Two Paths to Segregation: The Social Dimensions of Residential Location Among Traditional and Alternative Households

Amy L. Fuhrman

Department of Sociology
University of Washington

2009

I. Introduction

Housing is a central concern to individuals and communities; in fact, it represents the largest single use of urban land, and the fastest growing use of rural land in the United States (U.S. Department of Agriculture 2002). A home and its surrounding area carry hidden social meaning such as the representation of status, position, power, and personal identity. As stated by John Adams, "Americans use housing to hold onto their wealth, to state who they are, to build social bridges and fences, to join groups, and to exclude others from their groups" (1984:517).

Numerous factors at the individual level influence a household's decision of where to locate, making it difficult to determine the exact motivations behind residential location choices. However, aggregate patterns between household characteristics and spatial location are evident, and can reflect significant residential segregation between some groups.

Segregation is defined as the non-random distribution of individuals throughout the city (Chevan 1982), and is generally explained by three factors: race/ethnicity, socioeconomic status, and life cycle stage. These factors interact with each other, but researchers find that households are segregated by each of these factors independently while controlling for the others, and that the importance of each of these factors varies across space and time (Logan, Stults, and Farley 2004). In addition, scholars suggest that social change has led to the emergence of new dimensions of residential segregation (Davies 1984). Increasing variation in household composition and increasing divergence from a traditional family life cycle are major social changes occurring in recent decades. This study seeks to add to the literature on residential differentiation by introducing household composition (independent of life cycle stage) as an emerging dimension of segregation.

My primary objective is to compare traditional and alternative household types that are within similar life cycle stages within King County, Washington, which includes the city of Seattle. Specifically, I compare 1) married parents, single mothers, and single fathers, 2) male-female cohabitors, male-male cohabitors, and female-

female cohabitors, and 3) young males and females living alone. Using data from the 2000 U.S. Census, I first document the level of segregation between the households in each life cycle grouping. I then use data from the 2000 Public Use Microdata 5 percent sample file to examine characteristics of individual households, in order to distinguish systematic differences (including differences in race/ethnicity and socioeconomic status) between households in the same life cycle group. I identify these systematic differences as potential explanations for residential segregation. Finally, I test these potential explanations in a regression model which accounts for spatial autocorrelation, using census tract data from the 2000 U.S. Census.

II. Conceptual Framework and Hypotheses

The factorial ecology literature finds that residential differentiation in the majority of cities in the developed world is dominated by socioeconomic status, race/ethnicity, and family life cycle (Murdie 1969). This three-factor model represents a high degree of generalization, but tends to work well for cities in the U.S., Canada, Australia, and New Zealand (Knox 1995). There also appears to be a consistent pattern in the spatial expression of these dimensions. In a study of four U.S. cities, Salins (1971) demonstrates that family life cycle tends to exhibit a zonal gradient (extending out from the city center in concentric circular zones), while socioeconomic status is reflected in a sectoral pattern (extending out in wedge-shaped sectors from the axis of the city center), and patterns of race/ethnicity exhibit a clustered pattern with a tendency to extend in a sectoral fashion. The overlay of these dimensions serves to create areas of social homogeneity.

Recent studies suggest that the classical model of urban structure is becoming complicated by demographic, cultural, political, and technological change (Knox 1995), leading some scholars to suggest that residential differentiation and segregation will be manifested in more complex ways and at a finer level of resolution than sectors, zones, and clusters, and that there will be many more axes of differentiation (Davies 1984). Davies (1984) identifies migrant status, occupation, welfare dependency, and

poverty as some of the emerging axes of residential differentiation. This study adds household composition to this list, where household composition combines aspects of the family life cycle, including age, marital status, and the presence of children, with additional factors, including gender, cohabitation, and sexual preference. I am interested in determining whether there is residential heterogeneity within life cycle stages between traditional and alternative family formations. Specifically, are married couples with children residentially segregated from single parents with children? Are same-sex unmarried partners residentially segregated from opposite sex unmarried partners? Are young males and females living alone segregated from each other? I am also interested in determining whether this segregation can be explained by race/ethnicity and socioeconomic status.

A. Segregation Across Life Cycles

Households at different stages of the life cycle have different needs and preferences that are reflected in their residential choices, contributing to segregation across life cycles. The concept of a family life cycle is used to reflect the fact that households change in a fairly regular and time-sequenced way in response to vital processes—marriage, births, and deaths—leading to predictable shifts in the size and age composition of members of the household (Rossi 1980). Definitions of each life cycle stage vary, but most stress age, marriage, and the presence or absence of children. The stages of a traditional family life cycle are typically described as proceeding from a young, single adult, to a young, childless married couple, followed by a married couple with children at home, then a married couple with no children at home, and commencing with widowhood. The distinct housing needs that accompany each stage motivate the majority of moves; life cycle stage is thought to account for at least five of the eight or nine moves that a family might be expected to make in their lifetime (Berry and Horton 1970).

Housing needs and preferences are mainly a product of family size and life style. Dwelling space is cited as one of the most influential housing needs, and the most attuned to life cycle changes (Chevan 1982; Guest 1972; Michelson 1977; Rossi

1980). More than half of movers in Rossi's (1980) study of residential mobility in Philadelphia cited too much or too little living space as a reason for their move, and 44 percent cited it as the primary reason. Concerns over space are related to family size, which rapidly increases during early family stages as children are born, stabilizes as maximum family size is reached, and declines as children leave the household and spouses die.

Family life cycle is also associated with concerns over ownership, housing age, local facilities, neighborhood and school quality, convenience to services and stores, and workplace accessibility. Studies by Bell (1968) and Michelson (1977) both find that a household's current life style orientation determines, in part, the salience of these concerns. In his study of Chicago movers, Bell (1968) identifies three life style orientations: family (with housing orientations dominated by needs of children), career (with housing orientations dominated by the need to be mobile and convey status), and consumption (with housing orientations geared toward enjoying the amenities of the city). Michelson's (1977) study of movers in Toronto demonstrates that people without children are more likely to be careerists or consumerists and are more likely to live downtown compared to married couples with children, whose housing orientations tend to be family-oriented and who favor living in the suburbs.

Segregation by life cycle stage is viewed as a natural occurrence as households seek out housing and neighborhoods that fulfill their needs and preferences. It is well documented that families in different stages are residentially segregated from each other,[1] and scholars have done a fairly thorough job in documenting the reasons why. Based on family life cycle theory alone, we would expect all households within the same life cycle stage to locate in similar neighborhoods. However, it is important to note that other types of segregation, including racial/ethnic and socioeconomic segregation, may come into play.

[1] For instance, Edwards (1970) finds that dissimilarity of location is greatest between young couples without children and older couples with children than between any other pair of family types.

B. Racial/Ethnic Segregation

The segregation of traditional and alternative household types could reflect racial/ethnic segregation to the extent that households systematically differ by race or ethnicity. Studies reporting race/ethnic differences between married parents and single parents find that whites have the fewest births outside of marriage (25 percent in 1995), compared to blacks (45 percent) and Hispanics (27 percent), and a larger percentage of white children live with two parents (90 percent in 1998), compared to Hispanics (64 percent) and blacks (36 percent) (Teachman et al. 2000). This evidence suggests that racial/ethnic segregation could lead to the segregation of married parents from single parents. However, household composition may also lower racial/ethnic segregation, evidenced by Edward's (1972) finding that housing concerns which grow out of the presence of young children force black families with children, more than other black families, to seek housing outside of the black community. Regarding heterosexual cohabitation, research finds that blacks are more likely than whites to cohabit with an unmarried partner and less likely than whites to convert this partnership into a marriage (Schoen and Owens 1992; Brown 2005). There is a lack of research on the race and ethnic composition of lesbian and gay cohabitors, so it is unknown whether race or ethnicity has the potential to lead to segregation from heterosexual cohabitors. There is also a lack of research on race and ethnic differentials of young males and females living alone.

