Residential "Integration" and Racial Isolation in Northwest Philadelphia: An Examination of Community-Level Segregation

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ABSTRACT

Few studies have focused on the extent and effects of residential segregation within a specific neighborhood, although it is precisely in this crucible of the community that segregation is experienced. This paper offers a preliminary examination of levels of segregation and the racial distribution of space *within* communities in Philadelphia, using Germantown and Mount Airy as a case study. I focus on this area of the city because West Mount Airy has a longstanding reputation as a stable, integrated neighborhood. GIS tools are used to reveal significant spatial clustering of segregation across communities and striking variations in levels of segregation across block groups even within nominally integrated communities. Further, variation in segregation is positively associated with median housing values across block groups.

Introduction

Recent research suggests that segregation across U.S. metropolitan areas has declined since 1980, particularly in smaller, newer metropolitan areas (Fischer, et al., 2004). However, in older, established cities like Philadelphia, the extent of racial segregation as measured by the index of dissimilarity is still high -- 72.3. (Logan, et al., 2004). Yet within Philadelphia, the West Mount Airy neighborhood in the northwest of the city has retained a reputation as a stable, middle class, racially integrated neighborhood, even as contiguous neighborhoods such as West Germantown and East Mount Airy have become predominantly African American over the last 40 years. (Ferman, et al 1998). Few studies have focused on the extent and effects of residential segregation within a specific neighborhood, although it is precisely in this crucible of the community that segregation is experienced. This paper offers a preliminary examination of segregation within communities in Northwest Philadelphia, using Germantown and Mount Airy as a case study. (See Figures 1 and 2 for maps of these communities). In particular, I will address the following questions:

1) What are the demographic and socioeconomic characteristics of the Germantown and Mount Airy populations? How do these populations compare to one another across different communities?
2) What is the extent of racial segregation in Germantown and Mt. Airy and how does segregation vary within these communities?

3) What are the spatial patterns of segregation in Germantown and Mt. Airy?
4) How does the extent of segregation impact housing values within neighborhoods?

Students of urban sociology and the social interaction that occurs within urban spaces may be familiar, in passing, with the communities described in this paper and displayed in Figure 1. Elijah Anderson introduces *Code of the Street* (1999) with a tour down Germantown Avenue, passing through Mount Airy and Germantown, and marking a symbolic boundary between East and West within these communities. Anderson richly described the street life of the avenue as it wended its way southeast through the city of Philadelphia, just briefly mentioning the larger context in which this street life was situated:

> "Down the hill…is Cresheim Valley Road, a neighborhood boundary. …We are in Mt. Airy…Here, there are more black homeowners interspersed among white ones, and there is more black street traffic on Germantown Avenue. Mt. Airy itself is a much more integrated neighborhood, and the black people who live here are mostly middle class….As Mount Airy gives way to Germantown, check-cashing agencies and beeper stores as well as more small takeout stores appear…On the avenue Germantown gives the appearance of a segregated, black, working class neighborhood. But this is deceptive. Many whites, including middle class whites along with middle class blacks do live here."
> (Anderson, 1999).

Founded in 1683, Germantown was consolidated into the city of Philadelphia in 1854. At the time of its consolidation, the area was still largely rural. Until the mid-20th century, "Germantown" included what is today known as Mount Airy. West Germantown has a diverse housing stock, including brick row homes, many with front porches and yards, duplexes and single family homes, some dating from colonial times or from the Victorian era. (Adams, et al. 1991). East of Germantown Avenue, the housing stock is less diverse, with more two-story row homes, generally constructed in the 20th century.

Mount Airy is more affluent than Germantown. With Wissahickon Park bordering West Mount Airy on the west and its stone single family homes, parts of West Mount Airy have the

ambience of a graceful old suburb. But even in West Mount Airy, the housing stock is diverse, and includes duplexes, apartment buildings and more modest rowhomes. West Mount Airy has a national reputation and a self-conscious identity as a stable racially and economically integrated community. (Ferman, 1998) Indeed, West Mount Airy is a community that diversifed by direction, through conscious, organized community efforts to integrate in the wake of citywide white flight and population decline between 1960 and 1980. (Nyden, 1998). East Mount Airy lies east of Germantown Avenue and, while not as diverse as West Mount Airy, is solidly middle class. Although upper East Mount Airy contains stone single family homes, the housing stock is generally more modest than in West Mount Airy, with large stretches of red brick two story rowhouses dating from the 1950s.

Literature review

Since the publication of Massey and Denton's *American Apartheid*, much scholarly attention has focused on the causes and consequences of racial segregation between blacks and whites.[1] Massey and Denton (1993) argued that race is and continues to be the basis around which residential patterns are organized. Analyzing census tract data, Massey and Denton gauge measures of segregation reflecting evenness, exposure, racial clustering and concentration over time across 30 MSAs. They find an increase in racial segregation and concentrated poverty in black neighborhoods over time and argue that racial discrimination in the housing market prevents residential mobility among middle-class blacks. Following this seminal work, most studies of racial segregation compared levels of segregation across metropolitan areas or sought

[1] Although there is an extensive literature addressing the spatial concentration of other ethnic minorities and immigrants, this paper focuses only on racial differences in residential outcomes between blacks and nonHispanic whites. Across the 105 block groups examined in this paper, these two groups account for 84.5 to 100 percent of the block group population.

to explain changes in levels of segregation over time. (see for a recent example, Logan, et al. 2004; Timberlake, 2002) Still other studies of residential segregation have focused on how clustered specific racial or ethnic groups are within a larger metropolitan area or examined segregation measures for a multiplicity of ethnicities. (Clark and Blue, 2004; Iceland, 2004)

Addressing models of spatial assimilation and place stratification, much of the literature on racial segregation over the past decade examined whether and how residential outcomes vis a vis whites differ among blacks of varying socioeconomic statuses.[2] Results from these studies suggest that race continues to be central in shaping residential opportunities for African Americans, including middle-class African Americans. While there is some evidence that middle-class blacks in the United States reside in less segregated neighborhoods than poor blacks, these neighborhoods are generally characterized by fewer resources and amenities as well as higher poverty rates. (Massey, et al., 1987; Adelman 2004; Iceland, et al. 2005). Estimating a locational attainment model incorporating individual characteristics to predict residential outcomes, Alba, et al. (2000) conclude that while middle class African Americans live in more integrated neighborhoods than their more disadvantaged counterparts, they tend to reside in neighborhoods with whites of lower socioeconomic status.

While there has been an extensive literature on racial segregation across metropolitan areas, little work has focused at the extent and consequences of segregation at a more local level. However, a handful of qualitative studies examine this issue. For example, in *The Social Order of the Slum,* Gerald Suttles (1958) addresses the broader issue of segregation and social isolation

[2] The place stratification model suggests that racial segregation persists as a result of prejudices and institutional practices – such as housing discrimination -- that promote segregation. The spatial assimilation model predicts that individuals with higher economic status have better residential outcomes (less segregated neighborhoods, higher rates of homeownership, etc.), regardless of race.

among groups within a neighborhood by describing its ordered segmentation. According to Suttles, ordered segmentation describes the process by which age, gender, ethnic and territorial boundaries fit together and the order in which these groups come together in moments of conflict. Through participant observation, Suttles is able to identify the processes (ordered segmentation and provincialism) that shape the pattern of social interaction and enforce segregation. More recently, Patillo (1999) uses ethnographic methods to examine processes and consequences of segregation and economic fragility from a micro level by focusing on "the ecological context of black middle-class neighborhoods." Focusing on historically African American neighborhoods on the South Side of Chicago, Pattillo's counters the argument that middle-class blacks have outmigrated from poor communities, asserting that an increase in the black middle class has coincided with growth in the size of the black community. Thus, Pattillo maintains that the black middle class remains segregated in a buffer zone between more disadvantaged African American neighborhoods and white neighborhoods. (Pattillo, 1999, 2000, 2003).

Thus, most studies confirm that racial segregation continues to be widespread, even for more affluent blacks, dominating the spatial landscape of urban America. Because racial segregation remains associated with concentrations of poverty, it is generally assumed that African Americans in integrated neighborhoods will have better outcomes. As a result, there has been little attention to nominally racially integrated neighborhoods in the literature.

