.617)	(0.655)	(0.684)	(0.480)	(0.731)	(1.645)
Small Business Establishments, 2007	-0.001	0.009***	0.002	0.002	0.001	0.002
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.007)
Disadvantage Index, 2006-2010	0.154**	0.327***	0.254**	0.184*	0.288*	0.258
	(0.055)	(0.076)	(0.083)	(0.086)	(0.146)	(0.365)
Gini index, 2006-2010	-0.915	-3.504*	-1.578	0.930	0.640	9.021
	(1.472)	(1.489)	(2.033)	(2.033)	(3.162)	(5.574)
Proportion Veteran, 2006-2010	0.009	0.052***	0.041*	0.001	0.078**	0.149*
	(0.014)	(0.015)	(0.019)	(0.016)	(0.028)	(0.072)
Proportion Divorced, 2006-2010	0.091***	0.082**	0.025	0.035	0.062	0.075
	(0.018)	(0.026)	(0.030)	(0.026)	(0.039)	(0.095)
Proportion Living Alone, 2006-2010	-0.001	-0.020	0.010	0.009	-0.054*	0.022
	(0.008)	(0.012)	(0.015)	(0.015)	(0.026)	(0.054)
Residential Stability, 2006-2010	-0.015	-0.010	0.006	-0.020	0.010	0.137
	(0.014)	(0.015)	(0.019)	(0.014)	(0.023)	(0.076)
Population at risk (ln), 2007-2010	1.029***	1.456***	1.438***	1.872***	2.833***	5.474***
	(0.047)	(0.061)	(0.070)	(0.088)	(0.165)	(0.488)
Dummy West	0.244***	0.101	0.083	0.276*	0.578**	0.963
	(0.068)	(0.130)	(0.138)	(0.110)	(0.220)	(0.567)
Spatial Lag	-0.000	-0.073	-0.063	-0.133*	-0.560**	-1.499
	(0.014)	(0.048)	(0.059)	(0.060)	(0.193)	(0.791)
Constant	-7.620***	-12.699***	-14.040***	-17.210***	-28.891***	-73.611***
	(1.303)	(1.443)	(1.963)	(1.576)	(2.844)	(9.564)

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

CHAPTER 5: DISCUSSION AND CONCLUSIONS

The purpose of this dissertation has been to expand our knowledge of factors influencing the variation in county levels of middle-age non-Hispanic white male suicide—a demographic group which has received little attention in previous studies but which has experienced an alarming uptick in suicide rates over a short period of time. The current study has drawn on the large body of sociological work which has examined the phenomenon of suicide, but has augmented the findings from this body of work with more contemporary research within the field of sociology at large. Within classical and traditional research on suicide, the primary focus of ecological studies has been on the relationship between integration/regulation and suicide. While this body of work is substantial and has contributed much to our understanding of the geographic patterning of suicide across space, the research to date has been grounded in aggregated individual-level processes. In contrast, the objective of this dissertation has been to examine the relationship between this group's suicide rate and the institutional makeup of counties. In other words, the questions have been examined from a contextual framework as opposed to a compositional one.

The objectives of this dissertation have been guided by four key gaps identified in the literature. The first two—the lack of research on the correlates of suicide among middle-age non-Hispanic white males and the near-exclusive focus in the literature on integration/regulation—have already been mentioned. The third area in the literature that is surprisingly sparse is an examination of a potential relationship between structural disadvantage and suicide at the ecological level. Although it's somewhat understandable considering how influential Durkheim has been, and remains, to the sociological study of suicide, it is an important avenue that needs to be explored. This study begins to address this gap in the literature by building on the important research conducted by Kubrin et al. (2006) which found a strong adverse impact of structural

disadvantage on teenage suicide rates across large metropolitan areas. The fourth contribution to the suicide literature that this dissertation has attempted to make has been to explore how these contextual factors influence suicide differentially across the rural-urban spectrum. Counties differ markedly in their social and economic makeup at different levels of urbanization which opens the possibility that the relationships between contextual characteristics and suicide may differ based on degree of urbanization level. Addressing this gap in the literature is particularly important given that the highest suicide rates are found in the most rural areas and previous studies have not found an explanation for why this may be. As previously noted, rural areas are considered more integrated along traditional indicators than more urbanized areas, and yet traditional measures of integration/regulation are unable to account for variations in suicide across rural areas.