Racial and ethnic differentials between households may contribute to their spatial separation due to patterns of racial segregation. Segregation between whites and blacks has contributed to extreme racial isolation in some cities (Massey and Denton 1993), and while blacks with higher socioeconomic status are less segregated from whites than low status blacks, black-white segregation at all levels of socioeconomic status remains high (Adelman 2004, 2005). Racial segregation also exists between whites and other minorities including Hispanics and Asians, although at lower levels than blacks (Logan et al. 2004).

The Western region where King County, Washington is located is less racially segregated than the Northeast and Midwest, possibly because it is a newer metropolitan region without a history of entrenched segregation, or because it has a greater diversity of minority groups, including substantial populations of Asians, Hispanics, and blacks (Logan et al. 2004). Increased exposure to Hispanic and Asian minorities is thought to lower whites' resistance to integration with blacks, leading segregation to decline overall (White and Glick 1999). Results for the Seattle metropolitan area show that black-white segregation declined between 1980 and 2000, Asian-white segregation declined only slightly, and Hispanic-white segregation rose (Logan et al. 2004). The presence of racial segregation in Seattle and the relationship between race/ethnicity and household composition may contribute to segregation between traditional and alternative households.

C. Socioeconomic Segregation

The segregation of traditional and alternative households could be due to socioeconomic segregation to the extent that households systematically differ by socioeconomic status. Research establishing the socioeconomic differences between married parent and single parent families find that single parent families are more likely to be headed by persons with lower status than married couple families (Karoly and Burtless 1995). As a result, single parents may be unable to access the desirable family-oriented neighborhoods where married parents live. Rossi's (1980) research confirms that households with children living in areas of high mobility (which are characterized by less family-oriented housing and lower socioeconomic status) tend to be "broken" families facing economic barriers. Historically, cohabitation among heterosexuals has been more common among people with lower incomes and without a college education (Brown 2005; Smock, Manning, and Porter 2005). Economic resources are cited as a substantial barrier to the transition to marriage among heterosexual cohabitors. Nearly 75 percent of heterosexual cohabitors report they intend to marry their partners but cite financial security, stable employment, home ownership, and money for a wedding as barriers (Brown 2005). The economic outlook

for heterosexual cohabitors is more similar to single parent families than to married couples, despite having two potential earners (Brown 2005). There is reason to expect that gay and lesbian partnerships would have higher socioeconomic status than heterosexual partnerships, as most homosexual partnerships are dual-earner (Peplau 1993), and the lack of the legal right to marry in most states means that, unlike with heterosexuals, the less well-off are not selected into cohabitation primarily because of financial barriers to marriage. We lack direct evidence on whether young males and females living alone differ by socioeconomic status, although we might expect males to have higher socioeconomic status because they often have higher incomes and higher rates of employment compared to females.

Socioeconomic differentiation among households may contribute to segregation because socioeconomic status is a well-documented cause of segregation. Socioeconomic segregation arises when households use their resources to buy their way into more affluent neighborhoods, which are unequally distributed throughout the city. The tendency has been for impoverished neighborhoods to be located near the city center, and affluent neighborhoods to be more prevalent in the suburbs, although this pattern is not strong and varies across metropolitan areas (Guest 1972). The pattern in Seattle is more sectoral, with a concentration of low status areas in south Seattle and in some of the southern suburbs, and a concentration of affluent areas in a sector extending to the east.

Socioeconomic segregation and the concentration of poverty and affluence increased between 1970 and 1990 (Massey and Eggers 1990; Kasarda 1993; Fischer et al. 2004), and leveled out in the 1990s (Fischer et al. 2004; Jargowsky 2003). In 1990, the mean dissimilarity index for poor persons from the non-poor in the 100 largest U.S. metropolitan areas was 36.1, suggesting that 36.1 percent of poor persons would need to relocate in order to achieve an even distribution (Abramson, Tobin, and VanderGoot 1995). In general, the segregation of the poor was lower in the West than it was in the Northeast and Midwest (Abramson et al. 1995). The dissimilarity index for the Seattle metropolitan area was substantially under the mean at 29.8, although it increased 2.9

points between 1970 and 1990 (Abramson et al. 1995). Socioeconomic segregation patterns in Seattle and socioeconomic differentials between households may contribute to segregation between traditional and alternative households.

D. Household Composition as a New Axis of Segregation

Segregation studies largely focus on the three most established causes of segregation: family life cycle, race/ethnicity, and socioeconomic status, but social change may lead to the emergence of new axes of segregation. Changes in the family are some of the most discussed social changes occurring in recent decades. More families are diverting from "traditional" life cycles, and "alternative" types of households are more prevalent (Rosenfeld 2007; Sweet 1990; Teachman et al. 2000). The rise in divorce and the decline in marriage contribute to an increasing probability for non-marital childbearing and single parenthood, while a longer delay before first marriage increases the numbers of young singles living alone (Teachman et al. 2000). Heterosexual and homosexual cohabitation is also on the rise, in fact, by 2000 more than half of adults between 20 and 30 had experienced cohabitation (Brown 2005).

Generally, when the location of households of different compositions has been compared, comparisons have been across life cycle stages (e.g. comparing young single adults to married parents). By doing so, previous research has missed the possibility that segregation is present even within life cycle stages between "traditional" and "alternative" households. Increasing diversion from a traditional life cycle presents the opportunity to explore the ways in which residential location is influenced by household composition for reasons other than marriage or the presence of children. This study contributes to the literature by differentiating households by cohabitation status, gender of the household head, and sexual preference, in addition to marital status and the presence of children.

Existing research on residential segregation by life cycle gives no reason to expect that traditional and alternative households in similar life stages would have different housing needs and preferences. Independent of race or income, we would expect households in similar life cycle stages to be distributed equally among

neighborhoods with housing that meets their needs. Racial/ethnic and socioeconomic barriers could lead to segregation between some households despite similar housing orientations. The role of racial/ethnic and socioeconomic segregation has only been explored for single mothers and married parents, with results showing that race and socioeconomic status explain some, but not all, of their segregation (Howden 2005).

If race and socioeconomic status are ruled out, the segregation between households within similar life cycle stages is left unexplained. One explanation could be that households have varying abilities or opportunities to fulfill their needs and preferences. Discrimination related to their household type, for example, could be one force holding them back. Another explanation could be that alternative households have housing preferences distinct from traditional households, implying that housing needs and preferences are not uniform within a life cycle stage. The movers in Michelson's (1977) study identify neighbor characteristics, commuting, commercial activity, and pastimes as other important concerns, which have the potential to be related to household composition independent of life cycle stage.

Neighbor characteristics can motivate residential mobility as people seek out neighbors who are similar to themselves, and the characteristics of neighbors are thought to differ by location. Michelson (1977) finds that people moving to single-family houses rated their neighbors high in friendliness, having pride in property appearance, and being ready to help, while movers to apartments rated neighbors high in modernity, liveliness, and living for the present. This suggest that people wanting to live a "modern" lifestyle, for example, may wish to live near other "modern" people and will be drawn to similar neighborhoods. The desire to live near others who are similar is also reflected in Castells (1997) research on the gay community in San Francisco. Here, the gay population is concentrated in certain areas of the city (particularly in the Castro area), creating a space where it is publicly safe to express their identity and sexuality, and where they can build networks of support and sharing. The Capitol Hill neighborhood has a reputation as the center of gay life in Seattle, and

may be an attractive location for homosexual cohabitors seeking neighbors who share their lifestyle.

Workplace accessibility is also a concern for many households and may motivate residential mobility. Michelson (1977) finds that moving into downtown areas tends to reduce commuting time while moving into the suburbs tends to increase it, suggesting that households concerned with reducing commuting time will become concentrated in city centers. Single parents, for example, may be more concerned with reducing their commute than married parents because they do not have a spouse at home watching the children.