Data and Methodology

In this paper, I divide Mount Airy and Germantown into four focal communities – East Germantown, West Germantown, East Mount Airy and West Mount Airy. I use the term

"communities" to distinguish these areas from "neighborhoods" which I conceptualize as block groups. These communities lie in Northwest Philadelphia. East is physically divided from west by Germantown Avenue. (See Figure 2). In this analysis, I use block level data on population by race and hispanicity from 2000 Census Summary File 1 to calculate segregation measures of dissimilarity and exposure/isolation at the block group level. In addition, I use block group level data on socioeconomic and housing characteristics from the 2000 Census data Summary File 3 and tract level data on crime rates, housing violations (Bureau of License and Inspections) and tax assessment from the University of Pennsylania Cartographic Modelling Laboratory NeighborhoodBase and CrimeBase.

Most studies of segregation have used population counts at the tract level to calculate metropolitan area measures of segregation. However, urban researchers recognize that tracts are an imperfect means of defining neighborhood boundaries. For example, Coulton, et al. (2001) and Lee and Campbell (1997) conclude that individuals living within the same block have highly subjective and varying notions of neighborhood, suggesting that census tracts are not valid proxies. Similarly, Sastry, et al. (2002) find that Los Angeles residents' definitions of their neighborhood vary by socioeconomic status and social isolation. Grannis (1998, 2005) relies on a spatial approach incorporating access between areal units to identify neighborhoods as "T-communities" bounded by tertiary street networks unrelated to Census units.

Populations within census tracts typically range from 3,000 to 8,000 people; the mean population for the 25 Census tracts comprising Germantown and Mount Airy was 3,739. The Census also compiles data by block group and block, which are smaller than tracts and may serve as better proxies for neighborhood boundaries. Stuart (2004) argues that census blocks provide a more salient feature of neighborhood than other measures because the bounds of a

block capture the potential for daily interactions with neighbors, even if blocks cannot capture the full range of an individuals' use of their community.

In this analysis, I focus on the 105 block groups (comprised of 759 blocks in 25 tracts) that comprise the four focal communities. Table 1 shows the distribution of blocks, block groups and tracts across Germantown and Mount Airy and indicates that between six and eight blocks comprise a block group within these communities. I use block groups as a "neighborhood" measure because individuals in a block group may have more exposure to each other than they do with individuals in a different block group within the same tract, particularly in an urban setting where there is the potential for pedestrian traffic. First, I compare the demographic, socioeconomic and housing characteristics of the Germantown and Mount Airy populations and neighborhoods, using block groups rather than tracts as the unit of analysis (Table 2).

Next, I calculate three measures of segregation for block groups using block level data: (1) D, the dissimilarity index; (2) P*, an exposure index for African Americans and for NonHispanic whites; and (3) I, an isolation index for blacks and for NonHispanic whites.[3] These measures are reported in Table 3. Researchers have identified the shortcomings of these traditional measures of segregation, in particular their aspatial nature, and have proposed alternative measures which incorporate spatial considerations. (White, 1983; Reardon and Firebaugh, 2002; Reardon and O'Sullivan, 2004) However, these three measures are widely used in the literature and are employed in this analysis. Moreover, the measures of exposure and isolation reflect the extent to which two groups share or do not share the same neighborhoods, and thus reflect the potential for social integration and engagement among racial groups.

[3] African Americans and NonHispanic Whites account for between 95% of the population in Germantown and Mount Airy. The self-identified Hispanic population in the focal communities is 1.9%.

In addition, I examine spatial patterns of segregation across northwest Philadelphia and test for spatial autocorrelation. Spatial autocorrelation would occur when levels of segregation in one block group are influenced on levels of segregation in adjacent or proximal block groups. Because these measures are sensitive to the weight specification particularly for small sample sizes, I tested several weight specifications, including contiguity, nearest neighbor (n=4) and distance-based weights (Table 4). As shown in Table 4, these alternative specifications did not significantly alter the results and in the subsequent analyses I report results using rook contiguity weights. Finally, I construct a preliminary model to assess whether variations in the level of segregation are associated with variations in median housing values at the block group level, controlling for several socioeconomic and housing characteristics.

Results

Characteristics of the focal communities

As shown in Table 2, the four focal communities differ in terms of their demographic and socioeconomic characteristics. Germantown and East Mount Airy are predominantly African American, while West Mount Airy's population is more evenly split with African American and nonHispanic Whites both accounting for roughly 48 percent of the population.[4] The racial composition of these neighborhoods changed substantially over the past 30 years, with African Americans increasing their share of the population across all four communities. In 1970, approximately 36 percent of the population west of Germantown Avenue (West Germantown and West Mount Airy) was African American, while African Americans comprised 52 percent of East Mount Airy's population and 65% of East Germantown's population. Thus in 1970, the racial composition of the four communities was marked by the east-west divide of Germantown

[4] I refer to nonHispanic whites as "whites" in the discussion that follows.

Avenue. By 2000, there are still differences in the communities that lie to the east and west of Germantown Avenue, but north-south differences between Germantown and Mount Airy have become more salient over time. Although it is not within the scope of this paper to examine these changes over time, it is apparent that West Germantown and East Germantown have become more similar to one another than they are to either West or East Mount Airy.

Median housing values are lowest in East Germantown and highest in West Mount Airy. Median housing values in West Mount Airy are roughly three times higher than in East Germantown, more than two times higher than in West Germantown and about one-third higher than in East Mount Airy. To a large extent, these differences in median housing values also reflect the socioeconomic characteristics of the population in these four communities. For example, a higher proportion of Mount Airy residents have college degrees, and are employed in professional or managerial occupations compared to Germantown residents. Similarly, a lower percentage of Mount Airy residents live below the poverty level or receive public assistance compared to Germantown residents.

The differences in housing prices are also reflected more generally by the general conditions of the neighborhood. For example, vacancy rates for housing units are twice as high in Germantown as in Mount Airy. Homeownership is higher in Mount Airy although three in five housing units in East Germantown are owner occupied. The lower proportion of homeownership in West Germantown reflects the presence of several large apartment buildings. Serious crimes, aggravated assaults and signs of "disorder", such as housing violations and vandalism, are more prevalent in Germantown than in Mount Airy. However, West Germantown and West Mount Airy have higher rates of thefts, robberies and burglaries than the communities east of Germantown Avenue.

In addition to these differences between the four communities, there are also racial differences within the communities. For example, the proportion of whites with a college degree is roughly twice the proportion of African Americans with a college degree in each of the communities. Given these educational differences, whites in these communities also have higher household incomes, with the exception of East Germantown, where the median household income for whites and African Americans is similar. The income gap between whites and African Americans is sizable west of Germantown Avenue and narrower in East Mount Airy, suggesting that East Mount Airy, while predominantly African American, is a stable middle-class neighborhood, that may serve as a buffer zone between Germantown and wealthier West Mount Airy. Consistent with racial differences in income across these communities, African Americans are also more likely to live below the poverty level in three of the four communities. Poverty rates for whites and African Americans are not significantly different in East Mount Airy. While rates of homeownership are similar for whites and African Americans in East Germantown and West Mount Airy, they diverge in West Germantown and East Mount Airy with significantly higher rates of homeownership among whites. However, East Mount Airy has the highest rates of homeownership for both African Americans (67.1 percent) and whites (83.0 percent).

Measures of Segregation

Three measures of segregation were calculated for the 105 block groups: (1) the index of dissimilarity (D), (2) an exposure index for African Americans and for NonHispanic whites (P); and (3) an isolation index (I) for African Americans and nonHispanic whites. The index of dissimilarity measures how evenly one group (e.g. African Americans) are distributed across an

areal unit – in this case block groups – relative to another (e.g. nonHispanic whites). The index of dissimilarity varies from 0 to 1 and represents the proportion of one group that would have to move in order to achieve an even distribution across block groups. (Massey and Denton, 1988). The exposure index measures the extent to which members of one group are exposed to or have the potential to interact with members of another group. The exposure index varies from 0 to 1 with higher values indicating less segregation. The isolation index measure the extent to which members of one group are isolated from members of another group, that is the extent to which they have contact only with members of their own group. The isolation index also varies from 0 to 1 with higher values indicating a greater level of segregation in an areal unit.

As shown in Table 3, segregation varied across the four focal communities. Consistent with its reputation as an integrated community, West Mount Airy exhibited significantly lower levels of segregation than the other three communities with respect to the isolation and exposure measures. While Germantown and East Mount Airy exhibited high levels of African American isolation and white exposure, largely as a result of the racial composition of these communities, all of the communities exhibited moderate levels of dissimilarity. Moreover, there was less variation across communities in the dissimilarity index, with averages ranging from 0.329 in West Germantown to 0.431 in East Germantown. However, there was also substantial variation in segregation *within* each of the four communities.

