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Analysis of Hispanic ethnicity and race in the city of Sacramento, 1990-1998

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ANALYSIS OF HISPANIC ETHNICITY AND RACE IN THE CITY OF SACRAMENTO, 1990-1998

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by

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ABSTRACT

ANALYSIS OF HISPANIC ETHNICITY AND RACE IN THE CITY OF SACRAMENTO, 1990-1998

by Andrea Subotic

This thesis assessed the association between Hispanic ethnicity and race in 1990 and 1998 in the City of Sacramento and changes in this association forecasted by the Census. Due to criticism that categories did not adequately reflect the increasing racial and ethnic diversity in the United States in the 1990 Census, the Census 2000 Dress Rehearsal report, conducted in 1998, introduced a number of changes to racial and ethnic categories. The analysis presented here revealed that characteristics of the Hispanic population, in terms of association with race and spatial distribution, did not change substantially between 1990 and 1998, although significant small differences were observed. Hispanic ethnicity continued to be associated mainly with Other race, while in 1998 Hispanic ethnicity was associated with the Two or More race as well. This study also illustrated the difficulty of comparative analysis between the reformed 2000 Census questionnaire and earlier censuses.

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Thanks Andrew for making me believe that there is a light on the other side of the tunnel!

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CHAPTER I

INTRODUCTION

The growing population of minorities, particularly Hispanics and Asians, along with increasing numbers of children born to people in mixed-race marriages fueled demands for revising existing standards for collecting racial and ethnic data by the Census. Critics of the existing system argued that, since it did not allow respondents to choose multiple races, it did not accurately reflect the U.S. population (Fetto 2000). The Census instituted several changes for racial and ethnic categories in the 2000 Census form. The most profound change to the question on race for the 2000 Census was that respondents were allowed to identify one or more races to indicate their racial identity and that any respondent marking more than one race was counted in a newly established Two or More race category (Figure 6). With the reformed 2000 Census questionnaire in place, the Census has announced that results from the 2000 Census would generate a very different picture of the American demographic composition. Changes in racial and ethnic categories have provided the most detailed classification of the American population yet, but have also created significant obstacles when conducting comparative analysis between the 2000 Census and any previous census data.

In the late 1990's, the Census announced that the association between the ethnic and racial categories was likely to change with the new categorization selection. One of the assumptions provided by the census, based on the 1990 Census and the 1996 National Content Survey results, has been that the Hispanic population is growing increasingly multiracial and therefore would favor the new Two or More category, thereby changing

the association between Hispanic ethnicity and remaining racial categories (U.S. Census Bureau 1999 a). Using the Census 2000 Dress Rehearsal Data, this thesis tested assumptions forecasted for Hispanic population by the Census. Associations between Hispanic ethnicity and racial categories in the 1990 Census and 2000 Census were observed, with particular attention to the association between Hispanic ethnicity and Two or More race. Furthermore, patterns of population distribution across the city were compared between the 1990 Census and the Census 2000 Dress Rehearsal.

Throughout the history of the census of American population there have been changes implemented in the population classification that prevented an effective historical comparison. The obstacles to conducting comparative analysis between census years for the Hispanic population have been particularly acute. The United States Hispanic population has been struggling for better recognition by the census since 1940, when census used "mother tongue" to determine if a person was of Hispanic origin. If Spanish was identified as person's mother tongue, that person was of Hispanic origin. In 1950 and 1960, the Census collected and published data for "persons of Spanish surname" in five southwestern states. For the first time, in 1970, a separate question on Hispanic origin was provided; respondents were asked to choose whether their origin or descent was Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish origin. However, the census distributed questionnaires as part of a trial study that provided the question on Hispanic origin only to 5 percent of households nationwide, presumably missing a large segment of Hispanic population. In 1980, a census question on Hispanic origin was given on all questionnaires. Because the mechanism of counting

Hispanics changed with almost every census, accurate comparisons of Hispanic population between censuses was clearly challenging, perhaps impossible in some cases.

In the 1990's, the Census started designing another reform that would lead to a strikingly new presentation of the American ethnic and racial characteristics. Results from the 1980 Census had indicated that Hispanics were a growing segment of the U.S. population that increasingly demanded better categorization. It was, however, the most recent misclassification of the Hispanic population in the 1990 Census that triggered the latest census questionnaire reform. In the 1990 Census, almost 10 million people, of which 98 percent were of Hispanic origin, refused to identify with any of the provided racial categories and instead wrote for race "Mexican", "Puerto Rican", or "Cuban " (Sandor 1994). These categories were recognized by the Census not as racial, but rather as ethnic characterization and were therefore classified as Other race by the Census.

In the past ten years, the Census implemented three main reforms to adjust for the demands of the rapidly growing population of the Hispanic and other minorities. Introduction of the first reform, the multi racial category, into the 2000 Census provided the largest selection of racial categories in the history of the census, but it also introduced a limitation—race and ethnic data from the 1990 and 2000 Censuses were no longer directly comparable. Exact percent change in a racial or ethnic population can not be calculated between 2000 Census and any previous census year. In 1990, there were six possible responses to the race and ethnic question, while in 2000, the number of racial and ethnic categories expanded to eight and respondents were allowed to give multiple responses in the Two or More race category (Figure 1). Thus, the questionnaire allowed

a total of sixty-three different race responses. The sixty three responses included: six race alone categories, fifteen categories of two races, twenty categories of three races, fifteen categories of four races, six categories of five races, and one category of six races (Figure 7). Maps 1 through 13 show the percentage of population in each census block in each racial category as well as Hispanic ethnicity in 1990 and 1998. Visual comparison of maps for the same or similar racial categories revealed differences that were difficult to quantify without further statistical analysis. This was true even for categories, such as African American, that were not redefined in 1998 and experienced little change in number in Sacramento between 1990 and 1998. With the introduction of the Two or More category, the Census managed to find a method to address the multiracial segment of the U.S. population, but also limited the application of the 2000 Census data by limiting valid comparative analysis between 2000 and any previous census years.

The second reform in the 2000 Census questionnaire that might affect comparisons to the 1990 Census was changing the location of the question on ethnic origin. In the 1990 Census, the Hispanic origin question was placed several questions after the race question in an attempt to indicate that Hispanic origin represented a subject different from race. In the 2000 Census, however, the Hispanic origin question was placed immediately ahead of the race question and an instruction was included to answer both questions (Figures 5 and 6). Whether changing the location of the question on Hispanic origin significantly changed the way the question was answered could not be determined without conducting a control study of considerable magnitude on the 2000 Census population, something that was not done. However, a study conducted in 1996

by the census indicated that placing a question on ethnicity before the question on race gave a more accurate answer on Hispanic racial belonging, suggesting improved accuracy of the 2000 Census in this area (U.S. Census Bureau 1999 a).

Other changes to the 2000 Census questionnaire included terminology and formatting changes, all of which may complicate comparison with census data of previous years. The three separate identifiers for the American Indian and Alaska Native populations (American Indian, Eskimo, or Aleut) used earlier were combined into one category called American Indian or Alaska Native. The Asian and Pacific Islander category was split into two categories: Asian and Native Hawaiian and Other Pacific Islander (Figure 1). The "Native" was added to the "Hawaiian" response category in the 2000 Census to clarify the use of Hawaiian as a racial rather than a geographic term for this question (Figure 1). Finally, there was one additional clarification in the 2000 Census form; the American Indian or Alaska Native category, "American" replaced "Amer.". Changes in terminology and formatting might not seem as consequential as introduction of the multiracial category and changing the location of the ethnicity question, but the Census believed that these clarifying changes would increase the accuracy of the 2000 Census and that they were therefore worth making even though they further complicated comparison to the 1990 Census.

After the Census determined the changes in the questionnaire, the Census 2000 Dress Rehearsal was conducted in 1998 to collect preliminary data at three selected sites. The Census Bureau used the Dress Rehearsal as an opportunity to test some procedures and systems that had not been tested operationally in any prior field or processing activity

before using them in the next census (U.S. Census Bureau 2000 b). New census questionnaires were distributed in Sacramento, California, Columbia, South Carolina, and the Menominee American Indian Reservation, Wisconsin. The Dress Rehearsal data provided a valuable source of information on some of the new techniques implemented by the Census. The Census 2000 Dress Rehearsal data was collected in 1998, two years before the 2000 Census was conducted, which allowed the Census staff two years to evaluate changes that were about to be implemented on the national scale. The terms 'Census 2000 Dress Rehearsal' and '1998 Data' were used interchangeably throughout this study.

The Census 2000 Dress Rehearsal and 2000 Census data attempted to address some concerns of the Unites States Hispanic population, which has been struggling with the Census for better recognition over the past six decades. Hispanics have been concerned with confusion between ethnicity and race on census forms and poor representation of the many Hispanics of multiracial background. After six decades and six attempts, the Census 2000 Dress Rehearsal and the 2000 Census have now provided the most thoroughly reformed questionnaire yet in order to address better a growing and increasingly diverse Hispanic population. Hispanic ethnicity was expected to be associated with different racial categories in 1998 than in 1990 because of the introduction of new census categories, changes in the census questionnaire, and actual change in the demographic profile of the Hispanic population. Furthermore, the significantly multiracial Hispanic population was expected to aggressively adopt the new

Two or More racial category because the Two or More category was designed, in part, to answer concerns raised by Hispanics in response to the 1990 Census.

This study specifically examined, in each census block, the relationship between the number of people identified as Hispanic and the number identified in each racial category, including the Other and Two or More categories, spatial variation in these relationships, and the change in both the relationships and spatial variation between 1990 and 1998. The results provided firm data on the significant social issue of Hispanic identity, illustrated the advantages and limitations of the newly designed census questionnaire, and highlighted the difficulty of significant modifications to census procedures when performing historical comparisons.

This study used the city of Sacramento data collected during the Census 2000 Dress Rehearsal for analysis of the association between Hispanic ethnicity and all racial categories in 1990 and 1998. Because the Census did not provide data on Hispanic ethnicity and race for individuals in the Dress Rehearsal, it was impossible to know for certain how many individuals reported a particular combination of race and ethnicity in 1998. To address this limitation, this study employed separate aggregate data for the number of people reporting a given race and the number of people reporting Hispanic ethnicity in each block, the smallest unit for which the Census provided data. A multiple stepwise regression analysis with the 1990 Census and Census 2000 Dress Rehearsal data was conducted. Results from the multiple stepwise regression addressed change in association between the Hispanic ethnicity and Other race, association between the Two or More race category and Hispanic ethnicity, and patterns in distribution of Hispanic

population for 1990 and 1998 in relation to other racial categories in the City of Sacramento. This analysis of the Census 2000 Dress Rehearsal data addressed questions and concerns about racial categories, Hispanic ethnicity, and census questionnaire reforms likely to arise when the full Census 2000 data become available.