Commercial activity, including people's use of restaurants, places of public entertainment, and shopping, may motivate residential moves into areas where these opportunities are present. Michelson (1977) finds that people moving downtown are more frequent patronizers of restaurants and places of public entertainment (even before the move). However, it is difficult to speculate why traditional and alternative households would differ in their concerns over commercial activities.

Pastimes are also found to influence residential location when people move into areas where their pastimes are more accessible. Michelson (1977) finds that movers to suburbia list gardening and watching sports (husband only) as common pastime activities (even pre-move), while movers to downtown list reading and going to movies or plays. Again, there is little reason to speculate that the households in this study differ in their pastimes, but it could be a possibility.

Table 1 summarizes the potential for different household types in the same life cycle stage to be segregated from each other for various reasons. Evidence of racial/ethnic and socioeconomic differentials between married parents and single parents suggest that the potential for race/ethnicity and socioeconomic status to cause segregation is high. There is no strong empirical evidence that married couples are segregated from single parents for other reasons, but we can speculate that commuting or other concern might be important. There is little evidence of racial/ethnic differentials between heterosexual and homosexual cohabitors, so this is not likely to

be a cause of their segregation. However, there is evidence of socioeconomic differences, and other concerns such as similarity with neighbors, that have high potential to lead to segregation. The only strong reason to speculate that young males and young females living alone would be segregated from each other is socioeconomic status.

Table 1: Hypotheses of the Potential for Race/Ethnicity, Socioeconomic Status, and Other to Cause Segregation between Traditional and Alternative Households, within Life Cycle Stages

	Married Parents from Single Parents	Heterosexual Cohabitors from Homosexual Cohabitors	Young Males Living Alone from Young Females Living Alone
Potential to Cause Segregation			
Race/Ethnicity	High	Low	Low
Socioeconomic Status	High	High	High
Other	Low	High	Low

III. Data and Methods

A. Households for Comparison

I compare eight different household types which are grouped into three household groups according to family life cycle stage (Table 2). The first group consists of family households in which own children under age 18 are present, and where the head of household is between the ages of 15 and 64. This household group is composed of three household types: 1) married parents, 2) single fathers, and 3) single mothers. The second household group consists of unmarried partner households of all ages. This household group is composed of three household types: 1) male-female partners, 2) male-male partners, and 3) female-female partners. The third

household group consists of householders living alone, between the ages of 15 and 24.[2] This household group is composed of two household types: 1) males, and 2) females.

Throughout the paper I refer to comparing "traditional" and "alternative" households. In the group of family households with children, I consider married parents as the traditional household, and single fathers and mothers as alternative households. I use the term "traditional" more loosely in the group of unmarried partners by considering male-female partners as the traditional household, despite the fact that cohabitation is not considered part of a traditional family life cycle. However, heterosexual unions are more traditional, and for that reason male-male and female-female partners are distinguished as alternative household types. In the group of young householders living alone, I consider males as the traditional household and females as the alternative household, as it is traditionally more acceptable for males to spend a period of young adulthood living alone than females.

Table 2: Households for Comparison

Family Households with Children	Unmarried Cohabitors	Young Householders Living Alone
1. Married Parents	1. Male-Female Cohabitors	1. Males
2. Single Fathers	2. Male-Male Cohabitors	2. Females
3. Single Mothers	3. Female-Female Cohabitors	

B. Analysis Steps

The analysis takes place in three steps. First, I calculate indices of dissimilarity between traditional and alternative households within life cycle stages to assess the extent of their segregation from each other. Second, using descriptive statistics, I investigate household-level differences that have the potential to cause segregation. Third, I regress the distribution of households on neighborhood characteristics using Ordinary Least Squares regression when spatial autocorrelation is not present, or spatial regression when spatial autocorrelation is present. Using the predicted

[2] The age ranges for households with children (15-64), and householders living alone (15-24), were selected based on available Census tabulations. While different minimum and maximum ages may be preferable in order to give a more accurate representation of each life cycle stage, such tabulations are not available from the Census.

distribution of households, I re-calculate the index of dissimilarity to determine the extent to which the independent variables explain segregation.

1. Assess the Extent of Segregation

The first step in the analysis uses data from the 2000 U.S. Census Summary File 3, where the units of analysis are census tracts in King County,[3] to assess the extent of segregation between households of different compositions that are otherwise similar in their life cycle stage. I use the index of dissimilarity as the key measure of segregation. The index of dissimilarity compares two groups, and the value represents the proportion of the two groups that would have to move residences (in this case, move into a census tract in which they are underrepresented) in order to achieve an even distribution. The index ranges between 0 and 1; values close to 1 represent conditions of extreme segregation and values close to 0 represent low segregation. The index is computed such that:

$$D= \frac{1}{2}\sum_{i=1}^{n} \text{ABS}\left[\frac{x_i}{X} - \frac{y_i}{Y}\right]$$

where x_i and y_i are the number of members of group *x* and *y* located in tract *i*, and X and Y are the number of members of group *x* and *y* in the whole county, which is subdivided into *n* census tracts. The index of dissimilarity is a good measure because it is independent of the relative size of the two groups used in its computation, which is important in this study considering that the number of traditional households is larger than the number of alternative households in the local area. The index of dissimilarity is limited to measuring only the evenness of the distribution of two groups across census tracts and ignores other aspects of segregation like exposure and concentration.

2. Compare Household-Level Descriptive Statistics

The second step in the analysis relies on descriptive statistics to address whether households significantly differ on characteristics that could lead to

[3] I explored removing the rural census tracts from the analysis, and found that the results for the index of dissimilarity did not change. I also explored using census blocks as the units of analysis, and found that while the indices of dissimilarity did increase (as would be expected at a finer resolution), the pattern of segregation did not change. Because there is no change, I use all census tracts in King County.

segregation. Descriptive statistics are computed from the U.S. Census microdata files from the Integrated Public Use Microdata Series (IPUMS) for 2000, which is a 5 percent sample of the U.S. population (Ruggles et al. 2004). Information on individual households is not readily available in small geographic units like census tracts, so for this reason descriptive statistics are computed globally for King County. Information is gathered on characteristics of the household, or where individual characteristics apply, they are gathered on the household head.

a. Race/Ethnicity

Race/ethnicity is determined for the household head based on two variables from the IPUMS data, one indicating the race of the householder, and one indicating Hispanic origin. Race/ethnicity is grouped into five categories: white non-Hispanic, black non-Hispanic, Asian/Pacific Islander non-Hispanic, Hispanic (race is other or white), and other. Householders in the "other" category include American Indians, Alaska Natives, Hispanics whose race is not white or other, and those who marked two or more races.

b. Socioeconomic Status

Several variables are included as indicators of socioeconomic status. Median household income represents the total income earned by all members of the household in the previous year (1999).[4] Mean property values are estimated from a categorical variable with 24 categories by recoding to the mid-point of each category. The final open-ended category ($1,000,000 or more) is recoded to $1,000,000. The percent of each household type with a college degree indicates the percent of householders who hold a bachelor's, master's, professional, or doctorate degree. The percent of each household type that is employed or not in the labor force can also be described as the percent of households who are not unemployed. The percent not receiving public assistance represents the percent of each household type that did not have public assistance income in the previous year, which includes general assistance and

[4] The Mean Absolute Deviation (MAD) is calculated to measure dispersion around median household income; it is defined as the mean of the absolute deviations from the data's median. For all other variables where a mean is constructed, I calculate the standard deviation to measure dispersion.