Across the 105 block groups in the sample, the dissimilarity index averaged 0.387 ranged from 0.141 to 0.775, suggesting wide variation in the level of segregation across block groups. Although dissimilarity was somewhat higher east of Germantown Avenue, there was significant variation in the index of dissimilarity within the four focal communities. For example, as indicated in Table 3, across West Mount Airy's 21 block groups, the dissimilarity index ranged

from a low of 0.186 to 0.655. Block group dissimilarity indices for West Germantown and East Mount Airy exhibited the least dispersion.

Given the racial composition of Germantown and Mt. Airy, whites likelihood of exposure to African Americans was relatively high (0.704) while African Americans likelihood of sharing a block with whites was only 0.155. Again, the exposure indices also varied across and within the four communities, with East Germantown being the most segregated (0.821) and West Mount Airy the least segregated (0.404). In Germantown and East Mount Airy, the average African American lived in a block group where less than twenty (20) percent of their neighbors were white, whereas in West Mount Airy, the average African American lived in a block group where forty percent of their neighbors were white. Despite lower segregation in West Mount Airy as a whole, the exposure index varied within this community, ranging from 0.104 to 0.620. There was less dispersion in this index in the other communities, although in some block groups in East Mount Airy, the average African American lived on a block that was nearly one-half white.

The measures of isolation exhibit patterns similar to the measures of exposure, with East Germantown being the most segregated and West Mount Airy again the least segregated. In East Germantown, the average African American lived in a block group that was 93 percent black; in contrast, the average African American lived in a block group that was a 54 percent black. Again however, there were substantial differences even within the communities – the black exposure index ranged from 0.324 to 0.861 in West Mount Airy, from 0.443 to 0.962 in East Mount Airy and from 0.573 to 0.983 in West Germantown. However, whites are less isolated in East Germantown than they are in Mount Airy, largely because of the respective racial

compositions of these communities. In contrast to the other indices, the isolation indices exhibited substantial dispersion within each community.

Spatial Patterns and Spatial Autocorrelation

Mapping the segregation measures permits an examination of whether there are spatial patterns in their variation across block groups. A visual examination of the dissimilarity index across the 105 block groups reveals higher levels of unevenness east of Germantown Avenue with additional apparent concentration in southwest Germantown and along the northwest corner of West Mount Airy (Figure 3). Lower levels of dissimilarity appear in several contiguous block groups in West Germantown and lower West Mount Airy.

An examination of the other segregation measures is more suggestive. For example, in Figure 4, the highest values of the interaction index are concentrated in northwest Mount Airy with lower values in East Germantown and lower East Mount Airy, although this pattern is not uniform. There are some block groups within Germantown with sizable white populations. Moreover, there appears to be a buffer zone of moderate exposure west of Germantown Avenue and east of the train tracks. Although the exposure measures are not symmetric, Figure 5 presents the opposite pattern from Figure 4 when examined visually. Low values of whites exposure to African Americans occur in northwest Mount Airy, while higher values appear in East Germantown. Again, block groups with moderate exposure are bounded by Germantown Avenue on the east and the railroad tracks on the west. Levels of exposure decline as we move northwest across the communities.

As shown in Figure 6, high levels of African American isolation are concentrated in southeast Germantown as well as between the train tracks and Germantown Avenue in East

Germantown and lower East Mount Airy. Similarly, the distribution of the isolation index for whites also appears to exhibit clustering, with lower values in Germantown and lower East Mount Airy, high levels of white isolation in upper Mount Airy and a "buffer" zone of middling levels of isolation in West Mount Airy east of the train tracks (see Figure 7).

In order to determine whether the patterns displayed in Figures 3 through 7 represent significant clustering of segregation across the 105 block groups in the four focal communities, I constructed weights and calculated Moran's I as well as local measures of spatial association (LISA). Moran's I (Moran 1950) is a weighted correlation coefficient used to determine whether spatial patterns in group-level data are nonrandom, e.g. significantly clustered. Moran's I ranges from -1 to 1, with values closer to 1 if nearby or adjacent areas have similar characteristics, closer to -1 if nearby or adjacent areas have dissimilar values for the variable of interest and 0 if the values are distributed randomly across space. I experimented with alternative weights, including rook contiguity, a distance weight and a nearest neighbor weight, obtaining similar results. As shown in Table 4, each of the segregation measures and median housing values exhibited significant spatial autocorrelation across block groups, with the exception of the Dissimilarity Index using nearest neighbor weights.

However, high levels of one group's exposure to another may not reflect integration if the racial composition of the area is highly skewed. Therefore, comparing white exposure to African Americans and African American exposure to whites reveals how integrated or segregated a block group is. For example, moderate to high values of white exposure to blacks *and* black exposure to whites suggest integration whereas asymmetry in these measures (low-high or high-low) suggest that the area units are more segregated, or dominated by a particular group. Thus, the absence of clusters of values would indicate a more diverse block group.

Figure 8 displays cluster and significance maps for bivariate local indices of spatial association (LISA) using rook contiguity weights. LISA considers whether spatial clustering of similar values around an observation are significant. Figures 8.a and 8.c. map clusters of similar and dissimilar values for the exposure indices and the isolation indices and Figures 8.b and 8.d confirm significant clustering of segregation in West Mount Airy and East Germantown for the exposure and isolation measures. For example, in Figure 8.a., West Mount Airy is largely characterized by clustering of high values of black exposure to whites but lower values of white exposure to African Americans, whereas much of East Germantown is characterized by low values of black exposure to whites, and high values of white exposure to blacks. Therefore, in spite of its reputation and its even racial composition, I find significant clustering of segregation in West Mount Airy. Within Germantown, there are several block groups that reflect higher levels of exposure for both races, signifying that these block groups may represent pockets of integration. There is no significant clustering in parts of lower West Mount Airy, upper West Germantown and throughout most of East Mount Airy, also suggesting that these block groups exhibit the potential for a higher degree of social interaction and engagement between the races. Figure 8.c. exhibits a similar clustering pattern for the white and African American isolation indices. Once again, there is high white isolation and low black isolation in the northwest of the focal communities and high black isolation and low white isolation in the southeast of the focal communities. Moreover, there is not significant clustering in the middle of this region, suggesting that these block groups may act as a buffer zone between more segregated block groups. Again, the choice of weights did not alter the substantive results. The same pattern of localized clustering was evident using distance weights and nearest neighbor weights (n=4),

although the clustering was more highly concentrated in upper West Mount Airy and East Germantown with the latter weights. (Results are not reported here).

Regression Results

Finally, I assessed whether variations in the level of segregation influenced median housing values across block groups. However, the presence of spatial autocorrelation noted above suggests that the independence assumptions necessary for ordinary least squares estimation is violated. Therefore, spatial regression techniques are employed to capture the underlying spatial dependence. Since housing values in a block group are likely to be affected not only by the characteristics of the block group, but also by the characteristics of adjacent block groups, I specified a spatial lag model to predict median housing values across the 105 block groups.[5] The key independent variable was the level of segregation in a block group as measured by the five indices calculated at the block group level. Additional socioeconomic characteristics and housing characteristics were also included as controls in the model. Because many of the Census block group level variables likely to influence housing values are highly correlated (for example poverty rates, median household income, and public assistance receipt), the preliminary model reported here is parsimonious. However, the variables included in this model were salient in an ordinary least squares specification.

Because median housing value is highly skewed across the 105 block groups, the dependent variable in the model is logged median housing value. I expect that higher levels of segregation (as measured by dissimilarity, white isolation and African American exposure to

[5] Moreover, diagnostic tests (LaGrange Multiplier) indicated that a lag model would be more appropriate. Alternatively, one could specify a spatial error model. In this model, the error terms across spatial units are correlated. In the spatial lag model the error terms are correlated and the observations are not independent of one another.

whites) will be associated with higher median housing values. However, I expect that the extent of black isolation and white exposure to African Americans will be negatively related to housing values. I also include a measure of median household income in the block group. I expect that median household income will be positively associated with median housing values since more affluent households may purchase a higher quality neighborhood, characterized in part by homes of higher value. The proportion of college graduates in a block group might also be positively associated with housing values since high educational attainment reflects a potentially higher earning power. In addition to these socioeconomic variables, several housing and neighborhoods characteristics were included. The proportion of homeowners might influence housing values since owners may have a vested interest in preserving the value of their investment. Moreover, a high degree of homeowners may signal a settled, less transient population. Therefore, I expect that there will be a positive relationship between homeownership and housing values at the block group level. Finally, the proportion of vacant housing at the block group level and the rates of housing violations for tracts were also included in the model. Both of these variables reflect the concept of "broken windows" and general neighborhood disinvestment and thus are expected to be negatively related to housing values. Additional socioeconomic, housing and neighborhood controls were tested but added little to the model and are not reported herein.