CHAPTER II

STUDY DATA AND METHODS

This work employed regression analysis to study the relationship between Hispanic population and racial categories after the implementation of the reformed 2000 Census. The difficulty of performing direct comparison of the numerical data for the 1990 and 2000 Census required application of a regression analysis or another statistical technique. Stepwise multiple linear regressions generated results that will be examined in the following chapter, Result Analysis, to draw conclusions on the association between Hispanic ethnicity and racial categories at two time points. Stepwise multiple linear regression was chosen to measure a change in association between populations within the city because of its ability to measure effects in multiple populations simultaneously and produce residuals for further spatial analysis. Sacramento was chosen as the study area because it was the most ethnically and racially diverse area for which the Census 2000 Dress Rehearsal Data was collected.

Input Data

Data for the City of Sacramento obtained in 1990 and 1998 were used in the analysis. The 1998 data were the Census 2000 Dress Rehearsal data, which provide data no lower than the block level for racial and ethnic classification of the population. The Census does not routinely publish Census responses for individuals because of concern for the confidentiality of personal data and did not provide individual census responses in the Census 2000 Dress Rehearsal data. Therefore, this study was performed at the level of census blocks, the smallest geographic units for which the Census provided data. The

seven Census 2000 Dress Rehearsal racial categories were White, African American, Asian, Native Hawaiian and Other Pacific Islander, American Indian and Alaska Native, Other, and Two or More, and choice of race was entirely independent of choice of Hispanic ethnicity on the census forms. The 1990 data were the 1990 Census for City of Sacramento at the block level. All categories for which the Census collected data were available, so data on the five racial categories (White, African American, American Indian, Eskimo, and Aleut, Asian and Pacific Islander, and Other) and Hispanic ethnicity were extracted from the rest of the census data for use in this study. For both 1990 and 1998, the analysis used separate aggregate data for the number of people reporting a given race and the number of people reporting Hispanic ethnicity in each block.

Shapefiles are building blocks for maps in ArcView and were required for GIS analysis of this data. Shapefiles were obtained from the U.S. Census. Observed differences in size and shape of features in the shapefiles between 1990 and 1998 were expected because of the eight year gap in data collection and growth of the city during this time. In addition, 214 (2 percent) of the blocks in the Census 1998 Dress Rehearsal were missing values.

Software

Analyses were conducted with the statistical program SAS System for Windows V8e. Tables presented in the thesis were reformatted in Microsoft Excel for easier and more concise reading. Maps were produced with ArcView 3.2.

Statistical Methods Selection

Linear regression was chosen for this study after evaluation of linear, logistic, and Poisson regression analyses. The Logistic method was eliminated due to its requirement for a binary dependent variable with a binomial distribution to characterize an independent variable; the Census data for 1990 and 1998 are not in a binary format. In Poisson regression, the dependent variable is expressed in terms of counts and is related to a series of independent variables, providing a structure for analytical analysis (Zar 1998). However, Poisson regression is inappropriate for analysis of racial categories in the City of Sacramento since it assumes a Poisson distribution. The Poisson distribution models rare occurrences of some random event, which does not accurately describe racial categories in the racially mixed City of Sacramento. In contrast, the input data for this analysis met the basic requirements for linear regression, a continuous dependent variable with a normal distribution.

Prior to running the regression analysis, all assumptions of the linear regression were tested:

1. Assume that for any value of X there exists in the population a normal distribution of Y. The Normal Plot procedure was applied in SAS and none of the variables had a serious violation of normality. Data results have been provided in Tables 1 and 2.
2. Assume homogeneity of variances of Y values; variances must be approximately equal to one another. For all but Native American in 1990

and White and Pacific Islander in 1998, this assumption on homogeneity of variance was met.

3. The measurements of X are obtained without error. This requirement is typically impossible; an assumption needs to be made that errors in X data are negligible (Zar 1998).
4. In the population, the mean of the Y's at a given X lies on a straight line. This linearity requirement was satisfied, according to the multiple linear regression coefficient values (Tables 3 and 4).

Thus, the data reasonably well satisfied the assumptions set by the multiple linear regression model. Furthermore, some statisticians have observed that the multiple regression is robust to at least some of the underlying assumptions, so the observed deviations from strict assumptions were not a great concern (Zar 1994). These factors indicated that multiple linear regression was the most appropriate method for analysis of the available input data.

Statistical Analysis Steps

Before beginning each multiple regression, variables and parameters were defined and basic descriptive statistics were calculated. Upper and lower bounds of the confidence intervals were specified at 95 percent before conducting data analysis. In all analyses, Hispanic ethnicity was the dependent variable and race was the independent variable. After the multiple linear regression assumptions were tested and largely met, the univariate procedure was conducted. The univariate procedure calculated basic statistics: mean, median, standard deviation, variance range, student's t, and the

Kolmogorov-Smirnov test for normality. These basic statistics have been summarized in Tables 1 and 2 for easier reading of each variable. SAS provided a list of test scores for normality. The Kolmogorov-Smirnov test was selected as the most appropriate test, since the size of a population exceeded 2000 (SAS Institute Inc. 1998).

SAS tests for normality have been considered exceptionally sensitive by previous users and therefore were not the only criteria used when evaluating normality of the data. In the addition to the Kolmogorov-Smirnov test, normality plots and closeness of mean and median were examined for each variable. Testing these assumptions and analysis of the univariate procedure results was the foundation for a valid linear regression analysis.

Because a single-step simple regression analysis could not associate Hispanic ethnicity and multiple racial categories, this study employed stepwise multiple regressions. Stepwise multiple linear regressions between the Hispanic and racial categories in 1990 and 1998 were the initial steps in this analysis. Stepwise multiple regression is a type of multiple regression that starts with the best single regressor (indicated by R-square value), then finds the next best one and adds it to the existing model. All variables in the regression model are re-checked to see if they remain significant after each new variable is entered, and the procedure continues until R-square is maximized and a final regression model is produced. In this case, the racial category in the final regression model with the highest R-square value was interpreted as having the strongest association with Hispanic ethnic group. Stepwise multiple regression was required to study the relationship between racial categories and Hispanic ethnicity because the involved independent variables were correlated and dropping or adding

variables strongly affected the regression estimates and hypothesis tests. If the independent variables in the regression were uncorrelated, the estimates of regression coefficients would have been unchanged by adding or dropping independent variables (Cody and Smith 1997).

Residuals from the regression analysis provided additional spatial information about the variation in Hispanic ethnicity that could not be explained by the racial categories alone. Analysis of residuals has been frequently used to investigate spatial relationships in geographic data (McGrew and Monroe 1993). Residuals generated in the stepwise multiple regression could not be used to assess the relationship between Hispanic ethnicity and each racial category individually because only a single set of residual values, grouping all race categories together, was generated for each stepwise multiple regression. Accordingly, another set of stepwise multiple regressions was conducted with a limited number of variables. Variables included were only racial categories with significant *p* values and highest R-square values. These limited stepwise multiple regressions produced identical R-squared values to R-squared values generated by stepwise multiple regression which included all the variables. The set of residuals from limited stepwise multiple regression provided a detailed picture of the distribution for selected racial categories in association with Hispanic ethnicity that the stepwise multiple regression including all the variables could not provide.

CHAPTER III

RESULTS ANALYSIS

Association Between Categories

Analysis of the Census 1990 data indicated a strong association between Hispanic ethnicity and the Other racial category, as well as weaker associations between Hispanic ethnicity and remaining four racial categories. Hispanic ethnicity showed a strong correlation with Other race in 1990 Census (R-square = 0.6418). Native American, followed by Asian and Pacific Islander, were the next two racial categories associated with Hispanic ethnicity. Both Native American and Asian and Pacific Islander categories had statistically significant values. However, values of R-square were barely increased with the addition of the two variables to the stepwise multiple regression; Native American increased R-squared by 0.0051 to 0.6469, and Asian and Pacific Islander subsequently increased R-square by 0.0009 to 0.6478 (Table 3). Associations between Other, Native American, and Asian and Pacific Islander and Hispanic ethnicity were all significant with $P<0.0001$ in 1990, but the remaining racial categories, White and African American, did not have a significant association with Hispanic ethnicity and therefore were not added in the stepwise multiple regression analysis. Thus, in 1990, the Other racial category was the only independent variable with a high R-square value, although Native American and Asian and Pacific Islander were statistically significant, albeit with R-square values well below one percent (Table 3).

Results from the stepwise multiple regression with the 1998 data were broadly similar to those from the 1990 analysis. The Other racial category remained most

strongly associated with Hispanic ethnicity, having R-square equal to 0.6287, just slightly lower than the R-square of 0.6418 in the 1990 Census. The Two or More race category was the next most strongly associated racial category, increasing R-square by 0.0351 to 0.6638. R-square values increased only moderately as the following variables were added to the stepwise multiple regression: White (0.6904), Native Americans (0.6929), African American (0.6944), Native Hawaiian and Other Pacific Islander (0.6951) (Table 4). White racial category virtually had no impact on the R-square for the 1990 data set, however, in 1998 White increased R-square of 0.0266. The change in association with White was intriguing since White as a percentage of total population in the City of Sacramento has decreased from 60 percent in 1990 to 48 percent in 1998 (Figure 2) while an association between White and Hispanic has become evident according to the regression analysis with 1998 data (Table 4). Although the R-square value for the association between the Other racial category and Hispanic ethnicity declined moderately between 1990 and 1998, it was interesting that the overall R-square value in the multiple regression analysis actually increased from 0.6418 to 0.6951 over the same period.

Although statistically significant association was demonstrated between Hispanic ethnicity and the Native American, African American, and Native Hawaiian and Other Pacific Islander racial categories, these data were unlikely to have much practical significance, as R-square for all these associations was well below one percent. The Asian racial category was not added to the stepwise multiple regression process, indicating that Asians were the only racial category with no detectable association with Hispanic ethnicity in 1998. The aggregate data from 1998 indicated that, even with

addition of racial categories since 1990, most comparable racial categories remained similarly associated with Hispanic ethnicity.

Spatial Distribution of Hispanics

Residuals were analyzed to determine whether or not outliers from the regression line could reveal additional information about the spatial distribution of racial categories. Only residuals for racial categories that were strongly associated with Hispanic ethnicity were mapped for this data analysis. Because stepwise multiple linear regression generated a single set of residuals for the entire multiple regression model, another set of stepwise multiple regressions was conducted with a limited number of variables to generate residuals for significant variables and variables with highest R-square values only. In 1990, the association between Hispanic ethnicity and the Other racial category was significant (R-square= 0.6418), Native American and Asian and Pacific Islander were also significant, although with R-square less than 0.01, and the remaining variables displayed no significant association. Therefore, only the residuals for the analysis of the Other racial category were mapped.

Multiple Stepwise Regression for the 1998 data set was re-run with Other racial category alone (R-square = 0.6287) and second time with Other and Two or More (R-square = 0.0351) racial categories. These variables were chosen because they were highly associated with Hispanic ethnicity and enabled a comparison between the 1990 and 1998 results for the Other racial category. Furthermore, inclusion of the Two or More racial category measured the anticipated adoption of this category by the Hispanic population (U.S. Census Bureau 2000 a). For both the 1990 and 1998 data sets, stepwise

multiple regressions with selected variables generated R-square values identical to those generated by the stepwise multiple regression method that included all variables.