Guided by these issues, the objectives of this dissertation have been to examine whether variations in county-level middle-age non-Hispanic white male suicides can be explained by the differential presence of indicators of civic communities and/or by structural disadvantage. Previous studies have found that civic communities—those with strong foundations in place which facilitate the development of close knit communities capable of collectively mobilizing to affect change and address community issues—perform better across a variety of social and economic indicators than less civically-inclined communities. In addition, an extensive literature has documented the adverse impact of economic disadvantage on community outcomes. Thus, this dissertation has investigated whether these characteristics of the social and economic environment impact county levels of this demographic group's suicide.

Summary of Major Findings

In this dissertation, I test several hypotheses regarding the influence of the social and economic environment on this group's suicide rate. The results of the regression analyses demonstrate both supporting evidence of the hypotheses as well as results that run counter to expectations.

Hypothesis 1, which predicted that civic and social organizations would be associated with lower suicide rates, was only supported for non core counties. This finding is in line with the civic community perspective, and suggests that a strong presence of these secular institutions in non core counties offer communities protection from higher suicide rates for this group. What is unexpected is that this is the only category for which a statistically significant relationship exists. In fact, civic and social organizations exhibited a positive—but not significant—relationship with this group's suicide rate in three of the four metropolitan categories. However, although not robust to the inclusion of the structural disadvantage index, civic and social organizations exhibited a significant negative relationship with suicide across all contiguous U.S. counties in the model with only the civic community indicators and baseline controls.

Hypothesis 2, which stated that bridging congregations would be associated with lower suicide rates, was supported for all counties in the contiguous U.S. and in the micropolitan counties category. Bridging congregations also exhibited a significant negative relationship with suicide across large central metropolitan counties and across medium metropolitan counties in the model with civic community indicators and control variables only; however, when structural disadvantage was accounted for in the full models, the relationship did not retain statistical significance. This suggests that a relationship does exist, however, the relationship is weaker than the relationship between structural disadvantage and suicide. Although not statistically significant, bridging congregations also exhibited a negative relationship with suicide across large suburban and small metropolitan counties. Interestingly, this is not the case for non core counties. Across

non core counties, it appears that bridging congregations may play a minor role in elevating this group's suicide rate.

Hypothesis 3, which stated that small business establishments would be associated with lower suicide rates, was only supported in the large central category. The results, however, were not robust to the inclusion of the structural disadvantage index. No support for Hypothesis 3 was found in the results from all contiguous U.S. counties nor in any of the other categories. In fact, across large suburban metropolitan counties, it appears that small business establishments significantly contribute to higher rates of suicide for this group. This runs counter to expectations as an economic climate comprised of a robust small business sector has been found in previous studies to contribute to positive community outcomes.

Hypothesis 4, which suggests that civic and social organizations should exert more of a protective influence in more urbanized areas compared to bridging congregations, was not supported. Counter to expectations, the results showed a positive (but insignificant) relationship between civic and social organizations and suicide in three of the four metropolitan categories. Additionally, the findings of a significant relationship between civic and social organizations and suicide in the least urbanized category—and a positive (though insignificant) relationship between bridging congregations and suicide in this category—runs counter to expectations.

Hypothesis 5, which stated that bridging congregations should exert a stronger influence in less urbanized areas compared to civic and social organizations, was also not supported. Across metropolitan categories, bridging congregations were associated with lower levels of suicide across large central and medium metropolitan categories before accounting for structural disadvantage. Across large suburban and small metropolitan categories, the relationship was not significant but was in the expected direction. In contrast, civic and social organizations exhibited a positive, albeit insignificant relationship with suicide. The results from the two nonmetropolitan

categories further demonstrate results that do not support Hypothesis 5. The results show a significant negative association between bridging congregations and suicide across micropolitan counties and an insignificant but positive association in the most rural category. The opposite relationship was found between civic and social organizations and suicide—with non core counties exhibiting an inverse association and no association across micropolitan counties.

Hypothesis 6, which stated that structural disadvantage would be positively associated with suicide, was supported for all counties in the contiguous U.S. and in five of the six categories. The only exception was found for the most rural areas. Although these results show the expected relationship between structural disadvantage and this group's suicide rate, it is surprising that no relationship was found in the most disadvantaged rural category.

