Residential Segregation of Same-Sex Partnered Households from Heterosexual Partnered Households in U.S. Cities

Proposal

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INTRODUCTION

Homosexual-Heterosexual Segregation: **from the Harvey Milk School to "Gayborhood"**

Located on the third floor of a nineteenth-century high-rise in the East Village, the Harvey Milk High School looks just like any other public high school in New York City, New York. However, the school is utterly unique. It is an institution based not on academic interests, but on a fundamental building block of human identity: sexual orientation, which makes it different from any other school in New York City, or, indeed, the world. The Harvey Milk High School is named after assassinated San Francisco, California city supervisor Harvey Milk and it is designed for, though not limited to, gay, lesbian, bisexual, and transgender young people, as well as those questioning their sexuality. As the first gay-high-school in the U.S., the Harvey Milk High School undoubtedly received a lot of attention. Among the debates over its right to exist, one of the most controversial questions is: is it a good idea to segregate homosexual students from their straight peers?

School officials and supporters think a safety net like the Harvey Milk High School is very necessary for gay and lesbian teenagers because they are facing real dangers in public schools such as harassment and beatings. The Harvey Milk High School would allow these students to obtain an education without having to worry about external threats due to their sexual orientation. However, a lot of people argue that removing gay students and placing them in their own school is never a viable solution. Obviously, an isolated, segregated environment cannot teach both homosexual and heterosexual students to coexist and respect each other. And the

school will create the idea that gay and lesbian students are indeed different, requiring special protection and are unable to stand up for their own rights. More importantly, segregation between homosexual students and straight students is reminiscent of one of the most shameful episodes in American history, when Black students were placed in separate schools from their white peers. Indeed this "separate, but equal" educational system has been criticized for many years.

The great irony of the Harvey Milk High School is that it goes against the teachings of Harvey Milk, who, throughout his career, said that the answer to any challenge based upon sexual orientation was to be open and come out of the closet; to speak up and stand up for equal rights. But no one can deny that the Harvey Milk High School offers homosexual teenagers protection, albeit temporary, from external danger and discrimination. Indeed, not only do homosexual teenagers in New York City, but all homosexuals in the U.S. have to face this irony. It was precisely Milk's clarion call to "coming out" that helped to create an environment today in which more and more homosexual people feel the freedom and courage to cease hiding their true sexual identification. But in "coming out", they open themselves up to hostility and violence from their peers. So in this context, can we all agree that homosexuals should segregate from their heterosexual peers for their own good?

Although the answer is still vexing, a well-known fact is that in the U.S. many gays and lesbians choose to live separately from their heterosexual peers and cluster in certain areas. As we might see, more and more gay villages, or we can call them "gayborhoods," have appeared in U.S. cities. These areas often contain a large number of lesbian, gay, bisexual, and transgender people and a number of gay-oriented establishments, such as gay bars and gay pubs, nightclubs, bathhouses, restaurants, and bookstores. In 2004, Oakland, California even tried to create a gay

and lesbian district in a run-down portion of the city in an attempt to divert residents, entertainment, and shopping dollars from neighboring San Francisco. Not only within each city, but also throughout the country gays and lesbians are not evenly distributed. Using 2000 U.S. Census data, Baumle, Compton, and Poston (2009) showed that there are several areas in the U.S. with a particular high prevalence of gay men and lesbians. One of the most notable is the San Francisco Bay area and its several "enclaves."

This new type of segregation remains a debated issue. At first, the pattern of this segregation varies from city to city. In some cities, gays and lesbians congregate in visibly identified gay neighborhoods, while in other cities they are dispersed in neighborhoods which have less gay visibility because a liberal, affirming counterculture is present. For example, gays and lesbians in San Francisco congregate in the gay and lesbian-oriented Castro neighborhood, while gays and lesbians in Seattle, Washington concentrate in the city's older bohemian stomping grounds of Capitol Hill and those of Montreal, Canada have concentrated in a working-class neighborhood known as "Le Village".

Further, for the motivation of gays and lesbians' residential choices, some people, on the one hand, suggest that it is mainly caused by heterosexuals' discrimination towards homosexuals. Although today "homosexuality" is much less stigmatized than it was several years ago, there are still a large number of heterosexuals who might want to avoid contact with gays and lesbians, especially living within the same neighborhoods. However, other people argue gays and lesbians congregation in particular areas is based on their own choices. They may look for the presence of other gays and lesbians, a more liberal and safe environment, or better local amenities.

The following cartoon was published widely during the "Don't Ask, Don't Tell" repeal debate: it dipicts three coffins dressed in the American flag, with the caption reading, "Which is the gay one?" The idea is that in life and in death, LGBT (gay, lesbian, bisexual, and transgender) should strive to be equal, not to be separate. However, it does not seem to be the case in Atlanta, Georgia. A story published by the *Advocate* in April 2011 revealed an Atlanta cemetery's plan to reserve a special section for gay, lesbian, bisexual, and transgender couples and families who want to be buried separately from other people. John Suggs, family services counselor and spokesperson for H.M. Patterson and Son in Atlanta, said, "the idea of having a gay section in a cemetery seemed like a natural progression as gay men and lesbians gather more acceptance in mainstream society." I think it's a good idea because it is about a sense of community, connection and because it's a tradition."

WHICH IS THE GAY ONE ?