There were some limitations to this analysis that could weaken the conclusions of this study and any similar efforts. First, the census has specifically indicated that 2000 Census race data were directly comparable with neither the 1990 Census nor those from previous years (U.S. Census Bureau 2000 b). The Census implementation of the Two or More category made completely accurate comparative analysis with earlier census impossible data where multiple categories did not exist. In Maps 16 and 17 only individuals who reported a single race, Other race, were analyzed. Any individual who reported Other race and some other racial category was not included in the data presented in Maps 16 and 17.

Other limitations in this study were missing values in the Census 2000 Dress Rehearsal data set and changes in the shape file. The Census 2000 Dress Rehearsal did not provide data for 2 percent of the blocks in the study area. Even though this was a small number, its exclusion did introduce error in the data analysis. Close examination of the blocks in the shape file indicated that some of the blocks have changed in size between 1990 and 1998. Furthermore, the overall number of blocks grew by 800 in 1998, a 15 percent increase since the 1990 Census. Neither the inherent limitations of the Census's switch to the use of multi-racial categories nor the proportionally small complications of missing data or changing shape files would have been expected to prevent effective analysis of these data, as was indicated by the positive associations detected.

Interpreting Residuals

Most of the map interpretations were based on visual inspection of the residual distribution. Maps 14 and 15 presented residuals for regression of Hispanic ethnicity against all racial categories in 1990 and 1998. Similarity in residual values between the 1990 and 1998 was expected given that the relationship between each race with Hispanic had not drastically changed over eight years. Values for the 1990 residuals ranged from −18 to 27, while for the 1998 data residuals ranged from −19 to 30. Thus, at the aggregate level, without spatial analysis, the two years seemed roughly similar.

Close examination of the Map 14 indicated a pattern in the distribution of the residuals. The first two residual categories, ranging in value from −18 to 0, seem to account for the largest number of the blocks. Those are the blocks with under-represented Hispanic population relative to other racial categories, which seem to be distributed across the entire city. In contrast, areas where Hispanics were more prevalent than expected based on the racial categories in that area seem to show some clustering across the city. Clusters of blocks where Hispanics exceed other racial population range from 0 to 27 in residual value, and there were 70 blocks that contained the highest residual values, ranging from 2 to 27, as determined by the ArcView summarize tool. Summarize enabled summarization of a table based on the active field, residual values per block in this case, to categorize data by natural breaks for mapping and to create other summary statistics. Behavior of the blocks with highest and lowest residual values were most interesting to observe since they indicated a dramatic increase or decrease in concentration of the Hispanic population relative to the expectations for an area.

Clusters observed in Map 14 were divided into six sections, labeled clockwise from A through F. Each section contained groups of blocks where Hispanics are more prevalent than expected. Section F encompassed highest number of blocks where residuals ranged in value from 2 to 27; these were blocks with highest concentration of Hispanics. Sections A, C, D, and E were more balanced but still markedly clustered, with a concentration of blocks with residuals that ranged from just over 0 to 2.7; blocks with the highest residual category were also present in those blocks but much less frequently. In these blocks, the prevalence of Hispanics just slightly exceeded expectation, while the effect in section B was even less pronounced.

The Map 15 had residuals very close in value to residuals in 1990, but the distribution of values was less clustered. It was very difficult to point out any clusters of blocks in this map. Also, the distribution of positive and negative values changed little since 1990. The summarize tool in ArcView indicted that there were still 70 blocks where Hispanics concentration greatly exceeds the presence of other racial categories in 1998. However, visual inspection alone might have given a different impression, since the areas where Hispanics were predominant seem to have been dispersed. In 1990 blocks with high concentration of Hispanics seemed to cluster, but, in 1998, this clustering largely disappeared.

Review of the sections A through F specified in the Maps 14 and 15 confirmed the general impression. For instance, in 1990, there was more clustering and a higher number of blocks with highest value of residuals in section F. In 1998, section F was less clustered, and the number of blocks with the highest values that it contained had

decreased. Similarly, in the remaining sections in 1998, blocks with positive residual values were also more distributed. This increasing distribution of Hispanics implied that Hispanics were blending in more with the rest of the population. Another important characteristic for the 1998 population was that the percent of Hispanics in the City of Sacramento had increased to 21 percent in 1998 from 16 percent in 1990 (Figure 2). Hispanic population had increased over the eight-year period and had simultaneously become better integrated with the rest of the population.

Maps 16 and 17 provided a picture of distribution of residuals for Hispanic in relationship with Other race in 1990 and 1998. Large negative residual values for the Other racial category were surprising, given the strong association between the Other racial category and Hispanic ethnicity that was established in both 1990 and 1998. The large negative values of residuals could be explained by sub-populations that associated with the Other racial category, but did not consider themselves Hispanic. For both years, a lack of clustering was observed, the distribution of blocks where Hispanics were over- and under- represented appeared randomly distributed. Residual values for Hispanic ethnicity in relationship with the Other racial category had a greater range in 1998 (-11 to 9) than in 1990 (-5 to 10). Even though the percent of the Other racial category had increased in Sacramento since 1990 (Figure 2), the association with Hispanic had weakened. The R-square value for the Other racial category alone dropped from 0.6418 in 1990 to 0.6287 in 1998. This drop was a possible explanation for the increasingly negative values of residuals for the Other racial category in 1998 and an indication that

an increasing number of individuals in this racial category did not consider themselves Hispanic in 1998.

Similarly, Hispanic ethnicity was also associated with an increased number of racial categories (Native American, Pacific Islander, White, and Two or More) in 1998. This increase in the number of racial categories associated with Hispanic ethnicity and in the absolute level of correlation between Hispanic ethnicity and racial categories between 1990 and 1998 is likely to represent the same greater integration of Hispanics into the general population in Sacramento that has been suggested by dispersion of the clustered Hispanic population in 1998 (Map 15).

Map 18 indicated a pattern very similar to the pattern of residuals for Other racial category alone in 1998. Residuals were distributed across the city and no clustering of values was observed. However, the range of residuals decreased after the Two or More racial category was added to the stepwise multiple regression, from –11 to 9 for Other alone to –3 to 9 for Other and Two or More. Change in residual values demonstrated the significance of the small proportion of Hispanics who considered themselves to be in the Two or More racial category; although a minor association in the regression, the Two or More had a pronounced effect on the range of residuals obtained. Negative residual values for the Other and Two or More racial categories could be explained with the statement that some people who chose these categories might have been Hispanic, while others who selected the Other or Two or More race category might not have considered themselves Hispanic.

Results Analysis Summary

In summary, Hispanics are a growing segment of the population in Sacramento that increased their share of the total population between 1990 and 1998 by 5 percent, an increase greater than that observed for any of the racial categories during the same time period (Figure 2). The association between Hispanic and racial categories has fluctuated between the two time periods for some of the variables while for the others the association has remained steady. A positive association between Hispanics, a growing ethnic group, and White race, a racial group that is decreasing as a proportion of the total Sacramento population, suggested that a segment of Hispanic population was White race also. A small but steady number of Native Americans, just over 1 percent, has been associated with Hispanics in 1990 and 1998. In 1990, there was a very small number of Hispanics that also identified with Asian and Pacific Islander, however, in 1998, a significant association was established between Hispanic and Native Hawaiian and Other Pacific Islander, a racial category that accounted for 1 percent of the total population. In 1998, Hispanics had absolutely zero significant association with the Asian racial category, a growing population in Sacramento, while in 1990 the Asian/Pacific Islander category was statistically significant with R-square of well below one percent (Figure 2).

Another steady relationship has been established between Hispanic and Other race. In 1990 the R-square of 0.6418 indicated a strong correlation between Hispanic ethnicity and the Other race category. According to the Census, most Hispanics view themselves racially as Hispanic and do not identify with one of the specific racial categories (that is Black, Asian, etc.) (Bates 1996). In 1998, Hispanics were still favoring

the Other race, however, a small drop in R-square value might indicate that, due to an increase in the number of children with multiracial and ethnic parents, some Hispanics chose Two or More race over Other race.

Spatial observations on distribution of categories presented earlier in this chapter could not have been made if the analysis of the data was based only on R-square values. Therefore, residuals have provided insightful data on changing population patterns in Sacramento. Population that considers itself Hispanic has moved from clustered areas to a more randomly distributed population. As the numbers of Hispanics increased in Sacramento, the population seemed to be assimilating more thoroughly with the remaining population. Both R-square values and analysis of residuals revealed similarity between the Other racial category in 1990 and 1998 and suggested that some Hispanics who identified themselves as Other in 1990 switched to Two or More in the Census 2000 Dress Rehearsal.

CHAPTER IV

CONCLUSION

Results presented in this thesis and articles provided by the Census Bureau on the results from the Census 2000 Dress Rehearsal have revealed interesting characteristics of the Hispanic population. In addition to reporting actual changes in the Hispanic population, the Census 2000 Dress Rehearsal Results has been influenced by a change in location of the ethnic origin question on the census form, addition of a multiple race category, and modification of some existing racial categories to lower the non-response rate on race question. This study employed Census 2000 Dress Rehearsal data collected in 1998, where changes to be implemented in the 2000 Census were examined two years ahead of the actual census. Sacramento's diverse population and increasing Hispanic population made it an excellent study area for analyzing the effect of these changes to the Census. According to the Census Dress Rehearsal Data in Sacramento, 6.4 percent of total population was multiracial, while on the national level multi racial population accounted for less than 3 percent of the total population. Even with the Census Dress Rehearsal data, it was still difficult to determine to what extent changes introduced in 2000 Census questionnaire have changed the way Hispanics identified themselves because of the changes in the 2000 Census. This analysis revealed a continued association between Hispanic ethnicity and the Other racial category as well as other new racial categories, but the overall significance of the reforms in census questionnaire on the Census at large has been hard to determine at this point.

The analysis preformed here used stepwise multiple regression analysis to study the association between Hispanic ethnicity and racial categories. R-square values initially determined the degree of relationship between Hispanic and racial categories in 1990 and 1998, and residuals provided more in-depth information on spatial distribution of the population. A direct comparison between racial categories from 1990 and 2000 Census could not be conducted because the racial categories used in Census reports had changed, so the regression and residual-mapping analysis addressed all the racial categories for each year in association with Hispanic ethnicity. Since the Other racial category was strongly associated with Hispanic ethnicity in both 1990 and 1998, this relationship was compared between 1990 and 1998 to gain insight about change in the spatial distribution of the Hispanic population over this time period.