Temporary Assistance to Needy Families (TANF), and does not include payments for medical care or Supplemental Security Income (SSI). Percent above the federal poverty line describes the percent of each household type whose annual income is above the 1999 federal poverty threshold for their family size.

c. Family-Oriented Housing

Several variables are used to assess the extent to which households live in housing that corresponds to their life cycle stage. The percent living in owner-occupied housing includes those who own it free and clear and those who own it with a mortgage or loan. The percent in single-family dwellings include attached or detached homes. The percent who have lived at their residence more than five years is calculated based on the year the household moved into the residence. The mean number of rooms in dwellings is calculated from a continuous variable.

Significance tests are performed between each pair of household types within the same life cycle group, in order to determine whether there are significant differences. These differences are used to posit possible explanations for the segregation indices calculated in the first stage of the analysis.

3. Regress Census Tract Characteristics on the Distribution of Households and Calculate Predicted Indices of Dissimilarity

The third step in the analysis attempts to answer whether the characteristics of neighborhoods (here defined as census tracts) can explain where different household locate. This step is used to show whether the potential causes for segregation defined in the individual household analysis are validated at the neighborhood level. I perform regression analysis on data for census tracts that come from the 2000 U.S. Census Summary File 3. Separate regressions are run for each household type. Tracts are removed from the analysis if they do not contain any households within the household life cycle group. This results in removing one tract that contained no married couples, single males, or single females with own children under age 18, with the householder aged 15 to 64, for a final *n* of 372 tracts. Two tracts were removed which contained no male-female, male-male, or female-female unmarried partners of all ages, for a final *n*

of 371 tracts. One hundred and eight tracts were removed which contained no males or females aged 15 to 24 living alone, for a final *n* of 265 tracts.

a. The Dependent Variable

The dependent variable for the tract-level analysis is calculated from the proportion of each household type located in a census tract compared to the total number of households in its life cycle group.[5] A larger proportion indicates that a greater share of households in the life cycle group are made up of that household type, or a clustering of that household type compared to other households in the same life cycle stage. I convert the proportion into the odds and take the natural log so that the dependent variable can range from negative infinity to positive infinity (whereas the proportion is bounded by 0 and 1 and would result in floor and ceiling effects). The dependent variable (P) is calculated such that:

$$P = \ln\left(\frac{p}{1-p}\right) \quad where \quad p = \frac{\#\ of\ households\ in\ the\ type}{\#\ of\ households\ in\ the\ life\ cyclegroup}$$

I calculate the Moran's I for each dependent variable to determine whether census tracts with similar values for the dependent variable are spatially clustered. The Moran's I is calculated using a spatial weights matrix which determines the spatial dependence of surrounding census tracts. For all household types except young males and females living alone, I use a queen's contiguity weights matrix, which allows census tracts to be influenced by all contiguous census tracts. A queen's contiguity weight is not appropriate due to the spatial voids left by removing census tracts from analysis for young males and females living alone. I instead use the 8-nearest neighbors to calculate a spatial weights matrix for these households. Results indicate that the logits for all household types are spatially clustered, and significant at the .05 alpha level or smaller. This suggests that the potential for spatial autocorrelation in the regression equations is high.

---

[5] I also explored calculating the dependent variable as the proportion of households of each type compared to the total population of households (versus only the households in its life cycle group) and find that the same variables are significant in the regression, although the coefficients change because the proportion is structured differently. I chose to use the number of households in the life cycle group as the denominator because it is more tailored to addressing my research question.

I consider a number of independent variables to capture neighborhood characteristics that might influence whether certain household groups concentrate in those locations. The independent variables are similar to the variables used to calculate descriptive statistics in the second stage of analysis. The indicators for socioeconomic status are highly correlated with each other, as are the indicators for family-oriented housing, which leads to problems with multicollinearity when included in the same regression model.[6] For this reason, the socioeconomic and family-oriented housing indicators are combined into scales.

b. Racial/Ethnic Composition

Four variables are used to capture the racial/ethnic breakdown in each census tract: percent white non-Hispanic, percent black non-Hispanic, percent Asian/Pacific Islander non-Hispanic, and percent Hispanic (race is other or white).

c. Socioeconomic Status Index

The socioeconomic status index is a composite of six variables. I calculate the z-scores from the mean for each variable, and average them to create an index of neighborhood socioeconomic advantage, where higher values indicate greater socioeconomic status of the neighborhood. The six variables are median household income in the census tract for 1999, percent of the population 25 years and older that holds a bachelor's, master's, professional, or doctorate degree, percent of the population 16 years and older that are employed, the median home value of owner-occupied units, percent of households not receiving public assistance income, and percent of the population whose income is above the federal poverty line for their family size. The Cronbach's Alpha for these six variables is .874, indicating high internal reliability.

---

[6] A Variance Inflation Factor (VIF) over 5 is an indicator of multicollinearity. When all variables are entered into a regression separately, the VIF for median household income, median housing value, percent with a college degree, percent of the population living in the same house in 1995, percent of housing units that are owner-occupied, percent of housing units that are single-family, and the median number of rooms in the household all have VIF statistics that are over 5. When variables are combined into the socioeconomic status index and the family-oriented housing index, the VIF of the two indices are under 5, suggesting no problems with multicollinearity.

d. Family-Oriented Housing Index

The family-oriented housing index is a composite of four variables. I again calculate the z-scores from the mean for each of these variables, and average them to create an index of family-oriented housing, where higher values represent a greater prevalence of family-oriented housing in the neighborhood. The four variables are percent of households living in the same house in 1995, percent of housing units that are owner-occupied, percent of housing units that are single-family homes (attached or detached), and the median number of rooms in housing units. The Cronbach's Alpha of these four variables is .964, indicating high internal reliability.

e. Population Density, Distance from City Center, Age of Housing

Several additional independent variables are included in order to mitigate some of the spatial correlation between census tracts, and as indirect measures of other housing concerns such as access to the workplace, commercial activities, and various pastimes. These include population density, distance from the city center, and median age of the housing stock. Population density is computed by dividing the total population of the census tract by square miles. Distance from the city center is the distance in miles from the city center of Seattle to the center point of each census tract. Median age of the housing stock is calculated by subtracting the median year housing structures in the tract were built from the year 2000.

I use Ordinary Least Squares regression to specify a model, and use Moran's I (using the same spatial weights matrices as previously described) to test for spatial autocorrelation among the residuals. A significant Moran's I indicates the errors from the regression are spatially correlated and not likely to be due to random error. More specifically, spatial clustering of regression residuals implies that census tracts near each other are being impacted by the same unknown forces, causing their regression errors to be correlated, and introducing redundancy that affects the calculation of significance tests (Matthews 2009). I attempt to account for spatial autocorrelation by introducing the spatial variables (population density, distance to the city center, and median age of the housing stock) and re-testing the OLS model and the Moran's I. For

regressions in which the residuals remain spatially autocorrelated, I use the Lagrange Multiplier test to determine what type of spatial regression model should be used: the spatial lag model or the spatial error model (for a description of both see Anselin and Bera 1998). I find that the spatial lag model is the only spatial model that needs to be used.

The predicted values for the dependent variable given by the regression equations are converted back into proportions and used to calculate predicted indices of dissimilarity. The predicted indices of dissimilarity represent what segregation would be if only the independent variables from the regressions factor into segregation. I compare the predicted indices of dissimilarity to the observed indices of dissimilarity to determine how much segregation is left unexplained.

C. The Study Area

The study area is King County, Washington, which encompasses Seattle and much of the city's surrounding metropolitan area. Focusing on King County permits the study of an area which is clearly focused around the Seattle downtown. Consistent with many metropolitan regions, the city of Seattle has been growing slowly, increasing 9 percent between 1990 and 2000 (from 516,259 to 563,374), while the suburban ring has grown rapidly, increasing 18 percent in the same time period (from 991,060 to 1,173,660) (U.S. Census Bureau 2000, 1990).