(http://progressivenation.us/2010/10/06/which-is-the-gay-one/)

Regardless if you agree with John Suggs or not, we have to admit that today in our society there is a new type of segregation: homosexual-heterosexual segregation. People are not just separated by skin color, but also by their sexual orientation. This segregation is largely related to the progress of the gay rights movement; it is related to the fact that more and more

homosexual people are "coming out" and fighting for their public spaces; and it is also related to all the hate and discrimination from heterosexuals. However, not too many studies have been done in this field and there are some questions which are still very unclear. Therefore, I hope the analyses in this dissertation can, perhaps, play a role in exploring the existing patterns and dynamics of homosexual-heterosexual segregation and provide a foundation for future research and policy-making.

Explanations for Homosexual-Heterosexual Segregation

When analyzing the residential segregation patterns of homosexuals from heterosexuals, researchers are interested in the independent variables that are associated with this particular type of segregation. Which factors are related to the segregation between the homosexual population and the heterosexual population? Do gay and lesbian couples voluntarily or involuntarily segregate from heterosexual couples? How might cities be expected to vary in their levels of homosexual-heterosexual segregation?

Compton and Poston's study (2011) indicates that a city's poverty rate, crime rate, and political climate might be associated with the level of homosexual-heterosexual segregation in that city. Previous studies on ethnic segregation found that cities with high level of ethnic segregation tend to have higher rates of poverty and crime than cities with low level of ethnic segregation. Therefore, in Compton and Poston's work, they assume there is also high homosexual-heterosexual segregation in poor cities and crime ridden cities.

For the political climate, Compton and Poston assume that politically and religiously conservative cities should have higher levels of segregation than less conservative cities. Other

research has also indicated that less politically conservative areas tend to have a greater prevalence of same-sex partners (Walther and Poston, 2004) than more conservative areas.

Based on Compton and Poston's findings, I will, in this dissertation, construct my own theory to explain the variation in homosexual-heterosexual residential segregation across the 100 U.S. cities.

Problems in Studying Homosexual-Heterosexual Segregation

Generally speaking, the lack of representative samples is the most fundamental problem in quantitative studies on gays and lesbians. Oftentimes respondents are, for example, recruited by snowball methods; from the readers of particular magazines; from members of organizations for gays and lesbians; or, more recently, from persons who are willing to respond to Internet questionnaires. Critics in the field (e.g., Patterson 2000) have also pointed out that much of the research on the family life of gays and lesbians is based on white, well-educated, middle-class Americans. In addition to these sampling problems, the question of how to identify homosexuals has increasingly become the focus of debate. Should respondents be asked to identify themselves, or is it better to measure sexual practice instead, that is, to ask them about the number of lifetime same-sex partners, any such partner within a certain period, the sex of the majority of partners, and so on?

Recently, a number of scholars have begun to study economic and social issues in the gay and lesbian population using sizable samples, such as samples drawn from the General Social Survey, the National Health and Social Life Survey, and the U.S. Census. Among them, the U.S. census is the best data resource for studying gay and lesbian couples mainly because of its very vast size.

Before 1990, couples living outside marriage in marriage-like relationships were not identified separately from individuals living together as roommates. Demographers, however, had noticed an increasing prevalence of the former type of household. Bumpass and Sweet (1989), for example, reported that only 3% of women born between 1940 and 1944 had ever cohabited by age 25; among women born 20 years later, 37% reported cohabiting by age 25. Because of this trend, the U.S. Census Bureau modified slightly the survey instrument for the 1990 census to allow unmarried partners to be identified separately from roommates.

Fortunately, the census instrument allows household heads to report an unmarried partnership regardless of the partner's sex. In contrast, many previous surveys explicitly restricted cohabitation questions to heterosexual partnerships. Clearly, this is not a random sample of people who would identify themselves as gay or lesbian, nor is it a sample of those who have engaged in same-sex sex, because the sample contains only individuals who are involved in a cohabiting relationship.

LITERATURE REVIEW

Studies on Residential Segregation

One of the first sociological analyses of residential segregation was Park's (1925, 1926) study of the relationship between physical distance and social distance. Over the years,

sociologists have been continually interested in residential segregation. And much of the interest has been in the segregation of minorities from whites.

Since the 1950s several studies have focused on the persistent and high degree of black residential segregation in U.S. metropolitan areas (Duncan and Duncan 1955; Taeuber and Taeuber 1965; Sorensen, Taeuber, and Hollingsworth1975; Farley 1977, Harrison and Weinberg 1992). The high level of segregation of the black population is problematic because segregation has been shown to isolate blacks from amenities, opportunities, and resources which affect social and economic well-being (Logan 1978; Schneider and Logan 1982). Additional attention has also focused on the segregation of Hispanics from whites (Grebler, 1970; Kantrowitz, 1973; Massey, 1979), but the bulk of the studies have dealt with black-white segregation.

In the past few decades, residential segregation in U.S. cities has remained high, although slightly decreasing. Iceland's 2004 study indicated segregation has been decreasing, due mainly to declines in African American segregation. At the same time, however, there has been little change (or even slight increases) in Asian and Hispanic segregation. For Hispanics and Asians, it was the growth in Hispanic and Asian and Pacific Islander populations, respectively, that were associated with increases in segregation, suggesting that this population growth likely buttressed the establishment of ethnic enclaves. There has been virtually no attention in the sociological literature to the residential segregation of the homosexual population from the heterosexual population.