The association between Hispanic ethnicity and racial categories has been influenced by the changes introduced with the Census 2000 Dress Rehearsal. First, introduction of more specific categories did permit finer dissection of the relationship between Hispanic ethnicity and particular racial categories in the 2000 Census Dress Rehearsal. A notable example of this higher discrimination in the more recent census was given by change from the relationship between Hispanic ethnicity and the 1990 Asian and Pacific Islander category. The Asian and Pacific Islander racial category was associated with Hispanic ethnicity in 1990, however, when the category split into separate Asian and Native Hawaiian and Other Pacific Islander categories in 1998, only the Native Hawaiian and Other Pacific Islander racial category remained associated with Hispanic ethnicity. Second, Hispanic ethnicity was associated with the Other category in

1990 and that association continued in 1998. The modification introduced with the Census 2000 Dress Rehearsal introduced a new association between Hispanic and Two or More but did not substantially weaken the association with the Other race category. Finally, with the introduction of Two or More race category, the Census provided a greater selection for multiracial population. Almost ten million Hispanics who apparently felt that the 1990 Census did not provide adequate categories might have preferred the multiracial category (Sandor 1994). In the 1990 Census, Other race seemed to be a category of choice for anyone who was affiliated with more than one race. Although multiple regression indicated that Hispanic ethnicity was associated with the Two or More racial category, the correlation with the Other category still accounts for the vast majority of the association between racial categories and Hispanic ethnicity.

As anticipated, residuals revealed interesting observations about some variables. Special attention was dedicated to the Other and Two or More racial categories, Other because of it's association with Hispanic ethnicity in 1990 and Two or More because it was expected to appeal to the Hispanics on account of a large number of multi-racial marriages that the census bureau predicted for this ethnic group. Analysis of residual values for Other race and Two or More race categories confirmed the complexity of the two categories and some of the expectations of the Census. Even though both racial categories were associated with Hispanic ethnicity, especially Other with over 0.6 R-square value, the residuals ranged widely from negative to positive values in all cases. One suggested explanation for this observation was heterogeneity in the multiracial population; potentially, there were people who associated with more than one racial

category, but not necessarily Hispanic ethnicity, and still remain included in the Other or Two or More categories.

The final conclusion on Hispanics was that they have been a growing population that has become well dispersed across the City of Sacramento. With dissipation of clusters of blocks of high Hispanic population (Map 15), the Hispanic population has become a more integrated part of the population blend in Sacramento. Some Hispanics appear to have found that the changes introduced in Census 2000 Dress Rehearsal have addressed their needs, but nearly 22 percent of Hispanics still opted not to answer the race question, according to the results from the Census Bureau on Dress Rehearsal. Even with this high degree of non-response, however, the Census 1998 Dress Rehearsal also indicated that Hispanics have associated with the new Two or More race category and that the association between Hispanic and the Other racial category persisted.

Analyses presented in this study have been educational and relevant beyond the City of Sacramento. Hispanics population has increased at the national level as well, by 48 percent since the 1990 Census (Guzman 2001). As Hispanics have become a greater percentage of the U.S. population, the need to properly record their ethnic and racial affiliation has become more crucial. As the number of Hispanics has risen, they have also become more multiracial. Hispanics have increasingly been marrying people that were not of Hispanic descent, and, in 1990, 2.6 million children lived in marriages where parents were of different races, or where a Hispanic was married to a non-Hispanic (O'Hare 1998). As the numbers of multiracial and Hispanic population increased in the United States, the need for a multi-racial category became more imminent.

The Census has projected that only 2 percent of the U.S. population will be associated with the Two or More race category. However, in areas such as Sacramento, Los Angeles, and the San Francisco Bay area, the percentage of the population expected to use the Two or More racial category has been double or triple the projected national numbers. In such environments, the Two or More race category has been crucial to accurately account for the race of people. However, limitations introduced with the Two or More race category should not be forgotten; most notably, direct numerical comparison between 2000 data with any previous year has become almost impossible. However, this study has suggested that this limitation can be overcome, in part, through comparative statistical analysis. In this case, the Other racial category still retained the vast majority of association with Hispanic ethnicity in 1998 and allowed spatial analysis of the distribution of the Hispanic population through analysis of residuals. This associative study was then effectively fine-tuned by addition of the new Two or More racial category to the analysis. This approach of tuning the statistical analysis by gradual addition of the another category has applicability to any analysis of racial data in the actual 2000 Census, where it has been desirable to correlate race with income, education, and much other data.

Finally, the human impact of these changes should not be forgotten. In addition to allowing more accurate statistics on race and ethnicity in the United States population, at this point the Two or More race has provided a reform awaited by many multiracial people. For instance, the 2000 Census will mark a milestone for Ramona Douglass of San Jose, California, who, for the first time, has been allowed to identify herself as white,

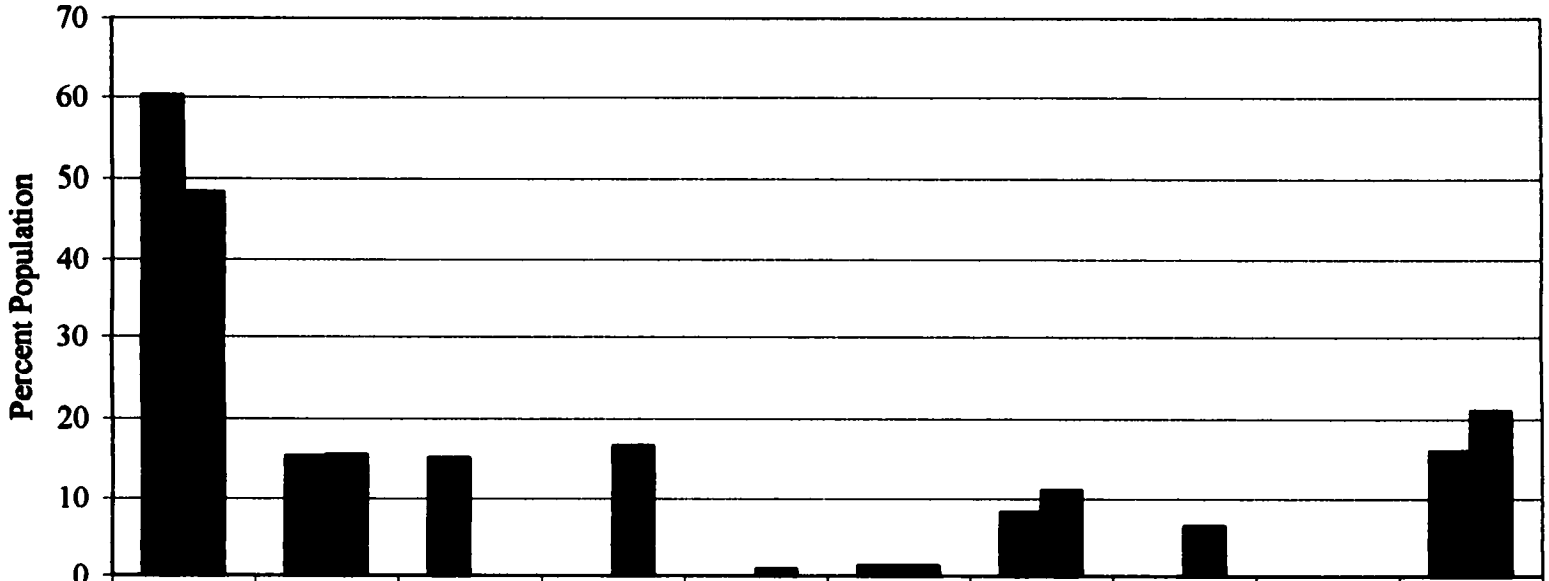
black, and American Indian with Hispanic or Latino origin. She claims that the U.S. Census has been intolerant and insensitive to multi-racial people and that reform has been overdue in the census racial classification. Many others will share the enthusiasm of Ms. Douglass for the new census questionnaire; they all hope and expect that the data will be used effectively despite all the changes in race classification and counting mechanisms (Fisher 1998).

Figure 1. Census 1990 and Census 2000 Dress Rehearsal Racial and Ethnic Categories
Directly comparable categories are placed on the same line. Blank lines indicate that a category was not used in that year.

Census 1990	Census 2000 Dress Rehearsal
White	White
Black or Negro	Black or African American
Asian/Pacific Islander	
	Asian
	Native Hawaiian and Other Pacific Islander
Amer. Indian, Eskimo, or Aleut	American Indian and Alaska Native
Other race	Some Other Race
	Two or More Races
Hispanic	Hispanic or Latino

Source: U.S. Census Bureau, 1998 b.

Figure 2. Sacramento Population in 1990 and 1998



	White	Black	Asian/ Pacific Is.	Asian	Nat. Hawaiian	Amer. Indian	Other	Two or More		Hispanic or Latino
1990	60.17	15.28	15.04			1.32	8.19			16
1998	48.3	15.5		16.6	0.9	1.3	11	6.4		21

Data Source: U.S. Census Bureau 2000 c.

* Only race categories add up to 100 %.

Figure 3. Race and Ethnic Categories in the Census 1860-2000 (page 1 of 2).

Census	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960
Race	White	White	White	White	White	White	White	White	White	White	White
	Black	Black	Black	Black	Black	Black	Black	Black	Black	Negro	Negro
	Mulatto	Mulatto	Mulatto	Mulatto		Mulatto	Mulatto				
		Chinese	Chinese	Chinese	Chinese	Chinese	Chinese	Chinese	Chinese	Chinese	Chinese
		Indian	Indian	Indian	Indian	Indian	Indian	Indian	Indian	American Indiar	American Indian
				Quadroon							
				Octoroon							
				Japanese	Japanese	Japanese	Japanese	Japanese	Japanese	Japanese	Japanese
							Filipino	Filipino	Filipino	Filipino	Filipino
							Hindu	Hindu	Hindu		
							Korean	Korean	Korean		
								Mexican			
											Aleut
											Eskimo
											Hawaiian
											Part Hawaiian
						Other	Other	Other	Other	Other	Other
Hispanic Ethnicity											

Source: AmeriStat 2000.

Figure 3. Race and Ethnic Categories in the Census 1860-2000 (page 2 of 2).

Census	1970	1980	1990	2000
Race	White	White	White	White
	Negro or Black	Negro or Black	Negro or Black	Negro, African American, or Black
	Chinese	Chinese	Chinese	Chinese
	Indian (Amer.)	Indian	Indian (Amer.)	American Indian or Alaska Native
	Japanese	Japanese	Japanese	Japanese
	Filipino	Filipino	Filipino	Filipino
		Asian Indian	Asian Indian	Asian Indian
	Korean	Korean	Korean	Korean
		Aleut	Aleut	
		Eskimo	Eskimo	Native Hawaiian
	Hawaiian	Hawaiian	Hawaiian	
		Vietnamese	Vietnamese	Vietnamese
		Guamanian	Guamanian	Guamanian or Chamorro
		Samoan	Samoan	Samoan
			Other API	Other Asian
				Other Pacific Islander
	Other	Other	Other race	Some Other Race
Hispanic Ethnicity	Mexican	Mexican, Mexican Amer., Chica	Mexican, Mexican Amer., Chic	Mexican, Mexican Amer., Chicano
	Puerto Rican	Puerto Rican	Puerto Rican	Puerto Rican
	Central/So. American			
	Cuban	Cuban	Cuban	Cuban
	Other Spanish	Other Spanish/Hispanic	Other Spanish/Hispanic	Other Spanish/Hispanic/Latino
	None of These	Not Spanish/Hispanic	Not Spanish/Hispanic	Not Spanish/Hispanic/Latino

Source:AmeriStat 2000.