The Seattle area is an interesting study site because it has low levels of racial/ethnic segregation (Logan et al. 2004) and moderate levels of socioeconomic segregation (Abramson et al. 1995) compared to the nation as a whole and to other regions. It is also an area with substantial populations of both traditional and alternative types of households, providing large enough groups for analysis.

IV. Results

A. Are Traditional and Alternative Households Segregated from Each Other?

The indices of dissimilarity, presented in Tables 3 to 5, indicate that despite being in similar life cycle stages, households of different compositions are segregated

Table 3: Indices of Dissimilarity for Household Group #1: Families with Children <18, Household Head Age 15-64

	Married Parents	Single Fathers
Married Parents	- -	
Single Fathers	0.300	- -
Single Mothers	0.284	0.241

Table 4: Indices of Dissimilarity for Household Group #2: Unmarried Cohabitors, All Ages

	Male-Female Cohabitors	Male-Male Cohabitors
Male-Female Cohabitors	- -	
Male-Male Cohabitors	0.429	- -
Female-Female Cohabitors	0.429	0.474

Table 5: Indices of Dissimilarity for Household Group #3: Householders Living Alone, Age 15-24

	Males
Females	0.340

from each other. This is not what we would expect to find based on usual discussions of life cycle segregation.

The level of segregation between married parents, single fathers, and single mothers is moderate. Married couples are segregated from both single father and single mother households (D =.300 and D = .284, respectively), and single fathers and single mothers are also segregated from each other (D =.241). The level of segregation between male-female, male-male, and female-female cohabitors is substantial and surprising. Male-female cohabitors are equally segregated from male-male and female-female cohabitors (D =.429 for both), and male-male cohabitors and female-female cohabitors are even more segregated from each other (D =.474). More than 47 percent of gay or lesbian households would need to relocate to new census tracts where they are underrepresented in order to achieve an even distribution. Again, not only is the more traditional household type segregated from the two alternative household

types, but the two alternative household types are substantially segregated from each other. The final two households for comparison, young males and young females living alone, are also surprisingly segregated from each other despite their similar life cycle circumstances (D =.340).

B. Do Traditional and Alternative Households Differ on Characteristics that Could Lead to Segregation?

Results from household-level descriptive statistics, presented in Table 6, can be used to assess potential explanations for the within-life-cycle segregation identified by the dissimilarity indices. It appears that married parents, single fathers, and single mothers may be segregated from each other due to the traditional racial/ethnic and socioeconomic causes of segregation. The household head in married families is significantly more likely to be non-Hispanic white, and less likely to be black, than either single fathers or single mothers, and less likely to be Hispanic than single fathers. Single fathers and single mothers are equally likely to be white or Asian/Pacific Islander, but single mothers are more likely than single fathers to be black, and single fathers are more likely than single mothers to be Hispanic. Married parents have significantly higher socioeconomic status than single fathers and single mothers. The median household income of married families is $77,450 compared to $48,200 for single fathers and $32,000 for single mothers. On average, married parents own higher valued property, are more likely to have a college degree, and are less likely to be unemployed, receiving public assistance, or be in poverty compared to single fathers and single mothers. Single fathers on average have higher socioeconomic status than single mothers; they have higher median incomes, and are less likely to be receiving public assistance or be in poverty. However, there is no significant difference in the value of property owned by single fathers or single mothers, and they are equally likely to hold a college degree or to be unemployed.

There is also evidence that, despite theoretically having similar housing needs and preferences, married parents, single fathers, and single mothers live in different types of housing. Married couples are more likely to live in large (with respect to the

Table 6: Descriptive Statistics Comparing Household Types within Family Life Cycle Groups

	Family Households with Own Children Under 18 (House Head Age 15-64)				Unmarried Partner Households (All Ages)				Householders Living Alone (Age 15-24)		
	1	2	3		1	2	3		1	2	
	Married Parents	Single Fathers	Single Mothers	Group Total	Male-Female Cohabitors	Male-Male Cohabitors	Female-Female Cohabitors	Group Total	Males	Females	Group Total
Race/Ethnicity											
% White, Non-Hispanic	75.9*†	67.6*	63.2†	73.0	81.7*†	89.7*	89.2†	83.4	69.7	66.8	68.3
% Black, Non-Hispanic	3.5*†	7.3*^	14.9†^	5.8	3.7	1.9	1.8	3.3	3.6	7.0	5.2
% Asian/Pacific Islander, Non-Hispanic	12.3*†	9.3*	8.0†	11.3	4.5	2.6	2.7	4.1	14.5	15.6	15.0
% Hispanic (race is other or white)	4.3*	8.2*^	5.0^	4.7	4.9	3.2	1.8	4.4	4.5	3.0	3.8
Socioeconomic Status											
Median income	77,450*†	48,200*^	32,000†^	66,400	60,900*	74,050*	72,000	63,000	19,500*	15,200*	17,202
(mad)	(50,281)	(30,995)	(23,468)	(47,906)	(36,254)	(35,381)	(29,371)	(35,864)	(14,918)	(9,965)	(12,716)
Mean property value (estimated)	314,934*†	232,161*	239,525†	303,782	242,567*†	298,422*	276,304†	256,452	131,667	121,364	127,308
(sd)	(199,28)	(166,504)	(164,074)	(196,557)	(128,817)	(162,024)	(144,535)	(138,673)	(78,112)	(69,492)	(73,317)
% With college degree	48.6*†	26.9*	23.9†	42.6	46.6†	54.5	64.9†	49.2	32.6	38.2	35.2
% Employed (or not in labor force)	98.2*†	95.8*	95.5†	97.5	97.3	99.4	99.1	97.7	97.3	98	97.6

Table 6 continued

	Family Households with Own Children Under 18 (House Head Age 15-64)				Unmarried Partner Households (All Ages)				Householders Living Alone (Age 15-24)		
	1	2	3		1	2	3		1	2	
	Married Parents	Single Fathers	Single Mothers	Group Total	Male-Female Cohabitors	Male-Male Cohabitors	Female-Female Cohabitors	Group Total	Males	Females	Group Total
% Not receiving public assistance	98.8*†	96.7*^	88.5†^	96.7	99.1	100	100	99.3	99.1	99	99
% Above federal poverty line	96.4*†	89.4*^	77.7†^	92.5	89.8†	94.2	97.3†	91	77.4*	68.8*	73.3
Family Housing Characteristics											
% In owner-occupied housing	79.4*†	47.3*^	37.7†^	69.6	41.2*†	66*	62.2†	46.1	6.8	5.5	6.2
% In single-family dwellings	86.1*†	60.8*^	52†^	78.1	49.7†	55.1^	67.6†^	52	8.1	8	8.1
% Lived at same residence more than 5 years	45.8*†	29.5*	29.8†	41.8	20.5*†	31.4*	32.4†	22.9	0.9	1.5	1.2
Mean number of rooms in dwelling	6.69*†	5.36*^	5.16†^	6.32	4.59*†	5.4*	5.19†	4.74	2.64	2.38	2.52
(sd)	(2.02)	(2.07)	(2.00)	(2.12)	(2.07)	(2.15)	(1.98)	(2.09)	(1.40)	(1.40)	(1.41)

Significance tests (alpha < .05)
*Significant difference between household type 1 and 2
†Significant difference between household type 1 and 3
^Significant difference between household type 2 and 3

number of rooms), single-family, and owner-occupied housing, and to have lived there for more than 5 years compared to single fathers and single mothers. Single fathers are more likely to be in larger, single-family, owner-occupied housing compared to single mothers. These housing differences may be a product of racial and socioeconomic segregation barring single parents from achieving their housing preferences. Or, it may indicate that housing needs and preferences are not uniform throughout the life cycle.