Segregation Indices and Problems

Social scientists often summarize the patterns of residential segregation with segregation indices. Duncan and Duncan's (1955) early work showed that all of the various indices could be regarded as functions of a single geometrical construct, the "segregation curve." They also surveyed the problems of segregation indices by providing a set of inadequacies and precautionary comments about the interpretation of them. However, the problems they mentioned back in 1955 were largely ignored for a long time.

Ten years later, Taeuber and Taeuber (1965) presented what was probably at that time the most detailed discussion of the measurement of segregation. After a long and detailed discussion of many indices, they opted to use the dissimilarity index in their major work on residential segregation and neighborhood change. After that, the dissimilarity index served as the standard measurement for capturing spatial segregation between social groups.

But in the 1970s, a torrent of papers began to appear that considered a variety of definitions and measures of segregation once again. Analysts started to realize the difficulties in the use and interpretation of segregation indices. For the first time, Cortese and his colleagues (1976) were concerned with the limitations of the dissimilarity index. In their article, they explored the difficulties in the use and interpretation of the index of dissimilarity, demonstrated some of the systematic biases resulting from these inadequacies, and provided a mathematical refinement that overcame some of the major problems inherent in the use of the index. In the paper, they suggest to use a measure they termed "Z" for studies of residential segregation.

However, Massey (1978) later argued that the "Z" measure Cortese and his colleagues proposed was inappropriate. The measure did a poorer job of measuring segregation empirically

than the index it was designed to replace. Massey's paper presented logical and empirical evidence to show that the "Z" index which was used by Cortese and his colleagues is an inappropriate measure of residential segregation, because "Z" does not control for the effects of varying tract sizes and minority proportions. Moreover, the "Z" index has no clear theoretical or intuitive meaning with respect to residential segregation. Indeed, the use of "Z" as a measure of segregation was shown to confuse the concepts of statistical and substantive significance. The inappropriateness of "Z" as a measure of segregation is demonstrated empirically by the lack of any type of association between "Z" and "D" (the dissimilarity index). On the other hand, "Z" may be useful as a rough guide in assessing the degree to which observed patterns of unevenness may be a result of random processes. But even in this limited role as a quasi-statistical test, the calculation of "Z" is usually unnecessary.

Another paper written by Winship (1977) argued that previous studies had an overwhelming tendency to look at residential segregation from only one perspective – that of the segregation curve and its deviation from complete segregation. Winship suggested that segregation can be measured as it deviates from a situation of complete desegregation or in terms of a situation in which there is random segregation in a city.

Undoubtedly, during the 1970s, there was some theoretical and methodological disarray in the field of segregation indices studies. Researchers seldom agreed about which measure of segregation was best to use and under which circumstances it should be used. Realizing the limitations of segregation indices but without any good and agreed upon solutions, researchers simply avoided those cities with relative small minority populations when studying segregation. After decades of lively debate, Massy and Denton (1988) published in 1988 their important study on the measurement of residential segregation; this paper has been deemed by some researchers

as one of the most important methodological papers published in the past several decades. In their article, twenty indices of segregation were surveyed and related conceptually to one of five main dimensions of segregation. The authors used data from a large set of U.S. metropolitan areas, the indices were intercorrelated, and factor analyzed. Based on the factor analysis and other information, one index was chosen to represent each of the five dimensions, and these selections were confirmed with a principal components factor analysis. Massey and Denton recommended adopting these five indices as standard indicators in future studies of segregation.

According to Massy and Denton's article, residential segregation is a global construct that subsumes five underlying dimensions of measurement, each corresponding to a different aspect of spatial variation; these dimensions are evenness, exposure, concentration, centralization, and clustering. Among them, evenness refers to the differential distribution of two social groups across areal units in a city. A minority group is said to be segregated if it is unevenly distributed over areal units (Blau 1977). Although the debate on the relative merits of the dissimilarity index has continued since 1976, Massy and Denton still thought it was the most useful measure of evenness. "It has been the mainstay of segregation research for thirty years, and its further use would preserve continuity in the research literature (Massy and Denton, 1988)."

Another important dimension is exposure which refers to the degree of potential contact, or the possibility of interaction, between minority and majority group members within geographic areas of a city. According to Massy and Denton's article, the "P" indices are the preferred measures of exposure since they have simple and straightforward interpretations. I will not discuss here the other three dimensions of segregation. I do not propose to use them in my dissertation research; moreover, the bulk of the literature on segregation has used measures of the first two dimensions of evenness and interaction.

Although Massy and Denton ushered in a long era of peace by designating residential segregation as a multidimensional phenomenon varying along five distinct axes of measurement, the debate on segregation indices has continued into the current research literature. Farley and Johnson (1985) found the segregation indices were dependent upon the relative size of the two groups, the average population size of areal units, and the number of areal units. Therefore, in some circumstances, people might err in concluding that a high value of a segregation index indicates a non-random distribution of the two groups. Later, Massey and Denton (1988) also observed that the dissimilarity index largely depends on the relative size of the two groups being compared.

Carrington and Troske (1997) took one step future to suggest that the random allocation of individuals to units will typically generate some deviation from evenness. Therefore, standard segregation indices tend to reflect random allocation as well as systematic group segregation. In their study, Carrington and Troske modified two popular indices so they measure deviations from random allocation rather than deviations from evenness. An empirical example suggested that their modified indices provided an improved measure of the systematic component of group segregation.

More and more studies show that one of the major objections of segregation indices is the expectation that "evenness" as the opposite of segregation is not as useful in most cases as the concept of "randomness". Sometimes the segregation indices can be positive even when people are allocated randomly across units.