Figure 4. Defining Racial and Ethnic Categories, Census 2000 Dress Rehearsal
This is taken verbatim from the U.S. Census Technical Documentation.

WHITE: Includes people who indicated their race as "White" or reported entries such as Canadian, German Italian, Arab, Near Easterner, or Polish.

BLACK OR AFRICAN AMERICAN: Includes people who indicated their race as "Black, African American, or Negro" or had written entries such as African American, Afro-American, Jamaican, Nigerian, West Indian, or Haitian.

ASIAN: Includes "Asian Indian, Chinese, Filipino, Korean, Japanese, Vietnamese, Other Asian. Asian Indian includes: Bengalese, Bharat, Dravidian or East Indian.

AMERICAN INDIAN AND ALASKA NATIVE:

American Indian. Includes people who indicated their race as "American Indian" entered the name of an Indian tribe, or reported such entries as Canadian Indian, French-American Indian, or Spanish-American Indian.

Alaska Native. Includes written responses of Eskimos, Aleuts, and Alaska Indians as well as entries such as Arctic Slope, Inupiat, Yupik, Alutiiq, Egegik, and Pribilovian. The Alaska tribes are the Alaskan Athabaskan, Tlingit, and Haida. The Census 2000 Dress Rehearsal tribal classification was expanded to list the individual Alaska Native Villages when they are given as a written response for race.

NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER: Includes people who indicated their race as "Native Hawaiian,""Guamanian or Chamorro," "Samoan," and "Other Pacific Islander."

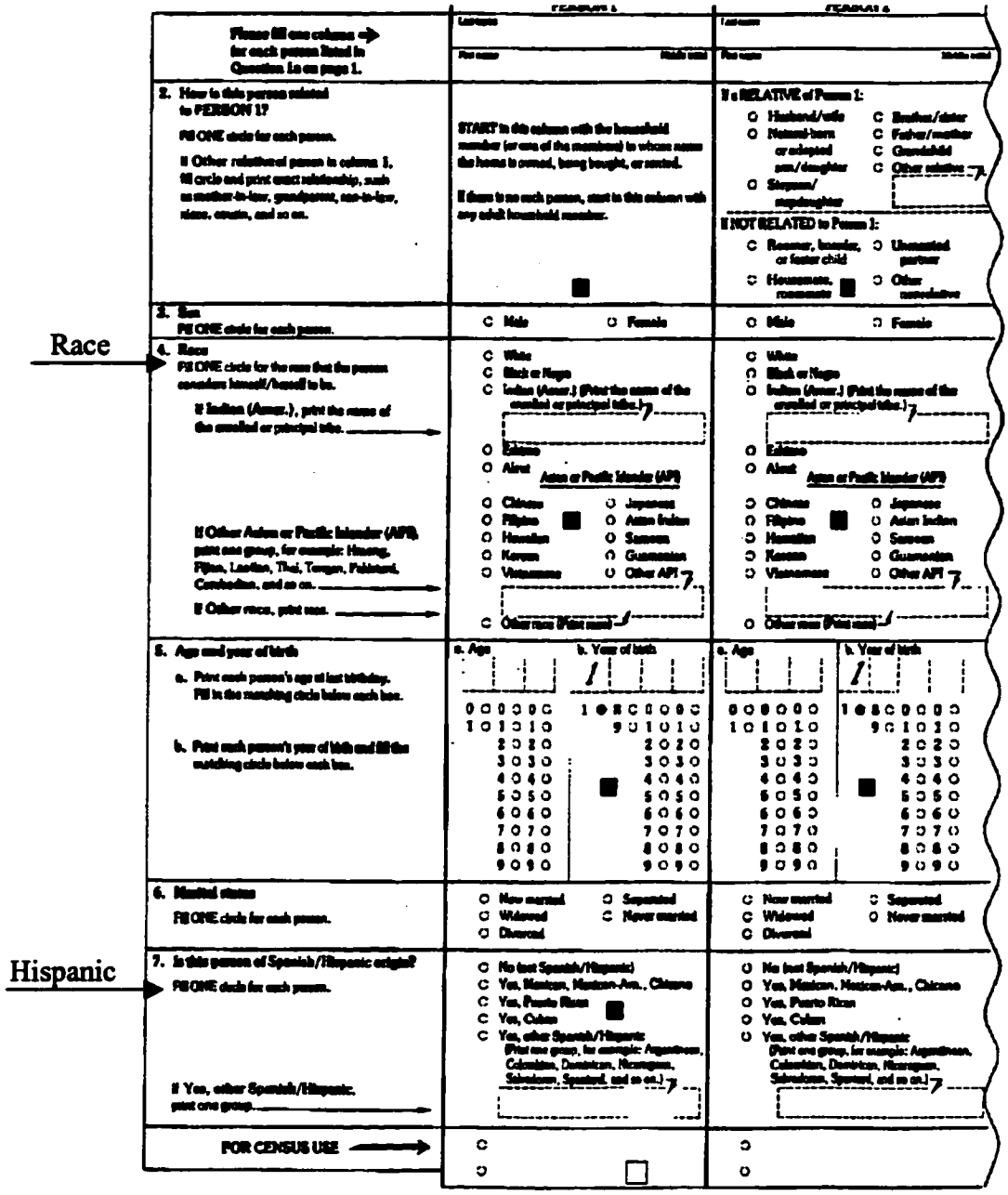
OTHER : Includes all other responses not included in any of the above racial categories. Respondents providing write-in entries such as multiracial, mixed, interracial, Hispanic or Latino group in the "Some other race" category are included here.

TWO OR MORE : Includes anyone who checked off more than one race in the questionnaire.

HISPANIC OR LATINO: The terms "Spanish", "Hispanic origin", and "Latino" are used interchangeably, these terms have the same meaning.

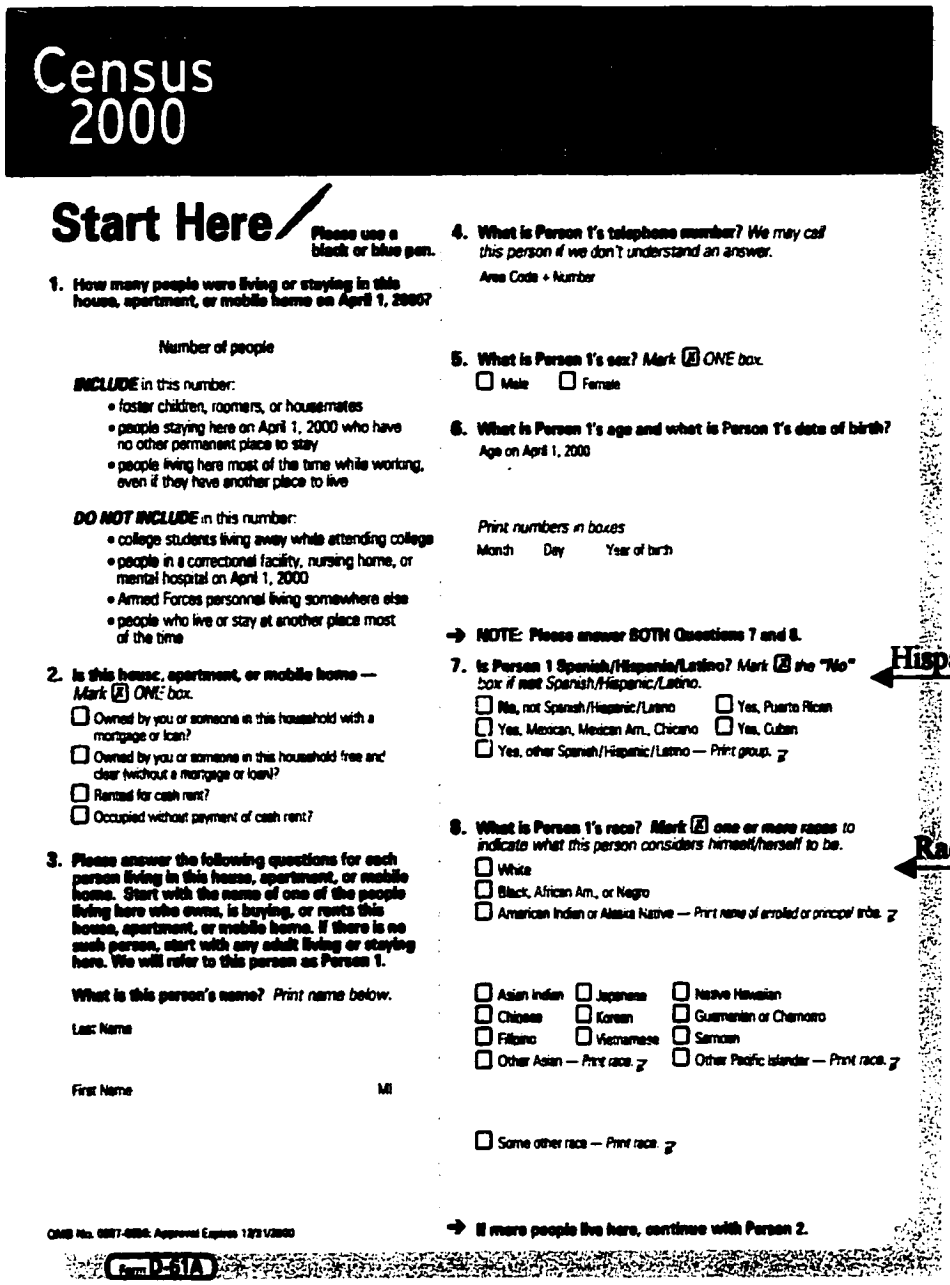
Source: U.S. Census Bureau 1998 b.

Figure 5. Portion of the original 1990 Census Questionnaire
Racial and ethnic categories are listed in sections 4 and 7.



Source: Williamson 1999.

Figure 6. Portion of the original Census 2000 Questionnaire
Racial and ethnic categories are listed in sections 7 and 8.



Census 2000

Start Here Please use a black or blue pen.

1. How many people were living or staying in this house, apartment, or mobile home on April 1, 2000?

Number of people

INCLUDE in this number:
- foster children, roomers, or housemates
- people staying here on April 1, 2000 who have no other permanent place to stay
- people living here most of the time while working, even if they have another place to live

DO NOT INCLUDE in this number:
- college students living away while attending college
- people in a correctional facility, nursing home, or mental hospital on April 1, 2000
- Armed Forces personnel living somewhere else
- people who live or stay at another place most of the time

2. Is this house, apartment, or mobile home — *Mark ☒ ONE box.*
- ☐ Owned by you or someone in this household with a mortgage or loan?
- ☐ Owned by you or someone in this household free and clear (without a mortgage or loan)?
- ☐ Rented for cash rent?
- ☐ Occupied without payment of cash rent?