Results for the spatial lag model predicting median housing values across block groups are reported in Table 5. As shown in Table 5, segregation was significantly associated with median housing value in each of the models. As expected, dissimilarity, white isolation and African American's exposure to whites was positively associated with median housing values; black isolation and white's exposure to African Americans was negatively associated with median housing values. The influence of the segregation measures was significant even with the

inclusion of the median household income variable, suggesting that the racial segregation across these communities does not merely reflect differences in socioeconomic status. As expected, median household income was also positively and significantly associated with median housing values. Households with more resources can afford to live in communities with higher housing prices. The proportion of college graduates did not influence median housing values in these models. In terms of housing and neighborhood characteristics, variation in the proportion of vacant housing units was significantly associated with housing values and had the expected direction; higher vacancy rates were associated with lower household values and may reflect neighborhood quality. The proportion of owner-occupied housing units had no effect, however, and had a negative sign. This result may stem from the relatively high rates of homeownership in East Germantown, where median housing values tend to be lower, and also because East Germantown is comprised of more block groups than the other communities. Building violations are salient only in the model using the white isolation index as the measure of segregation, but has the expected negative relationship throughout. Finally, the spatial lag variable is significant in three of the five specifications, In particular, the spatial lag variable is salient for the equation containing the dissimilarity index, African American isolation and white exposure to African Americans. Although the isolation and exposure indices are not symmetric, it is surprising that the spatial lag is not significant in the specifications including the white isolation and African American exposure measures. However, it may suggest that there are clusters in the spatial distribution of housing values across contiguous block groups with high concentrations of African Americans, but that there is a wider distribution of housing values across block groups with higher proportions of whites. Further, the significant value for the likelihood ratio test of spatial dependence in the models including the dissimilarity index and the African American

isolation index suggest that there is residual spatial dependence not accounted for by these models.

Discussion and Conclusions

While most studies of racial segregation focus on segregation across or at times within metropolitan areas, this paper represents an attempt to illuminate the racial distribution of space at the community level. In particular, the focus on northwest Philadelphia enables the examination of segregation within a nominally integrated community (West Mount Airy) and exposes substantial variation in levels of segregation across block groups *within* communities. Despite the even racial composition of West Mount Airy, this analysis found significant clusters of segregation in that community as well as in predominantly African American East Germantown, with a "buffer" zone appearing to separate these clusters. Segregation was also found to be associated with housing values across block groups.

Several results warrant further study. The dramatic changes in the racial composition of these communities over time and their consequent effects on spatial patterns of segregation should be examined. These changes may reflect what Patillo describes as growth in the size of the black community, rather than outmigration by the black middle class. Moreover, the areas identified as a "buffer zone" deserves more attention. In particular, these results suggest that East Mount Airy represents a stable, middle class community that is moderately integrated at the block group level. As housing prices rise in Philadelphia, these communities are likely to undergo additional changes, including gentrification, with implications for their racial composition and levels of segregation.

However, this study has several limitations. Any area analysis risks the ecological fallacy. But in this study, no claims are made about the relationship between the areal variables and individual outcomes. Also, the focus on a specific community results in a relatively small sample for analysis. Further, although much of the data I examined was available at the block group level, key variables of interest such as median housing values by race for block groups were not. The preliminary model predicting median housing values needs additional development and further refinement. Moreover, this study does not really address socioeconomic differences between and among racial groups, although I intend to incorporate considerations of class into future revisions. I also intend to examine the influence of segregation on additional outcomes for African Americans.

In addition, although this study uses measures of segregation standard in the literature, it would benefit from recent developments in the measurement of segregation which incorporate spatial considerations. However, even these spatial measures may mask the degree of segregation in a community because they merely reveal the potential for social interaction based on proximity, and not the quality of that interaction. For example, quantitative measures of segregation do not reveal how the neighborhood or community is used by its residents, which institutions are used and by whom and who participates in community functions. These questions are best addressed through a broader community study. Despite the limitations, these results suggest the importance of examining how segregation plays out at the community level.

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Table 1: Number of Census Geographic Units comprising 4 Communities in Northwest Philadelphia

	East Germantown	West Germantown	East Mount Airy	West Mount Airy	Total
Number of Blocks	267	180	146	166	759
Number of Block Groups	38	27	19	21	105
Number of Tracts	8	7	4	6	25

Table 2: Selected Characteristics of East Germatown, West Germantown, East Mount Airy and West Mount Airy, Philadelphia, PA

Variable	East Germantown	West Germantown	East Mount Airy	West Mount Airy	Focal Communities
Median Housing Value	$52,132	$65,707	$102,995	$151,843	$84,769
% White NonHispanic	5.6	15.8	17.5	47.8	18.8
% African American	91.0	80.3	78.1	47.5	77.2
% with Bachelors Degree+					
White NonHispanic	20.8	45.3	54.4	74.5	43.9
African American	10.6	14.6	28.4	39.7	20.7
Median Household Income					
White NonHispanic	$32,179	$55,160	$60,005	$95,373	$55,762
African American	$34,413	$35,183	$54,756	$62,687	$43,947
% owning housing unit					
White NonHispanic	58.1	58.3	83.0	67.0	64.1
African American	59.0	41.5	67.1	61.6	56.5
% of total units owned by:					
White NonHispanic	4.1	9.2	15.1	35.8	13.7
African American	53.6	32.6	55.0	28.8	43.5
% Poor					
White NonHispanic	21.1	19.7	12.1	5.7	16.1
African American	26.6	23.7	12.6	9.3	19.8
% Receiving Public Assistance	12.5	9.1	5.1	1.0	8.0
% in Professional/Managerial Occupations	25.3	32.6	43.7	67.3	38.9
% Owning Housing Unit	59.2	43.7	71.3	67.0	58.9
% Vacant Housing Units	12.8	12.3	6.0	5.6	10.0
% African American in 1970	65.4	36.5	52.9	36.7	49.9
% Moved from Another County in last 5 years	7.6	12.1	8.0	12.5	9.8
Serious Incidents per 1000 population, 1998-2002	70.7	82.1	50.0	56.2	67.0
Aggravated Assaults per 1000 population, 1998-2002	8.9	8.3	3.7	1.8	6.4
Thefts per 1000 population, 1998-2002	22.4	32.5	17.8	24.8	24.6
Robberies per 1000 population, 1998-2002	7.1	8.7	4.3	3.0	6.2
Burglaries per 1000 population, 1998-2002	10.1	12.6	8.2	12.4	10.8
Narcotics arrests per 1000 population, 1998-2002	8.4	5.4	1.7	0.6	4.8
Vandalism per 1000 population, 1998-2002	13.5	14.2	9.4	8.3	11.9
% of Buildings with L&I violations, 2000-2003	24.9	27.0	9.8	8.1	19.4
% of Buildings with Liens	7.4	5.9	2.2	1.6	4.9

Source: U.S. Bureau of the Census, SF-3; University of Pennsylvania Cartographic Modelling Laboratory

Table 3: Measures of Racial Segregation in 4 Communities in Northwest Philadelphia

	East Germantown	West Germantown	East Mount Airy	West Mount Airy	Focal Communities
D (Index of Dissimilarity)	0.431	0.329	0.388	0.347	0.387
Block Group Minimum	0.156	0.141	0.236	0.186	0.141
Block Group Maximum	0.775	0.526	0.536	0.655	0.775
P* White Exposure (to Blacks)	0.821	0.737	0.710	0.404	0.704
Block Group Minimum	0.267	0.496	0.299	0.165	0.165
Block Group Maximum	0.979	0.963	0.946	0.741	0.979
P* Black Exposure (toWhites)	0.041	0.130	0.144	0.400	0.155
Block Group Minimum	0.006	0.006	0.007	0.104	0.006
Block Group Maximum	0.199	0.340	0.478	0.620	0.620
I: Whites (Isolation)	0.113	0.210	0.244	0.533	0.248
Block Group Minimum	0.017	0.011	0.013	0.193	0.011
Block Group Maximum	0.712	0.451	0.646	0.779	0.779
I: Blacks (Isolation)	0.927	0.820	0.812	0.541	0.801
Block Group Minimum	0.750	0.573	0.443	0.324	0.324
Block Group Maximum	0.983	0.983	0.962	0.861	0.983