To illustrate, Fossett and Zhang (2010) have stated in their paper that "the impact of bias can complicate the interpretation and comparison of conventional index scores; in some

circumstances it can render segregation indices untrustworthy altogether." Therefore, in their paper, instead of using complicated techniques to adjust conventional indices, they identify new versions of popular segregation indices that are free of bias. These indices bring many benefits for research, and the new versions can be used in a wider range of circumstances and they are easy to compute and interpret.

In my dissertation analysis, I propose to focus on the uneven distribution between same-sex partnered households and heterosexual partnered households. Hence, I propose to use two versions of the dissimilarity index. One is the old version of the dissimilarity index (the conventional D-index) and, another one is Fossett and Zhang's new version of the dissimilarity index (the unbiased D-index). Then I will compare the results of the two versions of the dissimilarity indices

DATA and METHODS

Data and Limitations

The indices to be developed in my dissertation research will use census tract data from the 2000 U.S. census and the 2009 American Community survey. I have available same-sex

partnered data for gays and for lesbians in each of the census tracts in each of the 100 cities of the U.S in the years of 2000 and 2009.

As mentioned before, until the conduct of the 1990 U.S. census, it was not possible to undertake systematic and quantitative analysis of the homosexual-heterosexual residential segregation in the U.S. This changed in the 1990 census when the Census Bureau added an "unmarried partner" response to the other responses (husband, wife, son, grandfather, etc.) to the census question pertaining to the standard "relationship to the householder," i.e., the person in the household designated as person #1. The "unmarried partner" response was also used in the 2000 census.

One of the data tables available in Summary File 2 of the 2000 census, Table PCT 22, gives for the census tracts of each U.S. city the number of households in which person #1 is a male and another male in the household identifies himself as the unmarried partner of person #1;. A similar tabulation is provided for households in which person #1 is a female and in which another female identifies herself as the unmarried partner of person #1. Because the "unmarried partner" response is meant to reflect a "marriage-like" relationship between the two persons, researchers make the assumption that these data on same sex households (male-male or female-female) represent households inhabited by partnered gays, or by partnered lesbians (Black et al., 2000, 2002; Simmons and O'Connell, 2003; Walther and Poston, 2004; Gates and Ost, 2004).

Although the census data provide a large dataset for the analysis of issues related to cohabiting same-sex partners, "the data are nonetheless limited in several respects" (Compton and Poston, 2011). According to Compton and Poston, the census data only capture individual who choose to identify as unmarried partners. Individuals who prefer not to self-identify or who are single are not counted in this data set. So Compton and Poston (2011) think this could be

problematic for generalization to the greater population of homosexuals, if the types of individuals who self-identify or who are in partnered relationships differ on essential characteristics from those who do not self-identify or who are not in partnered relationships. These concerns have been previously addressed by those using census data to study sexual orientation (see e.g. Black et al. 2000; Baumle et al. 2011). Most previous studies have agreed that when compared to other datasets, such as the GSS or the NHSLS, the census data do not show a large bias, suggesting that the census data are not inappropriate for such analyses of homosexual partners (Black et al. 2000; O'Connell and Gooding,2006; Baumle et al., 2011). For example, Black and his colleagues (2000) calculated an error term and suggested that only a small number of individuals misinterpreted the "unmarried partner" response in the census.

In addition to 2000 U.S. census data, I will also use data from the 2009 American Community Survey. The American Community Survey (ACS) is an ongoing survey that provides annual data giving researchers current demographic and economic information about individuals and households in the U.S. (Census Bureau ACS website: http://www.census.gov/acs). The 2009 ACS enumerated the total population including those living in institutions, college dormitories, and other group quarter facilities and covers most Census questions. The smallest geographic unit that is identified is the Public Use Microdata Area (PUMA).

Like the 2000 census, the 2009 American Community Survey is a large dataset and allows for investigating the homosexual and heterosexual populations. However, similar to the 2000 Census data, 2009 ACS is limited by only identifying partnered same-sex couples in the data and thus excludes those people who may be same-sex couples without a live-in partner at the time of the survey. And again, the 2009 ACS can only capture those who are willing to identify themselves as being in a same-sex unmarried partner relationship; those who prefer not

to reveal their self-identity or, as just noted, who are single homosexual people, will not be able to be identified as homosexuals in my study.

In summary, the question in the census and the ACS about cohabitation makes it possible for us to conduct a systematic and quantitative study of homosexual-heterosexual residential segregation in the U.S. Although the question of the undercount of the enumeration of partnered gay men and lesbians is an important issue, I still believe the 2000 census dataset and the 2009 ACS are more than satisfactory for my analysis.

Conventional D-index:

In my dissertation, I will first use the conventional D-index to measure residential segregation between homosexual couples and heterosexual couples; it is defined as:

$$D = (\frac{1}{2}\sum_{i}^{n} |(HOM_i / HOM) - (HET_i / HET)|) * 100$$

where HOMi and HETi are the numbers of partnered gays (or lesbians) and heterosexuals living in the ith census tract of a city, and HOM and HET are the total numbers of partnered gays (or lesbians) and heterosexuals in the city. One-half of the absolute differences between HOMi/HOM and HETi/HET are summed over all the census tracts of the city, and multiplied by 100 to yield a percentage score. The resulting value of the D-index represents the percentage amount of partnered gays (or lesbians) that would need to move to certain other census tracts in order to for them to have the same residential distributions with the heterosexuals over the whole city.