The descriptive statistics for unmarried partner households give less insight into the possible causes for segregation. The household head of male-female cohabitors is significantly less likely to be white than same-sex cohabitors; however, there are no significant racial/ethnic differences between male-male or female-female cohabitors. Male-female cohabitors on average have lower socioeconomic status than same-sex partner households. Male-female cohabitors have lower incomes and own lower valued property than male-male cohabitors. They also own lower valued property and are less likely to hold a college degree or to be above the poverty line compared to female-female cohabitors. Male-male cohabitors and female-female cohabitors are not significantly different on any of the socioeconomic indicators, suggesting they have similar socioeconomic status. These results suggest that male-female cohabitors may be segregated from same-sex cohabitors due to race/ethnicity and socioeconomic reasons, whereas male-male and female-female cohabitors are not likely to be segregated due to race/ethnicity or socioeconomic status.

The unmarried partner households do, however, have significant differences in the types of housing they live in. The less traditional households (male-male and female-female cohabitors) are more likely to live in family-oriented housing. Compared to male-female cohabitors, male-male cohabitors are more likely to live in larger, owner-occupied housing, and to have lived there for more than 5 years. Female-female partners are more likely than male-female partners to live in larger, single-family, owner-occupied housing for more than 5 years, and more likely than male-male partners to live in single-family housing.

The evidence for the final group, young males and young females living alone, provides less insight. Young males and females living alone do not significantly differ on any racial/ethnic variables. Young males on average have higher median incomes than young females ($19,500 compared to $15,200), and are less likely to be in poverty, but they are not significantly different from females on other socioeconomic indicators. These results suggest that young males and females living alone are not likely to be segregated for racial/ethnic reasons, but their segregation could, to some extent, be due to socioeconomic status. Young males and females also do not differ on how family-oriented their housing is; they are both fairly unlikely to live in single-family, owner-occupied housing, and tend to live in smaller housing units.

C. Do Traditional and Alternative Households Locate in Neighborhoods with Different Characteristics?

Results from the regression of household type logits on neighborhood characteristics are presented in Table 7. The regression coefficients describe which neighborhood characteristics explain why a higher proportion of one household type lives in a neighborhood compared to other households in its life cycle group. The best model is presented for each regression, which for most households is the OLS model, but for single fathers and male-female cohabitors, whose residuals remain spatially autocorrelated in an OLS model, the results for the spatial lag model are presented. The odds of married parents being present in a neighborhood increase with socioeconomic status, while the odds for single fathers and single mothers decrease with socioeconomic status. A greater prevalence of family-oriented housing increases the odds that married parents live in a neighborhood, but decreases the odds for single mothers. These results are consistent with individual descriptive statistics finding that married parents have the highest socioeconomic status, followed by single fathers and single mothers, and that married parents live in more family-oriented housing than single mothers. The results for race/ethnicity show it is not a significant predictor of

Table 7: Unstandardized Coefficients from the Regression of Household Type Logits on Independent Variables

	Married Parents B (se)	Single Fathers B (se)	Single Mothers B (se)	Male-Female Cohabitors B (se)	Male-Male Cohabitors B (se)	Female-Female Cohabitors B (se)	Young Males Living Alone B (se)
Constant	1.143 (1.379)	-1.013 (2.405)	-1.512 (1.499)	6.142 (3.452)	-6.140 (3.821)	-6.661 (4.007)	8.916 (6.250)
% White, Non-Hispanic	.002 (.014)	-.017 (.025)	-.001 (.016)	-.040 (.036)	.026 (.040)	.029 (.042)	-.086 (.065)
% Black, Non-Hispanic	-.023 (.016)	-.015 (.028)	.023 (.017)	-.070 (.040)	.066 (.044)	.055 (.046)	-.133 (.072)
% Asian/Pacific Islander, Non-Hispanic	.011 (.015)	-.022 (.026)	-.009 (.016)	-.057 (.038)	.042 (.042)	.044 (.044)	-.083 (.069)
% Hispanic (race is other or white)	-.006 (.018)	.010 (.031)	.002 (.019)	-.002 (.044)	-.009 (.049)	-.022 (.051)	.016 (.078)
SES Index	.422*** (.072)	-.290* (.127)	-.409*** (.079)	-.086 (.182)	.083 (.201)	.098 (.211)	-.131 (.320)
Family Housing Index	.370*** (.066)	-.171 (.114)	-.378*** (.071)	-.125 (.158)	.150 (.175)	.205 (.184)	.902** (.293)
Population Density	.005 (.008)	.002 (.013)	-.009 (.008)	-.024 (.019)	.052* (.021)	-.020 (.022)	.003 (.030)
Distance from City Center	-.002 (.007)	.014 (.011)	-.003 (.007)	.010 (.016)	-.028 (.018)	-.005 (.019)	-.033 (.031)
Median Age of Housing	-.001 (.003)	-.004 (.004)	.001 (.003)	-.018** (.006)	.014* (.007)	.032*** (.007)	-.005 (.011)
Spatial Lag	N/A	.176* (.072)	N/A	.198** (.074)	N/A	N/A	N/A
R^2	.601	.221	.555	.181	.176	.121	.089

Note: Results for young females living alone are not reported because they are the inverse of the results for males.

* $p < .05$

** $p < .01$

*** $p < .001$

the location of married or single parents, at least when adjusting for socioeconomic status.[7]

Racial/ethnic distribution, neighborhood socioeconomic status, and the prevalence of family-oriented housing are not significant predictors of the location of unmarried partner households. Greater population density increases the odds that male-male cohabitors are present in a neighborhood. Older housing increases the odds for male-male and female-female cohabitors, but decreases the odds for male-female cohabitors.[8] These results are not consistent with individual descriptive statistics which found differentials in race/ethnicity, socioeconomic status, and family-oriented housing between male-female and same-sex cohabitors.

The results for young males and females are reported in a single column in Table 7 denoting the coefficients for young males. Because the dependent variable is constructed from the proportion of each household type relative to the other, the coefficients for females are the opposite of the coefficients for males, and the significance levels are the same. Only the family-oriented housing index is a significant predictor; the odds that young males live in a neighborhood increases with more family-oriented housing compared to young females. Racial/ethnic distribution and socioeconomic status of the neighborhood do not seem to play a role,[9] despite the fact that young males have higher incomes and are less likely to be in poverty than young females on an individual level.

---

[7] In bivariate regressions, race/ethnicity is a significant predictor of the location of married and single parents. The odds of married parents being present in a neighborhood increase with the presence of whites and Asian/Pacific Islanders, while the odds decrease for single mothers and fathers. These effects are no longer significant when socioeconomic status is introduced in the model.

[8] In bivariate regressions, density is also a significant negative predictor for male-female cohabitors, and distance from the city center is a significant negative predictor for male-female cohabitors and a positive predictor for male-male and female-female cohabitors. In a model which includes density, distance from the city center, and housing age, these results become insignificant. This suggests that for male-female cohabitors, population density works, to an extent, through age of the housing stock, and for all households, distance from the city center seems to work through age of the housing stock.

[9] Even in bivariate regressions, race/ethnicity and socioeconomic status are not significant predictors of the location of young males living alone. On their own, density is a negative predictor for young males, and distance from the city center is a positive predictor, but these results are not significant in the full model.