Table 4: Moran's I for Selected Segregation Measures and Median Housing Value by Block Group Using Rook Contiguity Weights, Distance Weights And Nearest Neighbor (n=4) Weights, 2000

	Moran's I (Rook Contiguity)	Moran's I (Distance)	Moran's I (Nearest Neighbor=4)
Dissimilarity (D)	0.0354+	0.1004^{+}	0.0328
White-Black Exposure (${}_{W}P^{*}_{B}$)	0.3042*	0.4592*	0.4645*
Black-White Exposure (${}_{B}P^{*}_{W}$)	0.4230*	0.6896*	0.6836*
White Isolation (I_W)	0.3594*	0.5352*	0.5290*
Black Isolation (I_B)	0.4283*	0.6924*	0.6906*
Median Housing Value	0.3625*	0.4075*	0.5208*

* $p<0.01$; + $p<0.05$

Table 5: Regression of Block Group Median Housing Value on Segregation (n=105)
Dependent Variable = Ln(Block Group Median Housing Value)
Rook Contiguity Weight

	Dissimilarity	Black Isolation	White Isolation	White Exposure to Blacks	Black Exposure to Whites
Constant	2.07 (2.34)	3.24 (2.24)	8.58 (2.84)**	5.43 (2.73)*	5.72 (2.73)*
Segregation Index	0.48 (0.25)*	-0.59 (0.29)*	0.93 (0.24)**	-0.45 (0.20)*	0.72 (0.29)*
% College Grad +	$2.0^{E-4}(9.0^{E-4})$	7.0^{E-5} (1.0^{E-4})	$9.9^{E-5}(9.6^{E-5})$	1.0^{E-4} (9.0^{E-5})	1.0^{E-4} (1.0^{E-4})
Median Household Income (Ln)	0.39 (0.12)**	0.36 (0.13)**	0.12 (0.14)	0.27 (0.13)*	0.29 (0.13)*
% Vacant Housing Units	-1.60 (0.65)*	-2.06 (0.64)**	-1.44 (0.62)*	-1.73 (0.64)**	-1.78 (0.64)**
% Owner Occupied Housing Units	-0.37 (0.20)	-0.11 (0.22)	0.002(0.21)	-0.13 (0.21)	-0.11 (0.21)
L&I Violations	-1.17 (0.71)	-1.02 (0.70)	-1.59 (0.69)*	-1.13 (0.70)	-1.04 (0.69)
W (Spatial Lag)	0.48 (0.18)**	0.44 (0.17)**	0.26 (0.21)	0.53 (0.20)*	0.23 (0.21)
R-squared	0.65	0.64	0.68	0.65	0.65
Likelihood Ratio (Spatial Dependence)	4.62*	4.78*	1.32	1.95	0.92