The value of the conventional D-index ranges from 0, indicating perfectly even residential distribution, to 100, indicating perfectly uneven residential distributions of the two

groups. That is to say, the higher the value of the index, the more uneven the partnered gays (or lesbians)'s residential distribution from the heterosexuals in a certain city.

The Bias in the Conventional D-index

Over decades, methodological studies have examined various aspects of the issue of index bias, most often in relation to the conventional D-index. Several conclusions have emerged from the debate and discussion on this topic.

First of all, the D-index is subject to bias in the sense that its expected value under random distribution is not zero. That is to say, the zero value of the D-index, the value that signals the absence of segregation defined in relation to exact even distribution, does not necessarily obtain under random distribution (Cortese, Falk, and Cohen 1976; Winship 1977). This bias may lead investigators to draw incorrect conclusions about the levels and variation of uneven distribution, particularly when addressing questions of whether race or other social characteristics plays a role in segregation, because the conventional D-index cannot distinguish random allocation and systematic group segregation. Also, the magnitude of the bias in D varies with circumstance. And the bias can be large and non-negligible in some circumstances (Winship, 1977).

Further, methodological studies have established that the magnitude of bias in the D-index varies as a complex function of some basic factors: the average total population per areal unit, and the relative size of the two groups in the segregation comparison (Cortese, Falk, and Cohen 1976; Winship 1977; Farley and Johnson 1985; Boisso, Hayes, Hirschberg, and Silber 1994; Carrington and Troske 1997; Ransom 2000; Allen, Burgess, and Windmeijer 2009). All else equal, bias tends to increase at an increasing rate as the average total population per areal

unit becomes smaller; all else equal, bias tends to increase at an increasing rate as the relative size of the two groups falls from balanced. In addition, the bias may be also affected by two more factors: the relative size of population groups other than the two groups being compared, and the degree of segregation of these other groups from the two groups being compared (Fossett and Zhang, 2011).

According to these agreements, I hold that it would not be prudent for me to only use the conventional D-index in my dissertation to measure residential segregation between homosexual couples and heterosexual couples; the major reason is that the population sizes of the two groups in the segregation comparison are very unlike. Obviously, there are many more heterosexual partners than same-sex partners in each of the cities. For example, in 2000 in New York City, only 1.17% of households were gay couples and 0.85% were lesbian couples. And also we cannot overlook the effects of "other groups." For example, when calculating the conventional D-index between gay male partners with lesbian partners, there are a large number of heterosexual partners in the same areas. As a result, we have reason to believe the amount of segregation measured by the conventional dissimilarity index between homosexual couples and heterosexual couples might be random segregation and not caused by discrimination or any other socioeconomic factors. I will thus also calculate unbiased D indices in my dissertation.

Fossett and Zhang's Unbiased D-index:

Contemporary segregation studies have routinely adopted a variety of "rule-of-thumb" practices to deal with concerns relating to the bias of the D-index. Some researchers adopt restrictions on study designs to avoid situations where index bias can complicate interpretations and comparisons of conventional index scores. Fossett and Zhang (2011) argued that "these

practices have had a pervasive, but largely unappreciated adverse influence on the literature; they have caused researchers to restrict the scope of segregation studies and to limit the kinds of questions they seek to answer."

In their paper, Fosset and Zhang (2011) introduced a new version of the D-index, what they refer to "unbiased D-index." The unbiased D-index has the desirable characteristic, as noted in its name, of being unbiased. That is, under random distribution the unbiased D-index has expected values of zero. Instead of using complicated techniques to adjust or test, Fossett and Zhang show how to obtain the unbiased D-index with a revised computing formula which eliminates the root source of bias in the conventional formulation of the D-index.

Basically, they show that all popular indices of uneven distribution can be formulated as simple differences of group means on scores based on group exposure (Pi) calculated from area population counts. In the case of the D-index, for example, if we use it to measure the residential segregation between blacks and whites in cities, the value of the D-index usually is interpreted as the percentage of black people who have to move to certain other areal units like census tracts in order for there to be an even distribution between blacks and whites. However, there is another interpretation of the D-index as mentioned by Becker, McPartland and Thomas (1978). Although this interpretation is rarely mentioned in methodological and empirical studies, it clearly shows the source of the bias of the conventional D-index. According to the alternative interpretation, the value of the D-index can be described as the white-black difference in the proportion of each group residing in areas where exposure to whites (Pi) exceeds the proportion white in the city (P).

Based on the new formula, Fossett and Zhange have noted that the bias of the conventional D-index is caused by the calculation of group exposure (Pi). Actually, the group

exposure in the conventional D-index is calculated from area population counts. That is to say, the exposure calculations for individual households include the household itself, which is biased in opposing directions for the two groups in the comparison, and the resulting difference produces the bias in the index score. Finally, the unbiased D-index is developed based on the fact that bias in the conventional D-index can be eliminated by the simple adjustment of calculating exposure based on counts of neighbors instead of counts for area population.

To sum, the unbiased D-index developed by Forssett and Zhang is free of bias and brings many benefits. I will construct three unbiased D-indices for gay partners, and three for lesbian partners, and one for gay partners and lesbian partners. And I will compare the results of the unbiased D-indices with the results of conventional D-indices. I will calculate these for 100 cities of the U.S.