3. Please answer the following questions for each person living in this house, apartment, or mobile home. Start with the name of one of the people living here who owns, is buying, or rents this house, apartment, or mobile home. If there is no such person, start with any adult living or staying here. We will refer to this person as Person 1.

What is this person's name? *Print name below.*

Last Name

First Name MI

4. What is Person 1's telephone number? *We may call this person if we don't understand an answer.*

Area Code + Number

5. What is Person 1's sex? *Mark ☒ ONE box.*
☐ Male ☐ Female

6. What is Person 1's age and what is Person 1's date of birth?

Age on April 1, 2000

Print numbers in boxes

Month Day Year of birth

→ **NOTE: Please answer BOTH Questions 7 and 8.**

7. Is Person 1 Spanish/Hispanic/Latino? *Mark ☒ the "No" box if not Spanish/Hispanic/Latino.* **Hispanic**
- ☐ No, not Spanish/Hispanic/Latino
- ☐ Yes, Puerto Rican
- ☐ Yes, Mexican, Mexican Am., Chicano
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latino — *Print group.*

8. What is Person 1's race? *Mark ☒ one or more races to indicate what this person considers himself/herself to be.* **Race**
- ☐ White
- ☐ Black, African Am., or Negro
- ☐ American Indian or Alaska Native — *Print name of enrolled or principal tribe.*
- ☐ Asian Indian
- ☐ Japanese
- ☐ Native Hawaiian
- ☐ Chinese
- ☐ Korean
- ☐ Guamanian or Chamorro
- ☐ Filipino
- ☐ Vietnamese
- ☐ Samoan
- ☐ Other Asian — *Print race.*
- ☐ Other Pacific Islander — *Print race.*
- ☐ Some other race — *Print race.*

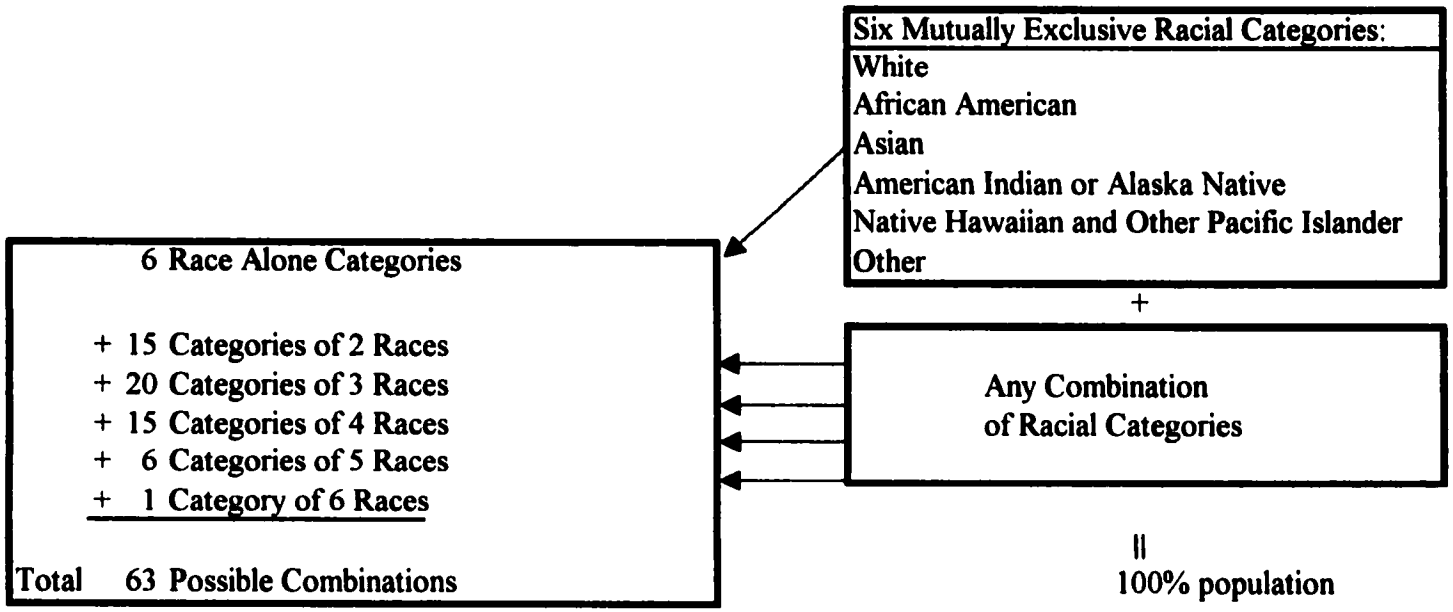
→ **If more people live here, continue with Person 2.**

OMB No. 0607-0856: Approval Expires 12/31/2000

Form D-61A

Source: Williamson 1999.

Figure 7. Sixty-three Racial Categories, Census 2000 Dress Rehearsal



Source: U.S. Census Bureau 2000b.

Map 1: Hispanic Population in the City of Sacramento in 1990.

Data Source: U.S. Census Bureau, 1990.

Map 2: White Population in the City of Sacramento in 1990.

Map 3: Black Population in the City of Sacramento in 1990.

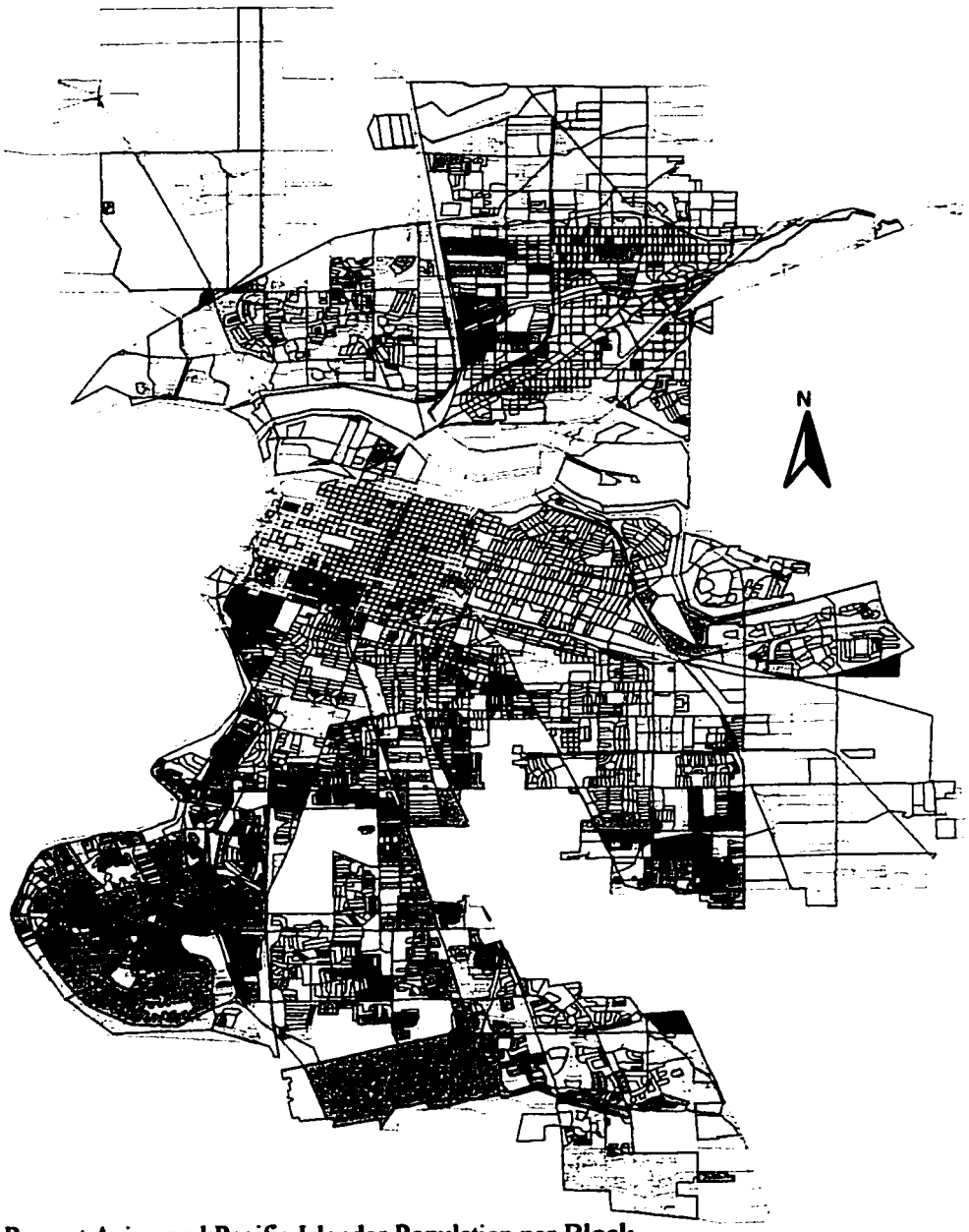
Percent Black Population Per Block

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100

1 0 1 Miles

Data Source: U.S. Census Bureau, 1990.

Map 4: Asian and Pacific Islander Population in the City of Sacramento in 1990.



Percent Asian and Pacific Islander Population per Block

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100

1 0 1 Miles

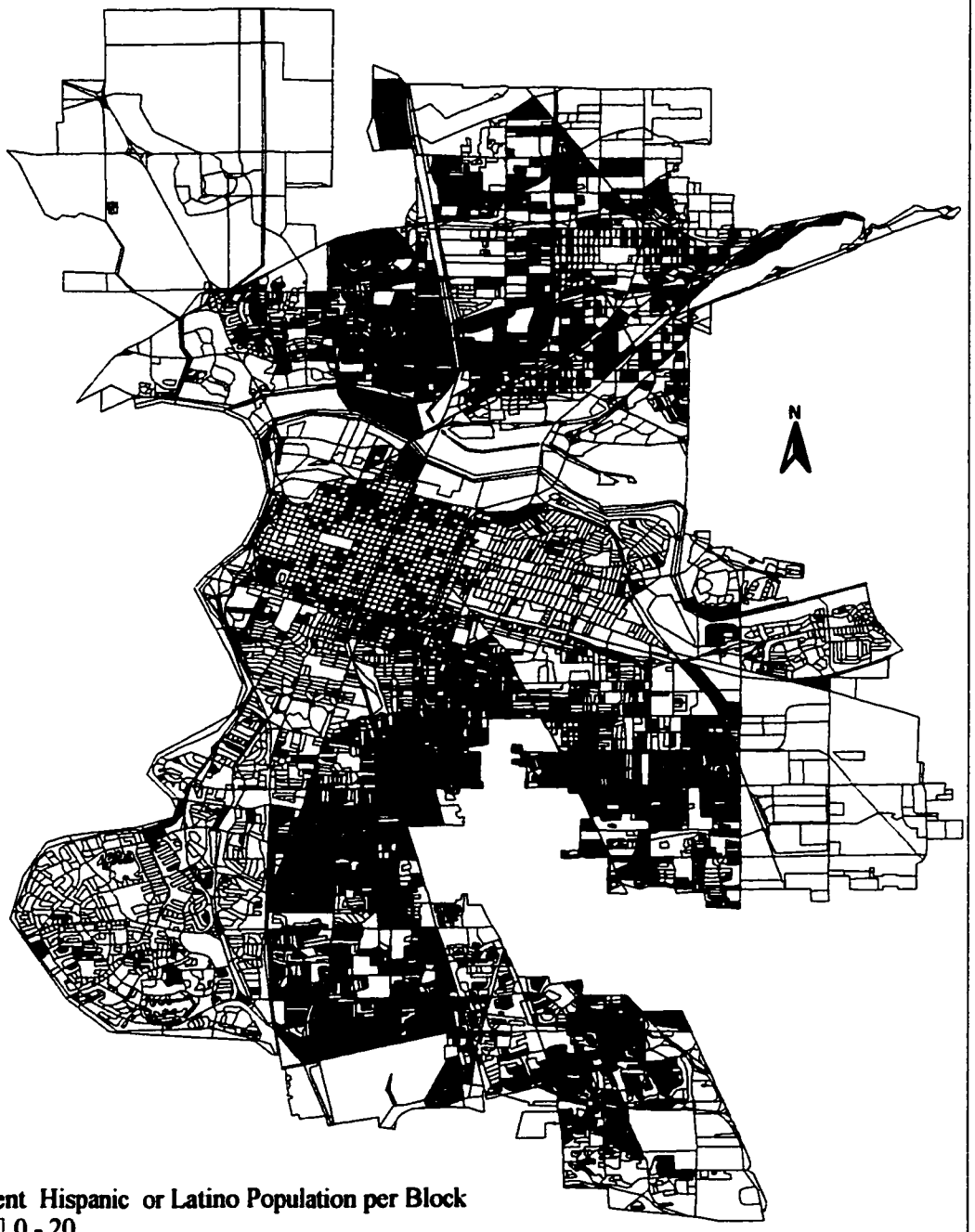
Data Source: U.S. Census Bureau, 1990.