Figure 1: Germantown and Mount Airy (Highlighted), Philadelphia, PA

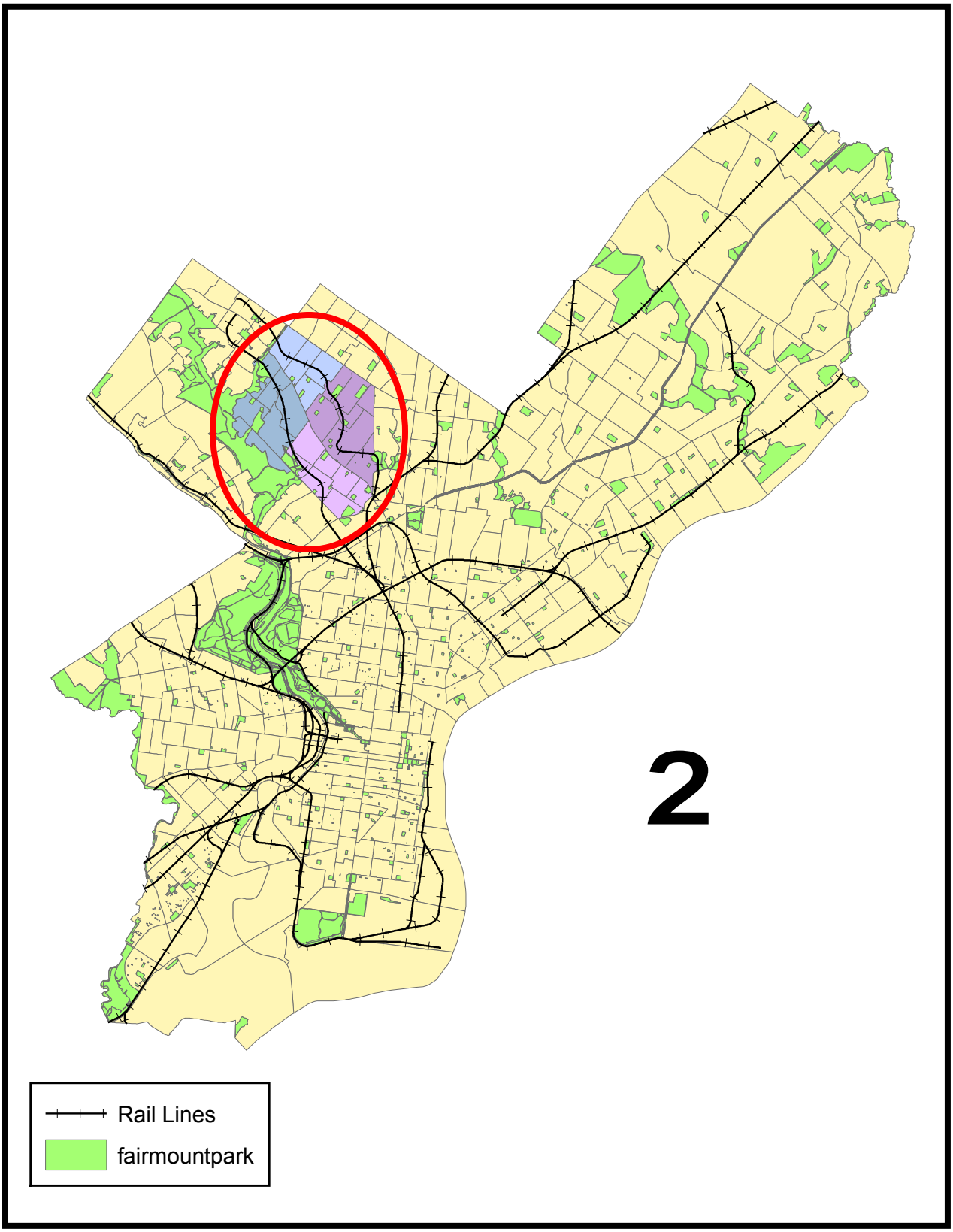


Figure 2: Germantown and Mount Airy, Philadelphia, PA

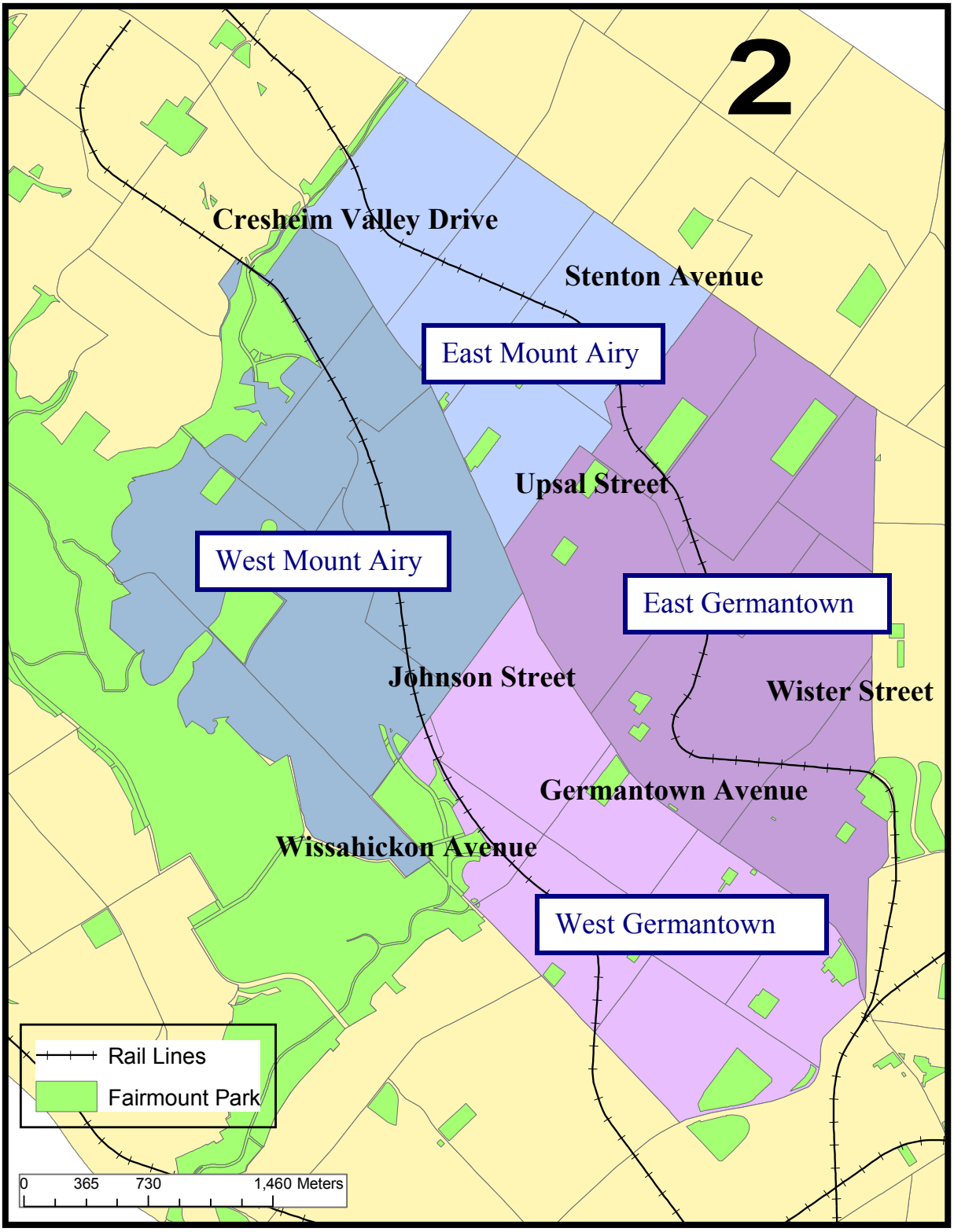
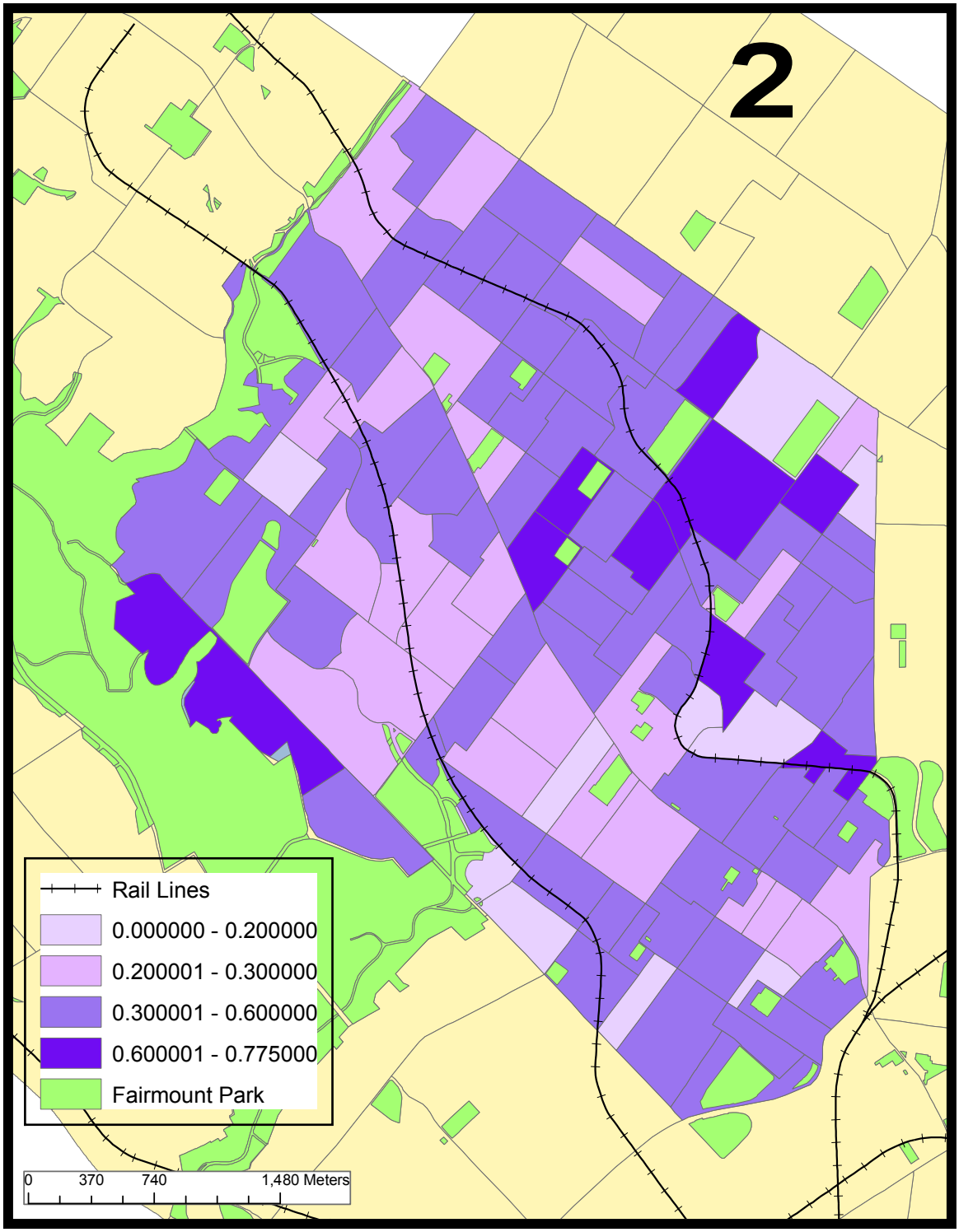
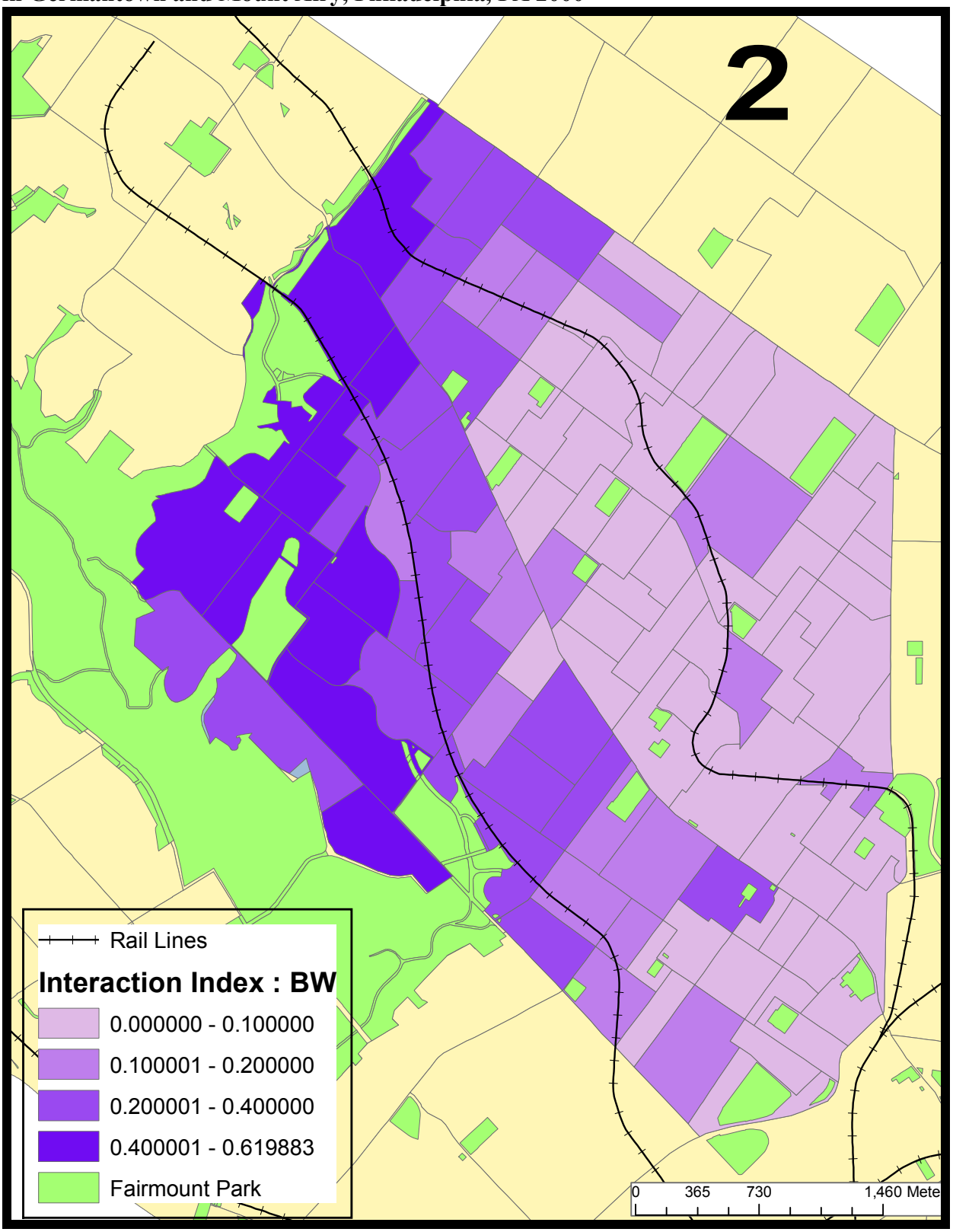