THEORY CONSTRUCTION and EXPECTED FINDINGS

As already mentioned, in my dissertation I will explain the variation in homosexual-heterosexual residential segregation across different cities. So I conducted my own theory on the explanations for homosexual-heterosexual segregation. The theory contains definitions, assumptions, and derivations.

Definitions

(1) A Homosexual Couple:

It is very difficult to define the concept of sex orientation. Literature usually indicates there are 7 variables defining this concept: sexual attraction; sexual behavior; sexual fantasies; emotional preferences; social preferences; self-identification; and life style. For purpose of this dissertation, my definition is based on self-identification.

1. They are two people of the same sex.

2. They occupy a housing unit (a house, an apartment, a mobile home, or a single room). According to the U.S. Census Bureau Definition of a household, the two people share the same household.

3. They identify each other as the other's romantic partners.

(2) A Heterosexual Couple:

1. They are two people of the opposite or different sex.

2. They occupy a housing unit (a house, an apartment, a mobile home, or a single room). According to the U.S. Census Bureau definition of a household, the two people share the same household.

3. They are either legally married or unmarried but identify each other as the other's romantic partner.

(3) Homosexual-heterosexual Residential Segregation:

As mentioned, residential segregation is a global construct that subsumes five underlying dimensions of measurement (Massy and Denton, 1988). For my dissertation, I want to use and focus on the aspect of "evenness", which refers to the differential distribution of two social groups among areal units in a city. So a minority group is said to be segregated if it is unevenly distributed. Based on the concept of "evenness", I developed the definition of homosexual-heterosexual residential segregation as following:

1. In city A, there are homosexual couples and heterosexual couples.

2. City A can be divided into different territorial units. These territorial units are relatively homogeneous units with respect to population characteristics, economic status, and living conditions. In each of the units, there are on average about 4,000 inhabitants. Using the U.S. Census Bureau's definition of a census tract, we can define these units as census tracts.

3. Homosexual couples are distributed among different census tracts in city A. We can call this residential distribution as city A's "Homosexual Distribution."

4. Heterosexual couples are distributed among different census tracts in city A. We can call this residential distribution as city A's "Heterosexual Distribution."

5. The difference of city A's "Homosexual Distribution" and city A's "Heterosexual Distribution" is the homosexual-heterosexual segregation in city A.

(4) The Degree of Homosexual-heterosexual Residential Segregation.

1. If there is no difference between "Homosexual Distribution" and "Heterosexual Distribution" in city A, this implies homosexual couples and heterosexual couples are perfectly evenly distributed in city A. Therefore, there is no homosexual-heterosexual residential segregation in city A.

2. If there is difference between "Homosexual Distribution" and "Heterosexual Distribution" in city A. In other words, some homosexual couples in city A have to change their current dwellings to city A's other census tracts in order to have a perfectly even distribution with heterosexual couples, this implies there is homosexual-heterosexual residential segregation in city A.

3. The degree of homosexual-heterosexual segregation is positively related to the amount of homosexual couples who have to change their current dwellings to city A's other census tracts in order to have a perfectly even distribution with heterosexual couples.

Assumptions

Racial/ethnic segregation is often seen as a cause of systematic economic disadvantage. For example, in Massey and Denton's book, AMERICAN APARTHEID (1993), they argue that the fundamental cause of poverty among African Americans is segregation. They use a "How Segregation Causes Poverty" model to illustrate that segregation has created a black underclass by limiting the educational and employment opportunities for them.

Previous racial/ethnic studies on segregation also show that great ethnic segregation in a metropolitan area has an impact on overall metro area crime rates (Sampson, 1985; Logan and

Messner, 1987; Shihadeh and Flynn, 1996; Shihadeh and Maume, 1997). Because greater racial segregation may worsen the schools and job access for minorities, or increase racism in the labor market, which in turn contribute to greater economic hardship and therefore greater criminality for minorities (Verdier and Zenou, 2004).

Over all, it seems racial/ethnic segregation is one of the causes of poverty and crime in U.S. metropolitan areas. By parallel reasoning, I assume homosexual-heterosexual segregation is probably also related to poverty and crime.

As mentioned, Compton and Poston's work (2011) shows that homosexual-heterosexual segregation is associated with the political climate of a city. So in my dissertation I want to test this assumption: there will be greater homosexual-heterosexual sexual segregation in conservative cities than in liberal cities.

Derivations

The following derivations were created by combining the two assumptions and four definitions described earlier.

Derivation 1:

If city A has high rates of poverty and crime, the degree of homosexual-heterosexual residential segregation in city A will be relatively high. Following the "rule of thumb" for residential segregation, we would expect more than 30% of homosexual couples in city A need to change their current dwellings to city A's other census tracts in order to have a perfectly even distribution with heterosexual couples in city A;

If city A has low rates of poverty and crime, the degree of homosexual-heterosexual residential segregation in city A is relatively low, which means less than 30% of homosexual couples in city A, based on the "rule of thumb", need to change their current dwellings to city A's other census tracts in order to have a perfectly even distribution with heterosexual couples in city A.

Derivation 2:

If city A is a more conservative city, the degree of homosexual-heterosexual residential segregation in city A will be relatively high, which means more than 30% of homosexual couples in city A, based on the "rule of thumb," need to change their current dwellings to city A's other census tracts in order to have a perfectly even distribution with heterosexual couples in city A;

If city A is a less conservative city, the degree of homosexual-heterosexual residential segregation in city A will be relatively low, which means less than 30% of homosexual couples in city A, based on the "rule of thumb," need to change their current dwellings to city A's other census tracts in order to have a perfectly even distribution with heterosexual couples in city A.