Map 5: American Indian, Eskimo, or Aleut Population in the City of Sacramento in 1990.

Map 6: Other Population in the City of Sacramento in 1990.

Data Source: U.S. Census Bureau, 1990.

Map 7. Hispanic or Latino Population in the City of Sacramento in 1998.



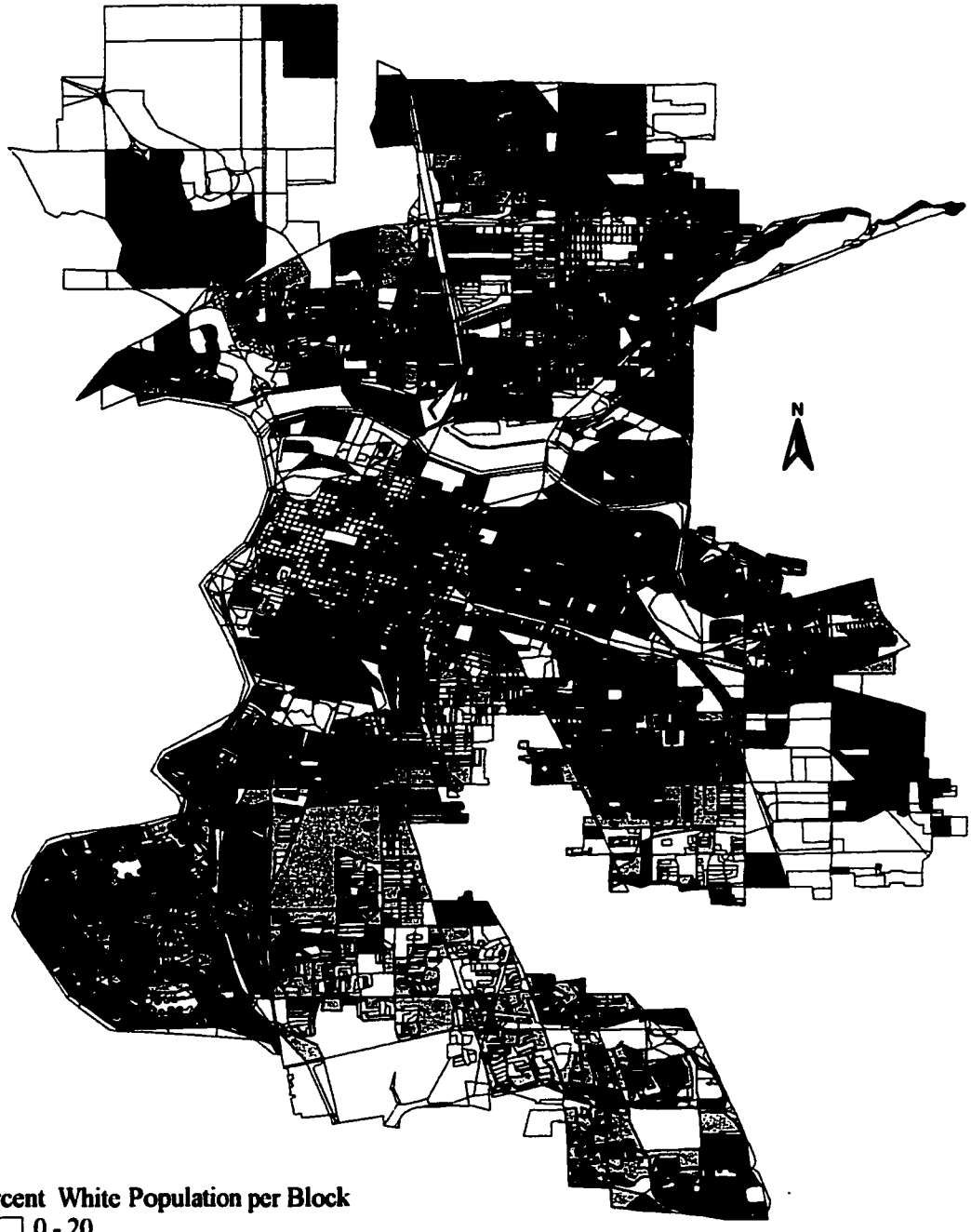
Percent Hispanic or Latino Population per Block

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100

1 0 1 Miles

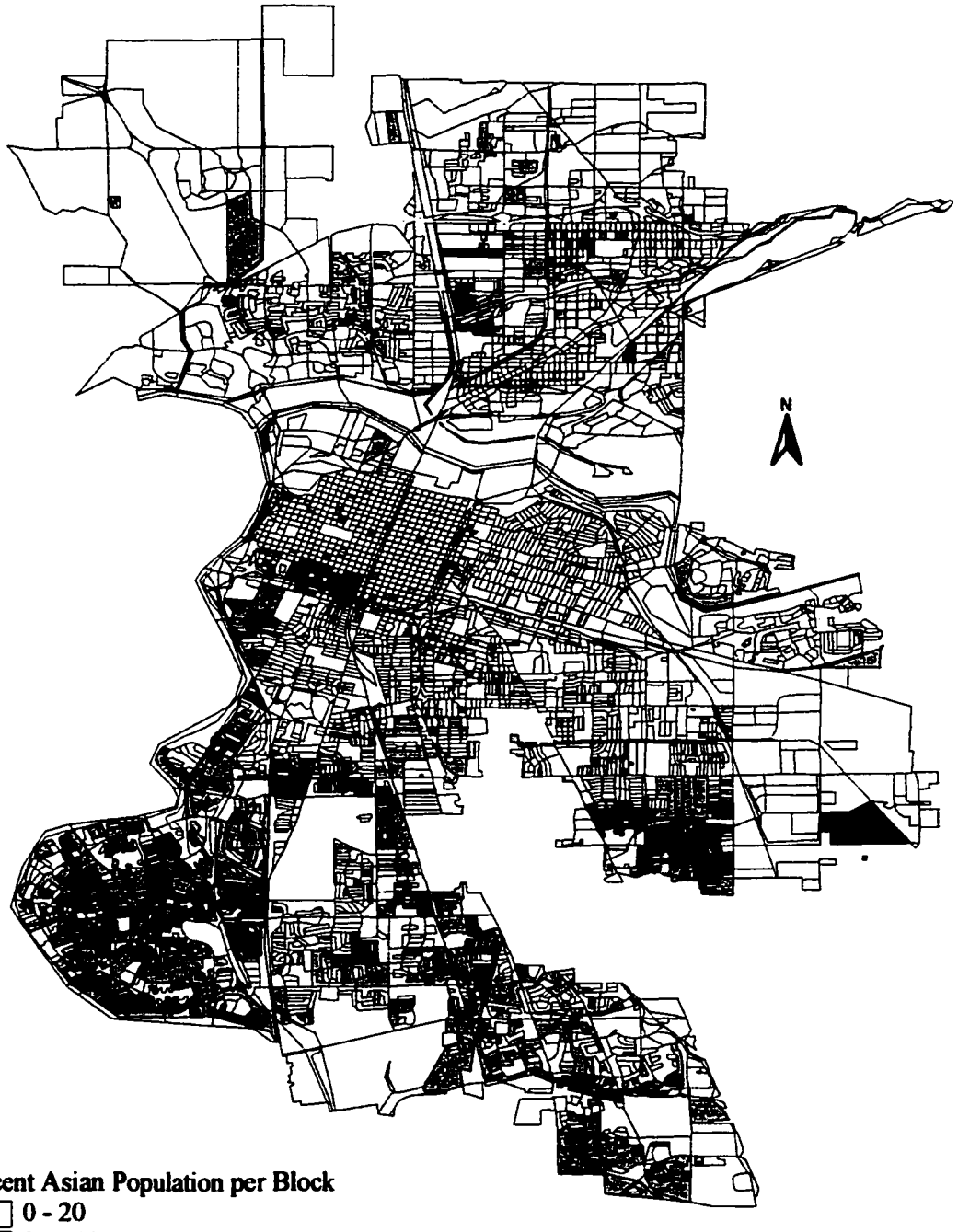
Data Source: Census 2000 Dress Rehearsal.