Hypothesis 7, which stated that structural disadvantage will exert a stronger influence on suicide in less urbanized areas compared to more urbanized areas, was supported between the large central and large suburban categories only. The results demonstrated a stronger relationship between structural disadvantage and suicide across large suburban counties than across large central counties. However, as noted previously, the least urbanized category showed an insignificant relationship between structural disadvantage and suicide. Therefore, the findings are largely mixed for this hypothesis.

In general, the results of this analysis has shown mixed support for the assertion that civic communities experience, on average, lower levels of middle-age non-Hispanic white male suicides. It was hypothesized that civically-robust communities would exhibit lower levels of suicide because they are more cohesive, members trust one another, and act collectively in the best interest of the community. As a result, members are integrated into the community, there are lowers levels of disadvantage, less inequality, and community concerns are able to be effectively

addressed. In effect, these community characteristics were thought to promote an environment which reduces a community's risk of high levels of suicides committed by this group.

However, the results from this analysis demonstrated no support that a small business climate offered communities protection from elevated rates of suicide and showed mixed effects in different areas between the other two indicators of civic community and suicide. Bridging congregations appear to reduce suicide primarily in micropolitan counties and civic and social organizations demonstrated a dampening influence on this group's suicide rate in non core counties only. With respect to metropolitan environments, the lack of a protective influence of the indicators of civic community used in this dissertation may be due to the changing nature of civic participation that researchers have argued has been occurring since the late 1960s. For example, Skocpol (2004) has argued that civic engagement remains high but that individuals are participating in civic activities through less structured forms of voluntary associations such as advocacy groups and nonprofit associations aimed at ameliorating various social injustices rather than joining traditional membership-based associations. It may be the case that the types of organizations which facilitate these modern forms of civic participation are more prevalent in urban environments and are not captured by the indicators of civic community included in this analysis.

In less urbanized areas, it may be that civic participation arises primarily from these more traditional institutions. Although it was assumed that bridging denominations would exert the strongest dampening influence in the most rural areas, the findings of a significant relationship across micropolitan counties only suggest that a critical population mass may be necessary to realize a salutary community effect in terms of lower levels of suicide. It could be that in micropolitan counties, bridging congregations foster community cohesion through regular social gatherings whereas in more remote areas the distance necessary to travel to participate regularly

may be too great. In contrast, civic and social organizations may contribute to lower levels of suicide in non core areas because they may sponsor events such as festivals and fund-raisers that occur less frequently but cultivate strong community ties.

The relationship between structural disadvantage and suicide was more consistent across categories. The results show that—with the exception of non core counties—variations in levels of suicide across counties is partly a function of levels of structural disadvantage. From a structural disadvantage perspective, high levels of suicide are due to elevated psychosocial stressors such as depression, stress, and anxiety that residents face because of the poor conditions of their environment. To cope with these stressors, residents may engage in high-risk behaviors such as excessive alcohol drinking or recreational drugs which, in turn, may make suicide seem like a good solution to life's social ills. Compounding the problem, communities with high levels of structural disadvantage are often characterized by weak institutional bases which make it difficult for residents to establish ties with other members. Community cohesion and collective efficacy are therefore weakened considerably, making it difficult for communities to improve their situation without outside help.

Implications and Future Research

The results from this dissertation contribute to our understanding of ecological variation in suicide, particularly among middle-age non-Hispanic white males. One of the most important takeaways from this analysis is that the relationship between civic community indicators and this group's suicide rate is most pronounced in nonmetropolitan settings. This is a key finding because the few studies that have examined nonmetropolitan suicide within the I-R framework (e.g., Davis 2008; Faupel et al. 1987; Kowalski et al. 1987) have concluded that social explanations of suicide are largely restricted to urban settings. This study suggests that the civic institutional makeup of

nonmetropolitan counties plays an important role in influencing levels of suicide. This is in line with the study conducted by Cutlip et al. (2010) which also found that the civic nature of communities plays an important role in influencing suicide rates across nonmetropolitan areas. However, the current study has also demonstrated that combining the indicators of civic community into a composite index as was done in the study conducted by Cutlip et al. (2010) may be masking important relationships between individual components of civic community and suicide. For example, if the bridging congregations and civic and social organizations measure had been combined into an index, the results would not have shown that micropolitan counties, on average, benefit more from bridging congregations while non core counties, on average, benefit more from the presence of civic and social organizations. Future work should continue to explore the unique influence of indicators of civic community on this group's suicide rate, particularly in nonmetropolitan settings.