Figure 3: Dissimilarity Index for Block Groups in Germantown and Mount Airy, Philadelphia, PA 2000



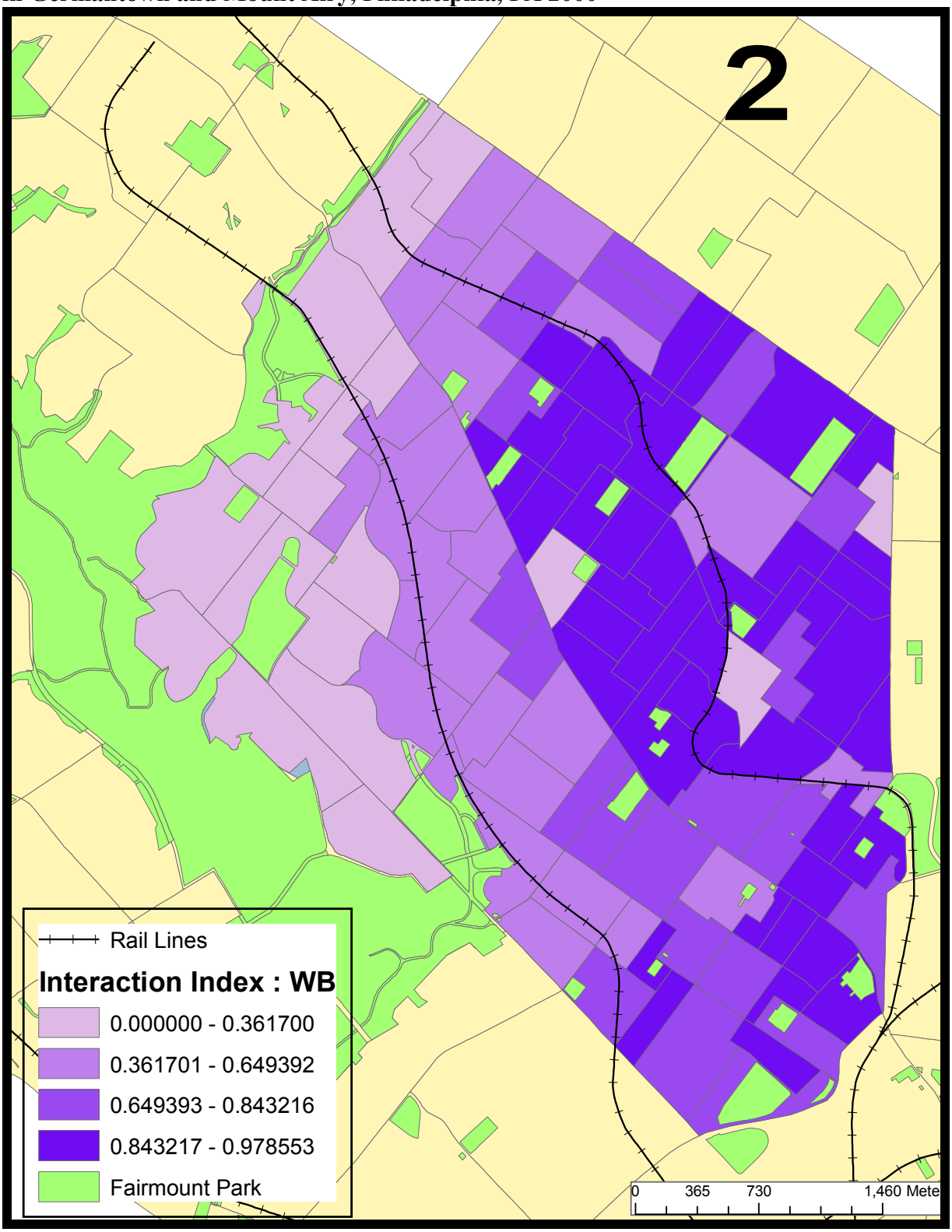
Source: U.S. Bureau of the Census, Census 2000, Summary File 1

Figure 4: African American Exposure (to Whites) Index for Block Groups in Germantown and Mount Airy, Philadelphia, PA 2000



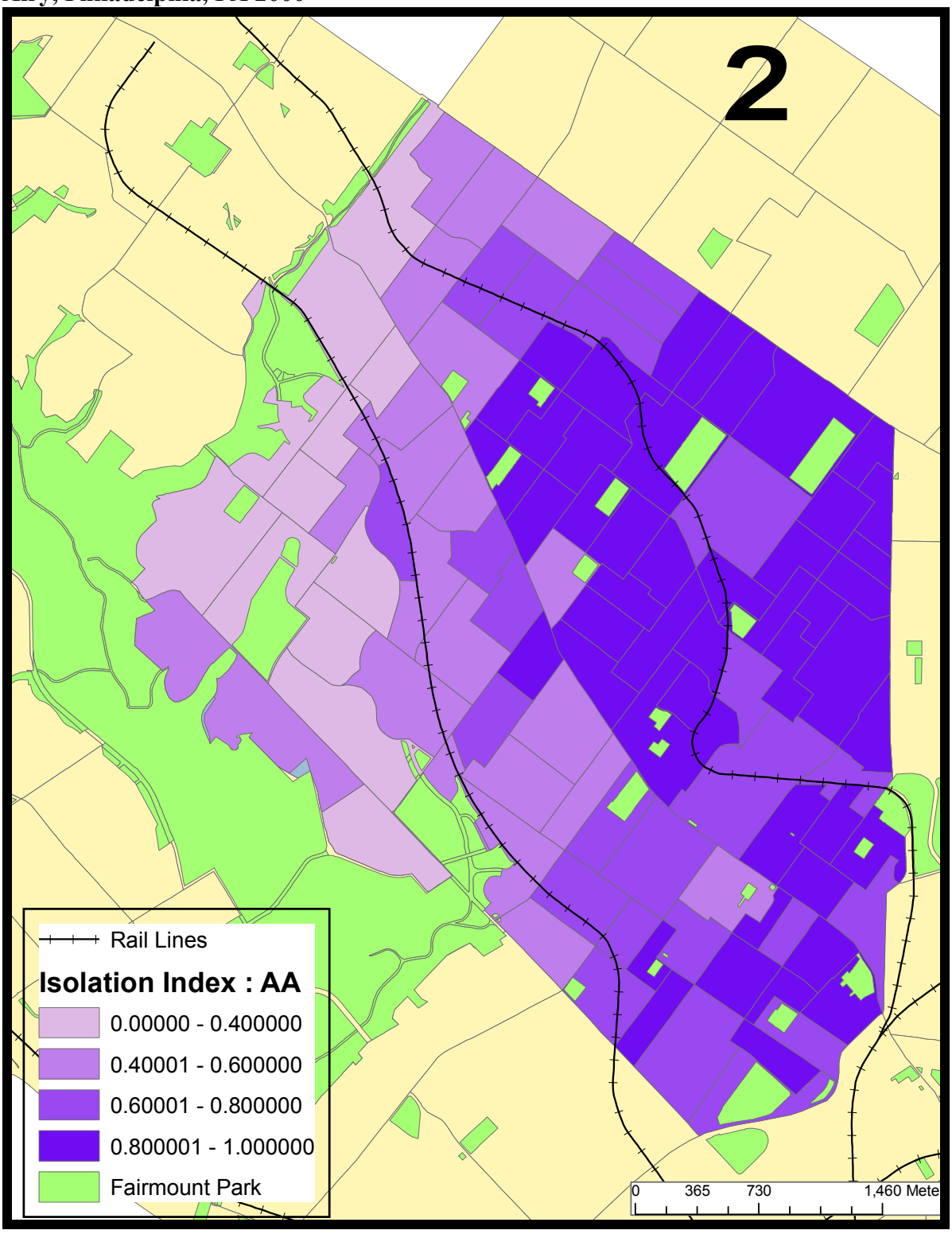
Source: U.S. Bureau of the Census, Census 2000, Summary File 1