D. How Well Does the Regression Model Predict Segregation?

Tables 8 to 10 present the re-calculated indices of dissimilarity using the predicted logits from the regression equations. The predicted logits are used to calculate the number of each household type that would live in each census tract if only the independent variables from the regression (race/ethnicity, socioeconomic status, family-oriented housing, density, distance, and age of the housing stock) explained segregation. The difference between the observed indices of dissimilarity (presented in Tables 3 to 5) and the predicted indices of dissimilarity are in parentheses. The differences between observed and predicted indices of dissimilarity represent the amount of segregation left unexplained by the regression model; a greater difference

Table 8: Predicted Indices of Dissimilarity for Household Group #1: Families with Children <18, Household Head Age 15-64

	Married Parents	Single Fathers
Married Parents	- -	
Single Fathers	0.234 (.066)	- -
Single Mothers	0.254 (.030)	0.101 (.140)

Table 9: Predicted Indices of Dissimilarity for Household Group #2: Unmarried Cohabitors, All Ages

	Male-Female Cohabitors	Male-Male Cohabitors
Male-Female Cohabitors	- -	
Male-Male Cohabitors	0.325 (.104)	- -
Female-Female Cohabitors	0.266 (.163)	0.211 (.263)

Table 10: Predicted Indices of Dissimilarity for Household Group #3: Householders Living Alone, Age 15-24

	Males
Females	0.270 (.070)

Note: Differences between the observed indices of dissimilarity (presented in Tables 3 to 5) and the predicted indices of dissimilarity are in parentheses.

indicates more unexplained segregation. The model is fairly good at predicting the segregation between married parents and single fathers, and even more so between married parents and single mothers, as the difference between the observed and predicted indices of dissimilarity are small. The model is worse at predicting segregation between single fathers and single mothers; we would expect an index of dissimilarity of only .101 but observe a value of .241, suggesting there are important causes of segregation left undefined. The regression model is also a worse predictor of the segregation between male-male and female-female cohabitors than it is between male-female and same-sex cohabitors. In fact, over half of the segregation between male-male and female-female cohabitors is left unexplained. For young males and females living alone, despite there being few significant independent variables, the regression model is a fairly good predictor of their segregation.

This evidence suggests that race/ethnicity, socioeconomic status, density, distance from the city center, and age of the housing stock are good predictors of the segregation between traditional and alternative households, but are not good predictors of segregation between two alternative households. Segregation between two alternative household types seems to be occurring for reasons that are not represented by variables within the prediction equation.

V. Discussion and Conclusion

The results of this study show there is more to consider regarding the dimensions of residential segregation than is represented in previous research. By differentiating households by marital/cohabitation status, presence of children, gender, and sexual preference, I find that households within similar family life cycle stages are residentially segregated based on household composition.

For some households, the hypotheses about the causes of segregation are supported based on the individual and neighborhood level statistics, while for others the hypotheses are not supported. Socioeconomic status remains a plausible reason for

the segregation between married parents and single parent households, as these households have socioeconomic differences on an individual level, and in the types of neighborhoods where they locate. Race/ethnicity does not remain as a plausible reason for the segregation of married parents from single parents after adjusting for socioeconomic status, at least in King County. Married parents are not located in neighborhoods with fewer minorities, despite being less likely to be minority on an individual level compared to single parents. This finding may be due to Seattle's profile of low racial/ethnic segregation, and may be different for other cities, especially older cities in the Northeast and Midwest with more substantial racial/ethnic segregation. Adjusting for socioeconomic status, race/ethnicity, population density, distance from the city center, and age of the housing stock, married parents are still more likely to live in neighborhoods with more family-oriented housing than single parents, suggesting that the preference for family-oriented housing is not uniform among these groups, or that there are other barriers (beyond socioeconomic status or race/ethnicity) for single fathers and mothers to fulfilling their needs.

Heterosexual and homosexual cohabitors do not appear to be segregated from each other for racial/ethnic or socioeconomic reasons. Although male-female partners are significantly more likely to be minority on an individual level, they are not more likely to locate in neighborhoods with fewer minorities. Similarly, although male-female partners have lower socioeconomic status on an individual level than same-sex partners, the socioeconomic status of a neighborhood is not a predictor of their location. Neighborhood socioeconomic status is also not a significant predictor of the location of male-male or female-female cohabitors, despite their higher socioeconomic status compared to heterosexual cohabitors. This evidence suggests that same-sex households do not use their higher socioeconomic status to access more affluent neighborhoods. Whether this is by choice, reflecting personal preferences, or by force, reflecting discrimination, is uncertain. The significance of housing age and, for male-male cohabitors, population density may represent other housing needs and preferences

that contribute to segregation. For instance, population density may be correlated with more commercial activities, which may be more important in the choice of neighborhoods for male-male cohabitors than for other households.

Finally, although young males living alone have higher socioeconomic status regarding income and the likelihood of being in poverty than young females living alone, they do not locate in significantly different neighborhood. This indicates that socioeconomic status is not a cause of their segregation.

This research suggests that there are new avenues of residential segregation that need to be explored in order to answer questions such as why segregation exists between single fathers and single mothers, or between gay and lesbian cohabitors. While race/ethnicity and socioeconomic status seem to do a fairly good job of explaining the segregation between traditional and alternative households within the same life cycle stage, they do little to explain the segregation between two alternative households. The results presented in this paper are notable but not conclusive, as there are several limitations to this study. One such limitation is the lack of data which locates individual households in their census tracts, so that individual characteristics and neighborhood characteristics can be examined simultaneously. Another limitation of this research is that much of the segregation between households is left unexplained. While various reasons such as neighbor characteristics, workplace accessibility, commercial activity, pastimes, and discrimination are suggested as potential explanations, they are not directly tested in an empirical model.

A first step for future research is to do a similar analysis of household composition on different geographic areas, to determine how segregation by household composition differs across cities and regions. Of special interest would be comparing areas with different profiles of racial/ethnic and socioeconomic segregation. Future research should also aim to identify other axes of segregation beyond the traditional explanations of race/ethnicity, life cycle stage, and socioeconomic status, as social and political change may lead to new forms of segregation. My results suggest that

changes in family structure have allowed residential differentiation by household composition to emerge, but there may be other emerging axes of segregation as well. Future research should also aim to uncover the mechanisms through which segregation by household composition occurs. It will be a challenge to identify discrimination in an empirical model as a mechanism behind segregation, but other measures, such as neighbor characteristics, workplace accessibility, commercial activity, and pastimes, could be gathered and tested.

One final direction for future research is to explore the consequences of segregation by household type. What is the impact when households of a certain type are clustered together? There may be both positive and negative consequences, for instance, a neighborhood with a high percentage of single mothers may lack financial and social resources, but a neighborhood with a high percentage of gay cohabitors may establish a community that provides solidarity and support to its members. There may also be consequences for the wider society, for instance, are attitudes about homosexuality different in cities where gays and lesbians cluster together compared to cities where they are distributed amongst other families? These questions will become increasingly important as changes in the family become more widespread, establishing more diverse types of households with varied housing and neighborhood orientations, and varied opportunities to fulfill them.

BIBLIOGRAPHY

Abramson, Alan J., Mitchell S. Tobin, and Matthew R. VanderGoot. 1995. "The Changing Geography of Metropolitan Opportunity: The Segregation of the Poor in U.S. Metropolitan Areas, 1970 to 1990." *Housing Policy Debate* 6:45-72.

Abu-Lughod, J. 1969. "Testing the Theory of Social Area Analysis: The Ecology of Cairo, Egypt." *American Sociological Review* 34:198-112.

Adams, John S. 1984. "The Meaning of Housing in America." *Annals of the Association of American Geographers* 74(4) 515-526.

Adelman, Robert M. 2004. "Neighborhood Opportunities, Race, and Class: The Black Middle Class and Residential Segregation." *City & Community* 3:43-63.

—. 2005. "The Roles of Race, Class, and Residential Preferences in the Neighborhood Racial Composition of Middle-Class Blacks and Whites." *Social Science Quarterly* 86:209-228.

Alba, R. D., J. R. Logan, and B. J. Stults. 2000. "How Segregated Are Middle-Class African Americans?" *Social Problems* 47(4):543-558.

Anselin, Luc, and Anil K. Bera. 1998. "Spatial Dependence in Linear Regression Models with an Introduction to Spatial Econometrics." Pp. 237-289 in *Handbook of Applied Economic Statistics*, edited by A. Ullah and D.E.A. Giles. New York: Marcel Dekker.