Additionally, the surprising lack of evidence of a relationship between small business establishments and suicide across most of the categories and a positive association with suicide across large suburban metropolitan counties suggests that more research is needed to identify the type and scale of business entities that are associated with this group's suicide rate. Examples of such measures could include small manufacturing firms and family-owned farms.

Another important implication of this research is that it demonstrates the influence of structural disadvantage on county levels of suicide. Although most previous research on ecological suicide has largely ignored this potential relationship, the results from this study strongly suggests that future studies need to explore the nature of this relationship further. For example, it would be useful to gain a better understanding of the mechanisms through which structural disadvantage influences community levels of suicide. It may be the case that the influence of structural disadvantage on suicide rates is due to its influence on social institutions or on the public health

infrastructure. Alternatively, the structural disadvantage-suicide link may be the result of elevated levels of stress and anxiety coupled with a corresponding increase in high risk behavior. Gaining a better understanding of these mechanisms could help communities develop more targeted approaches for suicide prevention programs.

Future research should also consider how aggregate-level indicators of civic community and structural disadvantage influence suicide at the individual level. Multilevel analysis could be used to examine whether a stronger presence of bridging denominations or civic and social organizations at the state level lower individual risk of suicide and whether higher contextual levels of poverty moderate or influence suicide at the individual level. Additionally, an important avenue for future multilevel analysis could be the implications of the institutional presence of megachurches on individual-level suicide. These types of institutions cultivate strong, within-group ties which is expected to truncate the network structure of the broader community and thus is expected to be associated with elevated suicide rates; however, the impact of belonging to a megachurch may provide individuals with social ties and support which may lower an individual's risk of suicide.

More broadly, the results of this dissertation demonstrate that the Urban-Rural Classification Scheme developed by the National Center for Health Statistics provides a more complete picture of the factors influencing ecological variations in suicide than what would be seen with a simple metropolitan-nonmetropolitan dichotomy or with a classification scheme that did not distinguish between large 'inner city' counties and large 'suburban' counties. For example, although not robust to the inclusion of the structural disadvantage index, an inverse relationship was found between bridging congregations and suicide and small business establishments and suicide across large central counties. These associations were not only not exhibited across large suburban counties, but small business establishments exhibited a positive relationship with this

group's suicide rate. These findings suggest that this classification scheme merits further use in ecological studies of suicide.

From a policy perspective, the results from this study suggest that counties—particularly micropolitan counties—would do well to focus on ensuring that bridging congregations are present in their communities and that they have the resources necessary to identify and address issues present with the community, particularly with regards to reducing poverty levels, encouraging and supporting strong family units, lowering unemployment rates, and discouraging individuals from dropping out of high school.

This dissertation also highlights the importance for communities to keep abreast of research aimed at identifying risk factors contributing to high levels of suicide among veterans and proactively work to ensure that their communities offer an environment which reduces these risk factors. Veteran suicide in the 1999 – 2009 period is estimated to have accounted for approximately 22 percent of all suicides according to the 2012 report released by the Department of Veteran's Affairs. The regression results from this study show that, on average, communities with larger shares of veterans do in fact exhibit higher levels of suicide among middle-age non-Hispanic white males. These results clearly suggest that more attention to veteran populations within communities is warranted.

Research Limitations

Although the findings in this dissertation are important, there are some limitations that should be discussed. First, as with other studies on the topic of suicide, there exists the possibility that national suicide data suffer from underreporting. The data are collected from death certificates filled out by coroners or funeral directors and thus may be misclassified. Individuals may also intentionally place themselves in harm's way which would result in a death not listed as a suicide.

However, despite this possibility, researchers continue to use the data because these are the only aggregate-level data available which allow for the study of the ecological patterning of suicide.

Another limitation of the study is the time lag between the bridging congregations measure and other data used in the analysis. The data for the bridging congregations measure were collected between 1999 and 2001 while the data from the majority of the other independent variables were collected between 2006 and 2010, and the data from the outcome variable were collected between 2007 and 2010. However, as mentioned previously, it was decided that using the 2000 version of this dataset was preferable to using the version with a data collection period that began two years after the data collection period for the outcome of interest.