Initial Conditions

(1). this dissertation will focus on the top 100 U.S. metropolitan areas (cities) with the highest populations based on U.S. census data.

(2). this dissertation will analyze the selected 100 US metropolitan areas (cities) in the year of 2000 and 2009.

Instantiations of the Derivations

In my dissertation, each city's rates of poverty and crime will be used as instantiations of the city's poverty and crime. Each city's Republic/Democrat voters and sodomy law will be used as an instantiation for the city's political climate. Then I get following instantiations of my derivations.

Among the selected 100 U.S. cities in the year of 2000 and 2009, cities with higher rates of poverty and crime will also have higher levels of homosexual-heterosexual segregation, compared to cities with lower rates of poverty and crime.

Among the selected 100 U.S. cities in the year of 2000 and 2009, there will be higher levels of homosexual-heterosexual segregation in cities with larger proportions of Republican voters, relative to Democrat voters, and with sodomy laws compared to cities with smaller proportions of Republican voters, relative to Democrat voters, and without sodomy laws.

One chapter of my dissertation will have regression models to test the derivations and discuss about the results. The final chapter of my dissertation will have several sections, one of which will focus on implications of my findings. I will entertain several issues, one of them the degree to which my research might have policy impacts on non-racial minority populations.

References:

Baumle, Amanda K., D'Lane R. Compton, and Dudley L. Poston, Jr. 2009. Same Sex Partners: The Demography of Sexual Orientation. Albany, NY: SUNY Press.

Baumle, Amanda and Dudley L. Poston, Jr. 2011. "The Economic Cost of Homosexuality: Multilevel Analyses," Social Forces 89: 1005–1032.

Becker, Henry J., James McPartland, and Gail Thomas. 1978. "The Measurement of Segregation: The Dissimilarity Index and Coleman's Segregation Index Compared." Pages 349-353 in the Proceedings of the Social Statistics Section of the American Statistical Association. Washington, D.C.: American Statistical Association.

Bellafante, Ginia. 2004. "Two Fathers, With One Happy to Stay at Home." New York Times (January 12): A1, A17.

Black, Dan A., Gary J. Gates, Seth G. Sanders, and Lowell J. Taylor. 2000. "Demographics of the Gay and Lesbian Population in the United States: Evidence from Available Systematic Data Sources." Demography 37: 139-154.

Black, Dan A., Gary J. Gates, Seth G. Sanders, and Lowell J. Taylor. 2002. "Why Do Gay Men Live in San Francisco?" Journal of Urban Economics 51: 54-76 .

Bumpass, L.L. and J. Sweet. 1989. "National Estimates of Cohabi- tation." Demography 26:615-25.

Carrington, William J. and Kenneth R. Troske. 1997. "On Measuring Segregation in Samples with Small Units." *Journal of Business and Economic Statistics* 15:402-409.

Compton, D'Lane R. and Dudley L. Poston. 2011. "The Residential Segregation of Same-Sex Partnered Households from Heterosexual Partnered Households in U.S. Cities in 2000" unpublished paper presented at the 2011 annual meeting of the Southwestern Social Science Association, Las Vegas.

Cortese, Charles, R. Frank Falk, and Jack Cohen. 1976. "Further Considerations on the Methodological Analysis of Segregation Indices." *American Sociological Review* 41: 630-637.

Duncan, O. D. and Beverly Duncan. 1955. "A Methodological Analysis of Segregation Indices." *American Sociological Review* 20:210-7.

Farley, Reynolds. 1977. "Residential Segregation in Urbanized Areas of the United States in 1970: An Analysis of Social Class and Racial Differences." *Demography* 14: 497-529.

Farley, Reynolds and Robert Johnson. 1985. "On the Statistical Significance of the Index of Dissimilarity." Unpublished paper presented at American Statistical Association meetings, Washington, D.C.

Farley, Reynolds, and William Frey. 1994. "Changes in the Segregation of Whites from Blacks during the 1980s: Small Steps towards a More Integrated Society." *American Sociological Review* 59: 23-45.

Fong, Eric and Kumiko Shibuya. 2000. "The Spatial Separation of the Poor in Canadian Cities." Demography 37: 449-459.

Fossett, Mark A. and Cynthia M. Cready. 1998. "Ecological Approaches in the Study of Racial and Ethnic Differentiation and Inequality." Pp. 157-194 in Continuities in Sociological Human Ecology, edited by Michael Micklin and Dudley L. Poston, Jr. New York: Plenum Press.

Fossett, Mark A. and Wenquan Zhang. 2011. "Unbiased Indices of Uneven Distribution and Exposure: New Alternatives for Segregation Analysis." unpublished paper presented at the 2011 annual meeting of Population Association of America, DC.

Frisbie, W. Parker, and John D. Kasarda. 1988. "Spatial Processes." Pp. 629-666 in Handbook of Sociology, edited by Neil J. Smelser. Newbury Park, CA: Sage.

Gates, G. J., and Jason Ost. 2004. The Gay and Lesbian Atlas. Washngton D.C.: The Urban Institute Press.

Giddens, A. 1992. "The Transformation of Intimacy." Oxford: Polity Press.

Grebler, L., J. W. Moore, and R. C. Guzman. 1970. *The Mexican American People: The Nation's Second Largest Minority.* New York: Free Press.