Figure 5: White Exposure (to African Americans) Index for Block Groups in Germantown and Mount Airy, Philadelphia, PA 2000



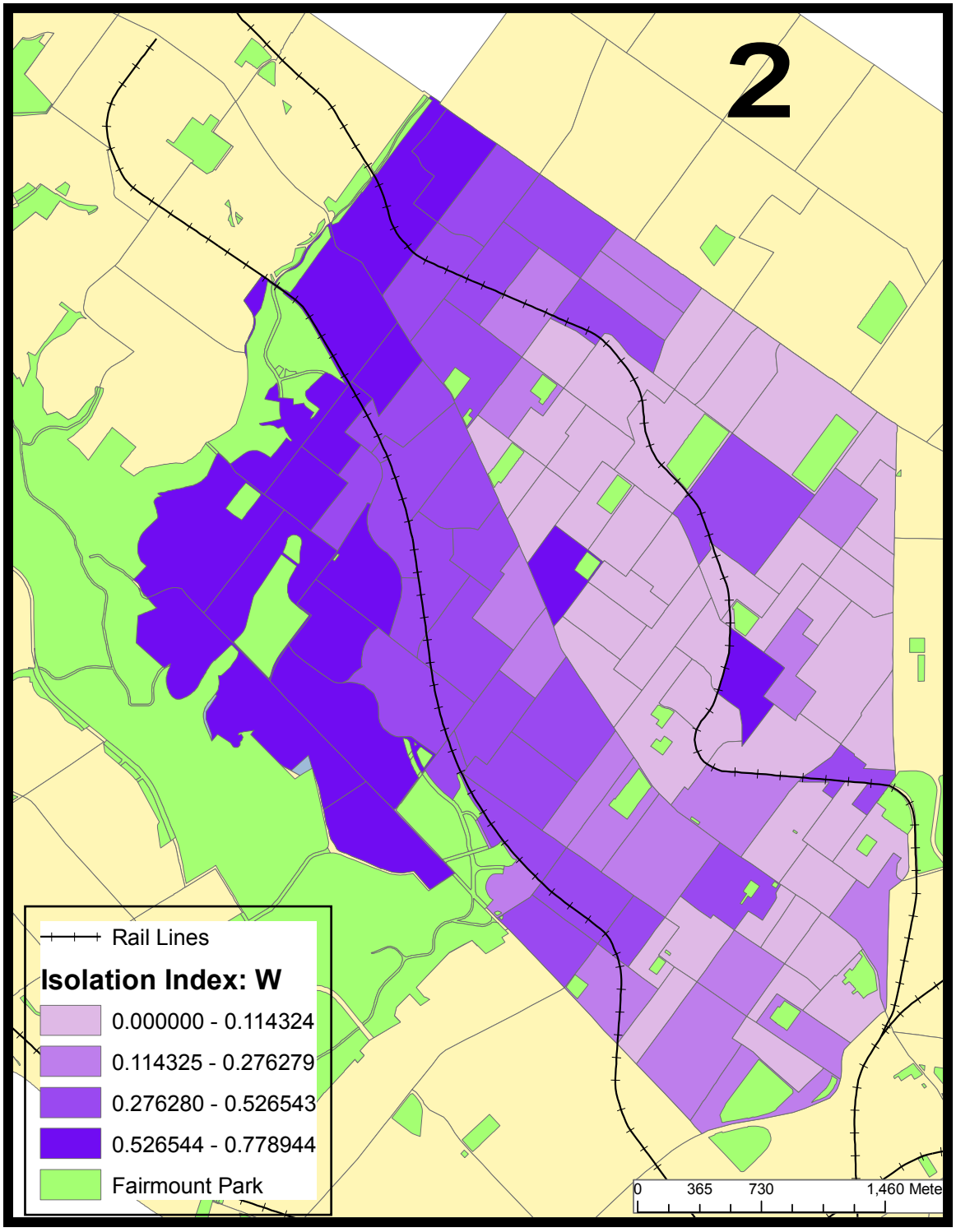
Source: U.S. Bureau of the Census, Census 2000, Summary File 1

Figure 6: African American Isolation Index for Block Groups in Germantown and Mount Airy, Philadelphia, PA 2000



Source: U.S. Bureau of the Census, Census 2000, Summary File 1

Figure 7: NonHispanic White Isolation Index for Block Groups in Germantown and Mount Airy, Philadelphia, PA 2000



Source: U.S. Bureau of the Census, Census 2000, Summary File 1

Figure 8: Local Indices of Spatial Association – Significance Maps (Rook Contiguity)

Figure 8.a
Cluster Map: Black Exposure Index (to Whites) and White Exposure Index (to Blacks)

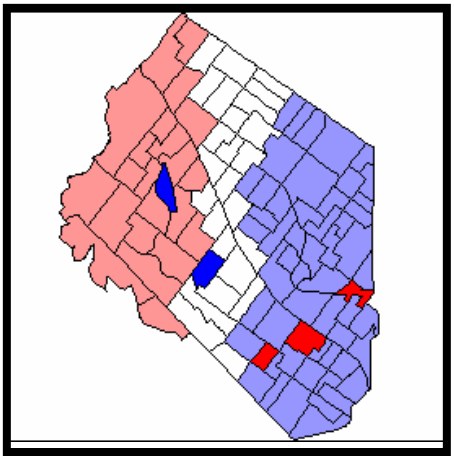


Figure 8.b
Significance Map: Black Exposure (to Whites) and White Exposure (to Blacks)

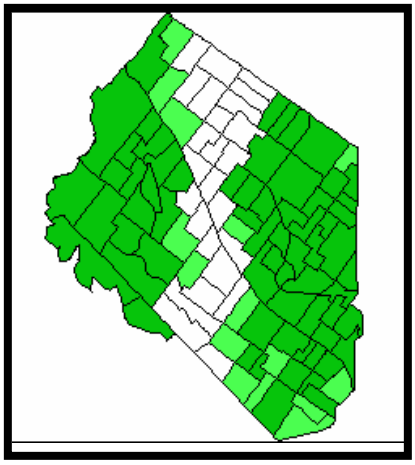
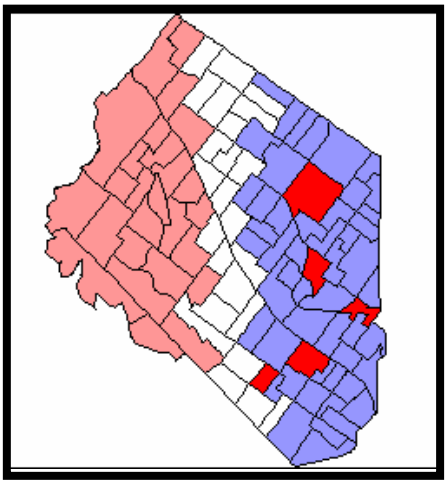


Figure 8.c
Cluster Map: White Isolation Index And Black Isolation Index



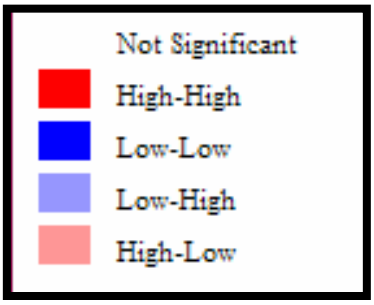


Figure 8.d
Significance Map: White Isolation Index and Black Isolation Index