Additionally, it is important to note that this dissertation examined ecological suicide and as a result, cannot speak to the contributing factors that are associated with an individual's decision to commit suicide. In other words, the results of this dissertation does not and cannot speak to whether civically-active individuals commit suicide at lower rates than their less civically-active counterparts or whether lower-income individuals commit suicide at higher rates than higher-income individuals.

Conclusion

Despite the limitations identified above, this dissertation advances our knowledge of factors influencing suicide at the county level, particularly among middle-age non-Hispanic white males. The research presented in this analysis demonstrates that the civic institutional makeup of communities influences the levels of suicide committed by these community members. Further, this dissertation demonstrates that there is a strong correlation between structural disadvantage and this group's suicide rate. Moreover, these social and economic structural characteristics have a differential relationship with this group's suicide rate at different levels of urbanization.

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APPENDIX A: BRIDGING DENOMINATIONS

Evangelical Protestants
Allegheny Wesleyan Methodist Connection
American Baptist Association, The
Associate Reformed Presbyterian Church
Christian Churches and Churches of Christ
Christian Reformed Church in North American
Cumberland Presbyterian Church
Evangelical Presbyterian Church
Association of Free Lutheran Congregations, The
Free Methodist Church of North America
Fundamental Methodist Conference, Inc.
Lutheran Church-Missouri Synod
Orthodox Presbyterian Church, The
Presbyterian Church in America
Primitive Methodist Church in the USA
Seventh-day Adventist Church
Wesleyan Church, The
Wisconsin Evangelical Lutheran Synod

Mainline Protestants
American Baptist Churches in the USA
Christian Church (Disciples of Christ)
Congregational Christian Churches, Additional (not part of any national CCC body)
Episcopal Church
Estonian Evangelical Lutheran Church
Evangelical Lutheran Church in America
Friends (Quakers)
International Council of Community Churches
Latvian Evangelical Lutheran Church in America
Moravian Church
National Association of Congregational Christian Churches
Presbyterian Church (USA)
Reformed Church in America
United Church of Christ
United Methodist Church
Universal Fellowship of Metropolitan Community Churches

APPENDIX B: SENSITIVITY ANALYSES

	Model 1	Model 2	Model 3	Model 4
All Counties				
Poverty Rate, 2006-2010	0.050***			
Female-headed Households, 2006-2010		-0.010		
High School Dropouts, 2006-2010			0.043***	
Unemployment Rate, 2006-2010				0.059*
Large Central Metropolitan Counties				
Poverty Rate, 2006-2010	0.034***			
Female-headed Households, 2006-2010		0.022		
High School Dropouts, 2006-2010			0.029***	
Unemployment Rate, 2006-2010				0.003
Large Suburban Metropolitan Counties				
Poverty Rate, 2006-2010	0.070***			
Female-headed Households, 2006-2010		0.016		
High School Dropouts, 2006-2010			0.038***	
Unemployment Rate, 2006-2010				0.126***
Medium Metropolitan Counties				
Poverty Rate, 2006-2010	0.055***			
Female-headed Households, 2006-2010		0.015		
High School Dropouts, 2006-2010			0.043***	
Unemployment Rate, 2006-2010				0.016
Small Metropolitan Counties				
Poverty Rate, 2006-2010	0.011			
Female-headed Households, 2006-2010		0.034		
High School Dropouts, 2006-2010			0.036***	
Unemployment Rate, 2006-2010				-0.005
Micropolitan Counties				
Poverty Rate, 2006-2010	0.034			
Female-headed Households, 2006-2010		0.072		
High School Dropouts, 2006-2010			0.025	
Unemployment Rate, 2006-2010				0.009
Non Core Counties				
Poverty Rate, 2006-2010	-0.053			
Female-headed Households, 2006-2010		-0.153		
High School Dropouts, 2006-2010			0.093*	
Unemployment Rate, 2006-2010				0.228

*** p<0.001, ** p<0.01, * p<0.05

Note: Models include control variables and indicators of civic community.

VITA

Kayla Fontenot was born in Opelousas, Louisiana. She received her Bachelor of Science degree in Psychology from Louisiana State University in 2005. She received her Master of Arts degree in Sociology from Louisiana State University in 2007. She will receive her Doctor of Philosophy degree in Sociology from Louisiana State University during the Spring 2015 commencement ceremony.