Harrison, R. J. and Weinberg, D. H. 1992. "Racial and Ethnic Residential Segregation in 1990." unpublished paper presented at Population Association of America meetings, Denver.

Iceland, John. 2004. "Beyond Black and White Metropolitan Residential Segregation in multi-ethnic America." *Social Science Research* 33:248-271.

Kantrowitz, N. 1973. *Ethnic and Racial Segregation in the New York Metropolis*. New York: Praeger.

Klawitter, Marieka M., and Victor Flatt.1998. "The Effects of State and Local Antidiscrimination Policies on Earnings for Gays and Lesbians." *Journal of Policy Analysis and Management* 17: 658-686.

Krysan, Maria. 2002. "Whites Who Say They'd Flee: Who are They, and Why Would They Leave?" *Demography* 39: 675-696.

Logan, J.R. 1978. "Growth, Politics, and the Stratification of Places." *American Journal of Sociology* 84:404-416.

Logan, J.R. and S. Messner. 1987. "Racial Residential Segregation and Suburban Violent Crime." *Social Science Quarterly* 68: 510-527.

Massey, Douglas S. Massey. 1978. "On the Measurement of Segregation as a Random Variable." *American Sociological Review* 43:587-590.

Massey, Douglas S. 1979. "Effects of Socioeconomic Factors on the Residential Segregation of Black and Spanish Americans in U.S. Urbanized Areas." *American Sociological Review* 44(6):1015-1022.

Massey, Douglas S. 1985. "Ethnic Residential Segregation: A Theoretical Synthesis and Empirical Review." Sociology and Social Research 69: 315-350.

Massey, Douglas S., and Nancy A. Denton. 1987. "Trends in the Residential Segregation of Blacks, Hispanics and Asians: 1970-1980." American Sociological Review 52: 802-825.

Massey, Douglas S. and Nancy A. Denton. 1988. "The Dimensions of Residential Segregation." *Social Forces* 67(2):281-315.

Massey, Douglas S. and Nancy A. Denton. 1989. "Hypersegregation in U.S. Metropolitan Areas: Black and Hispanic Segregation along Five Dimensions." *Demography* 26(3):373-391.

Massey, Douglas S. and Nancy A. Denton. 1993. *American Apartheid: Segregation and the Making of the Underclass.* Massachusetts: Harvard University Press.

Mondimore, Francis Mark. 1996. A Natural History of Homosexuality. Baltimore: The Johns Hopkins University Press.

Murray, Stephen O. 1992. "Components of Gay Community in San Francisco." Pp. 107-146 in Gay Culture in America: Essays from the Field, edited by Gilbert Herdt. Boston: Beacon Press.

O'Connell, Martin and Gretchen Gooding. 2006. "The Use of First Names to Evaluate Reports of Gender and Its Effect on the Distribution of Married and Unmarried Couple Households." Poster presented at the Annual Meetings of the Population Association of America, Los Angeles, CA.

O'Reilly, K. & Webster, G.R. 1998. A sociodemographic and   partisan analysis of voting in three anti-gay rights referenda in Oregon. Professional Geographer, 50, 4: 498-515.

Park, Robert E. 1925. "The Concept of Position in Sociology." *Publications of the American Sociological Society* 20: 1-14.

Park, Robert E. 1926. "The Urban Community as a Spatial Pattern and a Moral Order." Pp. 3-20 *The Urban Community*, edited by E.W. Burgess. Chicago: University of Chicago Press.

Patterson, C. 2000. "Family Relationships of Lesbians and Gay Men." *Journal of Marriage and the Family* 62:1052-69.

Sampson, R.J. 1985. "Race and Criminal Violence: A Demographically Disaggregated Analysis of Urban Homicide." *Crime and Delinquency* 31:47-82.

Schneider, M., and J. R. Logan. 1982. "Suburban Racial Segregation and Black Access to Local Public Resources." *Social Science Quarterly* 63:762-770.

Shihadeh, Edward and Nicole Flynn. 1996. "Segregation and Crime: The Effect of Black Isolation on the Rates of Black Urban Violence." *Social Forces* 74(4): 1325-1352.

Shihadeh, Edward and Micheal Maume. 1997. "Segregation and Crime: The Relationship Between Black Centralization and Urban Black Homicide." *Homicide Studies* 1(3): 254-280.

Simmons, T. and M. O'Connell. 2003. "Married Couple and Unmarried-Partner Households: 2000." Census 2000 Special Reports. CENSR-5. Washington, D.C.: U.S. Bureau of the Census.

Soresen, A., K. E. Taeuber, and L. J. Hollingsworth, Jr. 1975. "Indexes of Racial Residential Segregation for 109 Cities in the United States, 1940-1970." S*ociological Focus* 8:125-142.

Taeuber, Karl E. and Alma F. Taeuber. 1965. *Negroes in Cities: Residential Segregation and Neighborhood Change.* Chicago: Aldine Publishing.

Verdier, Thierry and Yves Zenou. 2004. "Racial Beliefs, Location, and the Causes of Crime." *International Economic Review* 45(3).

Walther, Carol S., and Dudley L. Poston, Jr. 2004. "Patterns of Gay and Lesbian Partnering in the Larger Metropolitan Areas of the United States." *Journal of Sex Research*: 41: 201-214.

Winship, Christopher. 1977. "A Re-evaluation of Indices of Residential Segregation." *Social Forces* 55:1058-1066.