Baller, Robert D., and Kelly K. Richardson. 2002. "Social Integration, Imitation, and the Geographic Patterning of Suicide." *American Sociological Review* 67:873-888.

Bell, W. 1968. "The City, the Suburb, and a Theory of Social Choice." Pp. 132-168 in *The New Urbanization*, edited by Scott Greer, Dennis McElrath, David Minar, and Peter Orleans. New York: St. Martin's.

Berry, Brian J. L., and Frank E. Horton. 1970. *Geographic Perspectives on Urban Systems*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Brown, Susan L. 2005. "How Cohabitation is Reshaping American Families." *Contexts* 4:33-37.

Castells, Manuel. 1997. *The Power of Identity*. Massachusetts: Blackwell.

Chevan, Albert. 1982. "Age, Housing Choice, and Neighborhood Age Structure." *The American Journal of Sociology* 87:1133-1149.

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

Darden, J. T., and S. M. Kamel. 2000. "Black Residential Segregation in the City and Suburbs of Detroit: Does Socioeconomic Status Matter?" *Journal of Urban Affairs* 22:1-13.

Davies, Wayne. 1984. *Factorial Ecology*. Aldershot: Gower.

Edwards, Ozzie L. 1970. "Patterns of Residential Segregation within a Metropolitan Ghetto." *Demography* 7:185-193.

—. 1972. "Family Composition as a Variable in Residential Succession." *The American Journal of Sociology* 77:731-741.

Farley, R., E. L. Fielding, and M. Krysan. 1997. "The Residential Preferences of Blacks and Whites: A Four-Metropolis Analysis." *Housing Policy Debate* 8(4):763-800.

Fischer, Calude S., Gretchen Stockmayer, Jon Stiles, and Michael Hout. 2004. "Distinguishing the Geographic Levels and Social Dimensions of U.S. Metropolitan Segregation, 1960-2000." *Demography* 41:37-59.

Guest, Avery M. 1971. "Retesting the Burgess Zonal Hypothesis: The Location of White-Collar Workers." *The American Journal of Sociology* 76:1094-1108.

—. 1972. "Patterns of Family Location." *Demography* 9:159-171.

Howden, Lindsay M. 2005. "Household Type, Economic Disadvantage, and Residential Segregation: Empirical Patterns and Findings from Simulation Analysis." M.A. thesis, Department of Sociology, Texas A&M.

Jargowsky, P. A. 2003. "Stunning Progress, Hidden Problems: The Dramatic Decline of Concentrated Poverty in the 1990s." Washington, DC: The Brooking Institution.

Karoly, L., and G. Burtless. 1995. "Demographic Change, Rising Earnings Inequality, and the Distribution of Personal Well-Being 1959-1989." *Demography* 32:379-405.

Kasarda, J. D. 1993. "Inner-City Concentrated Poverty and Neighborhood Distress." *Housing Policy Debate* 4(3):253-302.

Knox, Paul. 1995. *Urban Social Geography: An Introduction*: Longman Scientific & Technical.

Logan, John R., Brian J. Stults, and Reynolds Farley. 2004. "Segregation of Minorities in the Metropolis: Two Decades of Change." *Demography* 41:1-22.

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

Massey, D. S., and M. L. Eggers. 1990. "The Ecology of Inequality: Minorities and the Concentration of Poverty, 1970-1980." *American Journal of Sociology* 95(5):1153-1188.

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

Matthews, Stephen A. 2009. "GIS, Spatial Analysis and Social Science Research: Methods, Applications, and Resources." Presentation for *Mental Health Prevention Research Training Program*, Seattle, WA, University of Washington. May 6, 2009.

Michelson, William. 1977. *Environmental Choice, Human Behavior, and Residential Satisfaction*. New York: Oxford University Press.

Murdie, R. A. 1969. *Facotrial Ecology of Metropolitan Toronto, 1951-1961*: University of Chicago.

Peplau, Letitia Anne. 1993. "Lesbian and Gay Relationships." in *Psychological Perspectives on Lesbian and Gay Male Experiences*, edited by Linda D. Garnets and Douglas C. Kimmel: Columbia University Press.

Rosenfeld, Michael J. 2007. *The Age of Independence: Interracial Unions, Same-Sex Unions, and the Changing American Family*: Harvard University Press.

Rossi, Peter H. 1980. *Why Families Move*. Beverly Hills, California: Sage Publications.

Ruggles, Steven, Matthew Sobek, Trent Aleander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hally, Miriam King, and Chad Ronnander. 2004. "Integrated Public Use Microdata Series: Version 3.0." *Historical Census Projects*: University of Minnesota.

Salins, P. D. 1971. "Household Location Patterns in American Metropolitan Areas." *Economic Geography* 47:234-248.

Schoen, R., and D. Owens. 1992. "A Further Look at First Marriages and First Unions." in *The Changing American Family*, edited by S. South and S. Tolnay. Boulder, CO: Westview Press.

Smock, Pamela J., Wendy D. Manning, and Meredith Porter. 2005. "Everything's There Except Money: How Money Shapes Decisions to Marry Among Cohabitors." *Journal of Marriage and Family* 67:680-696.

St. John, C., and R. Clymer. 2000. "Racial Residential Segregation by Level of Socioeconomic Status." *Social Science Quarterly* 81:701-715.

Sweet, James A. 1990. "Changes in the Life-Cycle Composition of the United States Population and the Demand for Housing." Pp. 35-61 in *Housing Demography: Linking Demographic Structure and Housing Markets*, edited by Dowell Myers: The University of Wisconsin Press.

Teachman, Jay D., Lucky M. Tedrow, and Kyle D. Crowder. 2000. "The Changing Demography of America's Families." *Journal of Marriage and the Family* 62:1234-1246.

U.S. Census Bureau. 1990. "Census of Population and Housing, 1990: Summary Tape File 3." Washington, DC: U.S. Census Bureau.

—. 2000. "Census of Population and Housing, 2000: Summary Tape File 3." Washington, DC: U.S. Census Bureau.

U.S. Department of Agriculture. 2002. "Rural Residential Land Use: Tracking Its Growth." in *Agricultural Outlook*: Economic Research Service.

White, M. J., and J. E. Glick. 1999. "The Impact of Immigration on Residential Segregation." in *Immigration and Opportunity: Race, Ethnicity, and Employment in the United States*, edited by F. Bean and S. Bell-Rose. New York: Russell Sage Foundation.

APPENDIX: Summary of the Samples

Table 1: Summary Statistics of Sample of Household Heads, IPUMS 5% Sample, 2000

Household Group	Household Type	Sample Size	Percent
Family Households with Own Children Under 18 (Household Head Age 15-64)	Married Couple Family	6,706	75
	Single Father Family	546	6.1
	Single Mother Family	1,689	18.9
	Total	8,941	100
Nonfamily Unmarried Partner Households (All Ages)	Male-Female Partners	995	78.8
	Male-Male Partners	156	12.4
	Female-Female Partners	111	8.8
	Total	1,262	100
Nonfamily Householders Living Alone (Age 15-24)	Males	221	52.6
	Females	199	47.4
	Total	420	100

Table 2: Summary Statistics for King County Census Tracts, 2000 U.S. Census, Summary File 3

	Married Couples with own children <18, householder age 15-64	Single-Males with own children <18, age 15-64	Single-Females with own children <18, age 15-64
Total	156,936	12,235	37,713
Mean # of households in tract	421.87	32.89	101.38
Number of census tracts (n) = 372			

	Male-Female cohabitors	Male-Male cohabitors	Female-Female cohabitors
Total	35,909	4,404	4,155
Mean # of households in tract	96.79	11.87	11.2
Number of census tracts (n) = 371			

	Young males living alone, age 15-24	Young females living alone, age 15-24
Total	5,809	5,480
Mean # of households in tract	21.92	20.68
Number of census tracts (n) = 265		