Map 8. White Population in the City of Sacramento in 1998



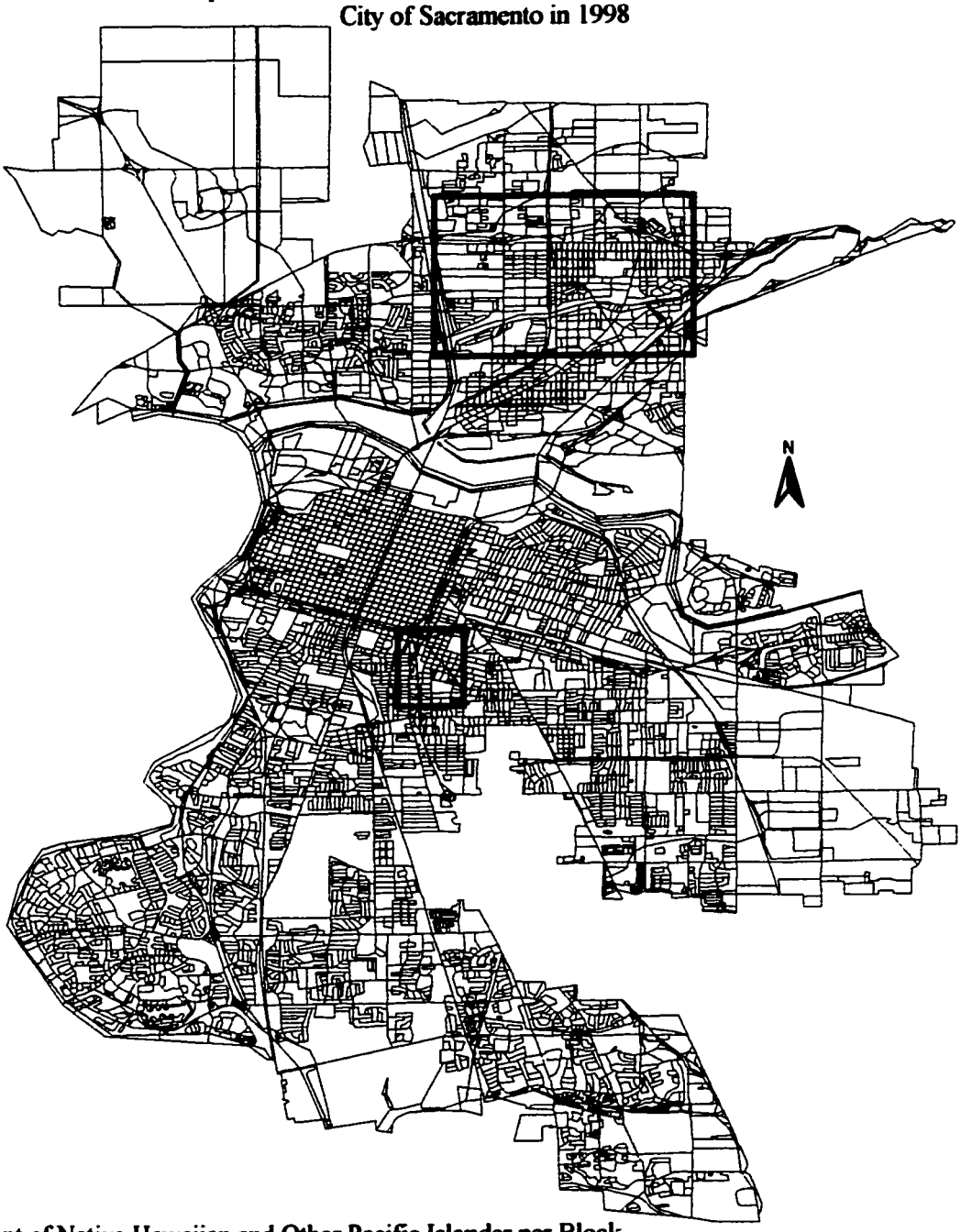
Map 9. Black or African American Population in the City of Sacramento in 1998

Map 10. Asian Population in the City of Sacramento in 1998



Data Source: Census 2000 Dress Rehearsal.

Map 11. Native Hawaiian and Other Pacific Islander in the City of Sacramento in 1998



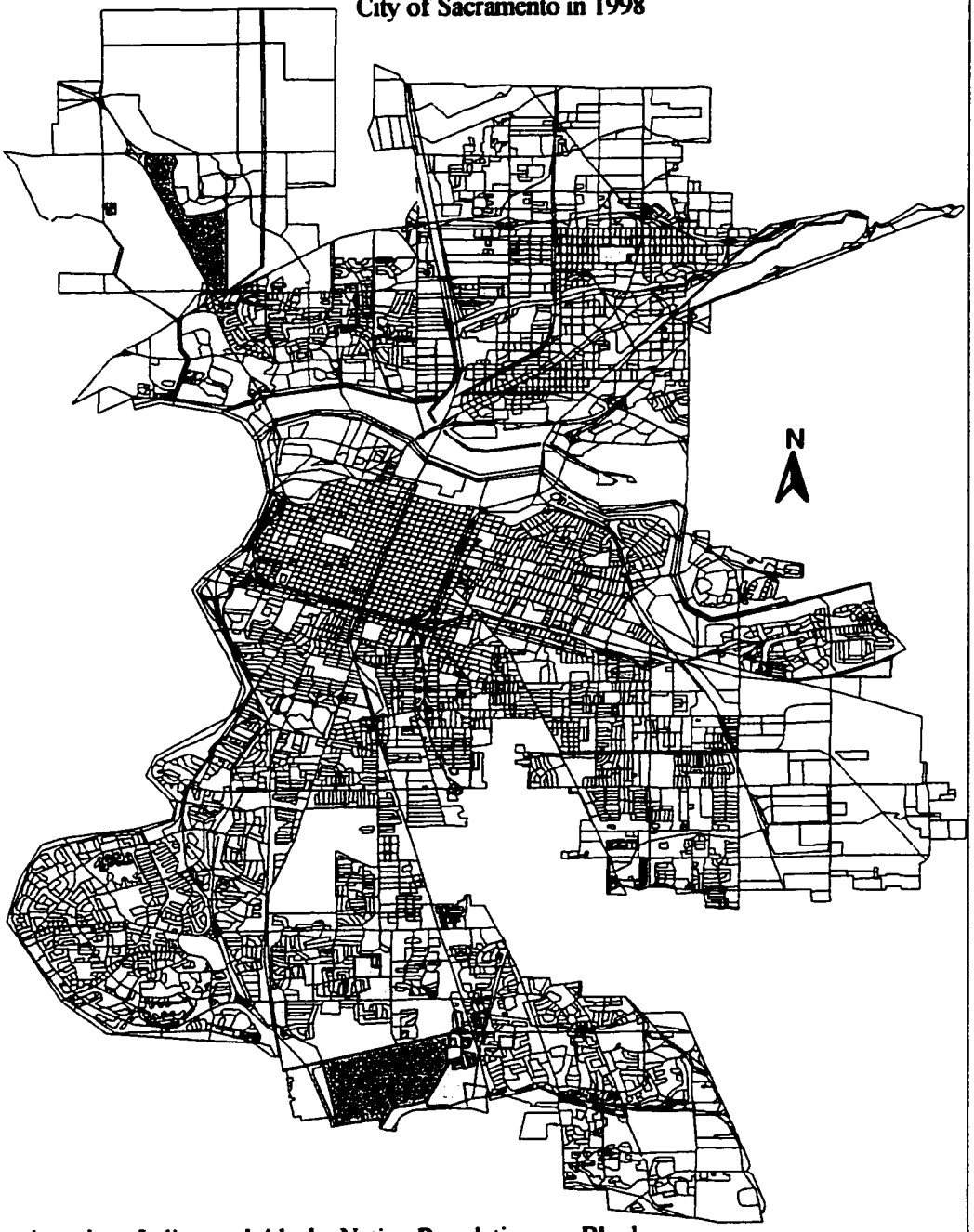
Percent of Native Hawaiian and Other Pacific Islander per Block

0 - 20
21 - 40
41 - 60
61 - 80
81 - 100

1 0 1 Miles

Data Source: Census 2000 Dress Rehearsal.

Map 12. American Indian and Alaska Native Population in the City of Sacramento in 1998



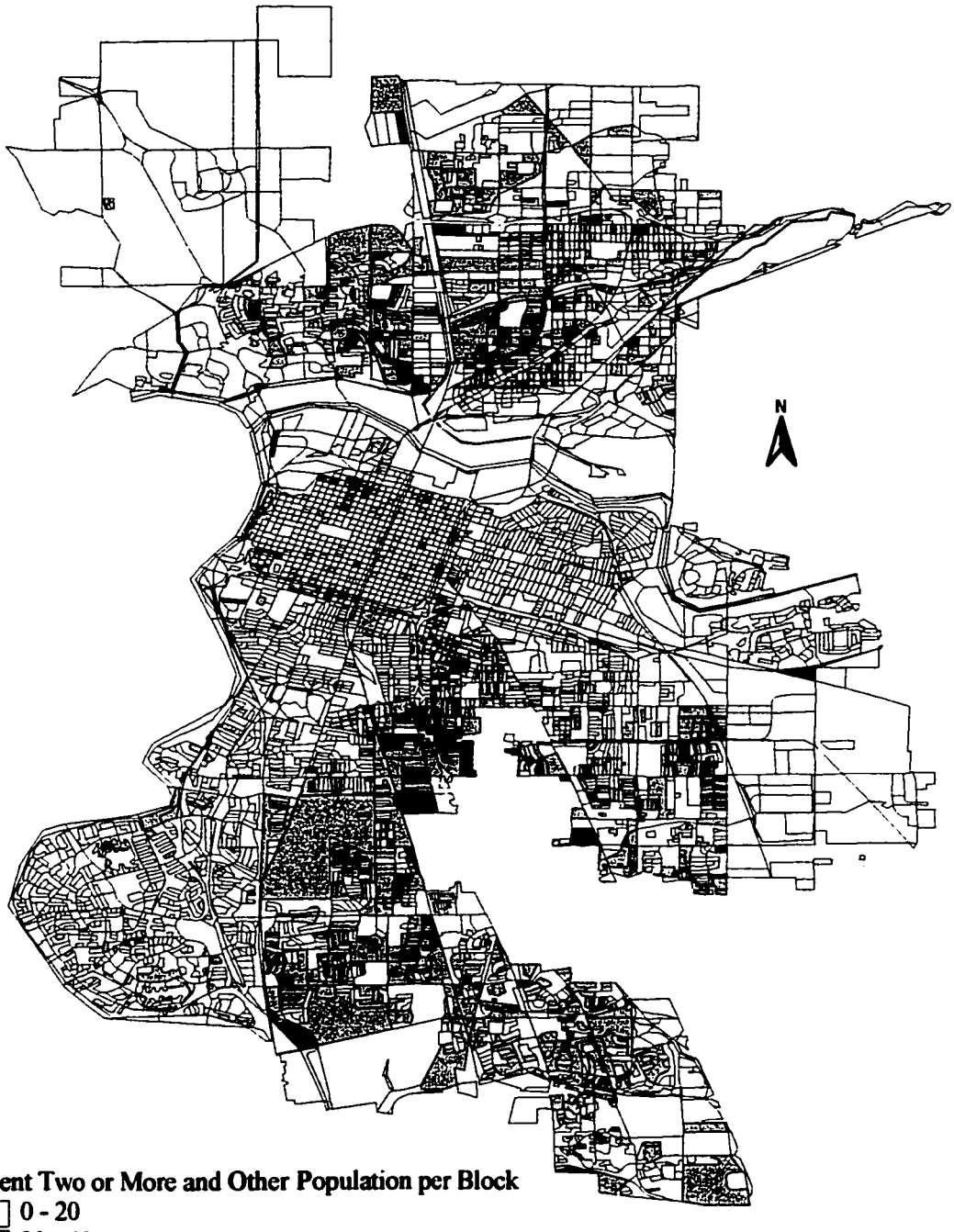
Percent American Indian and Alaska Native Population per Block

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100

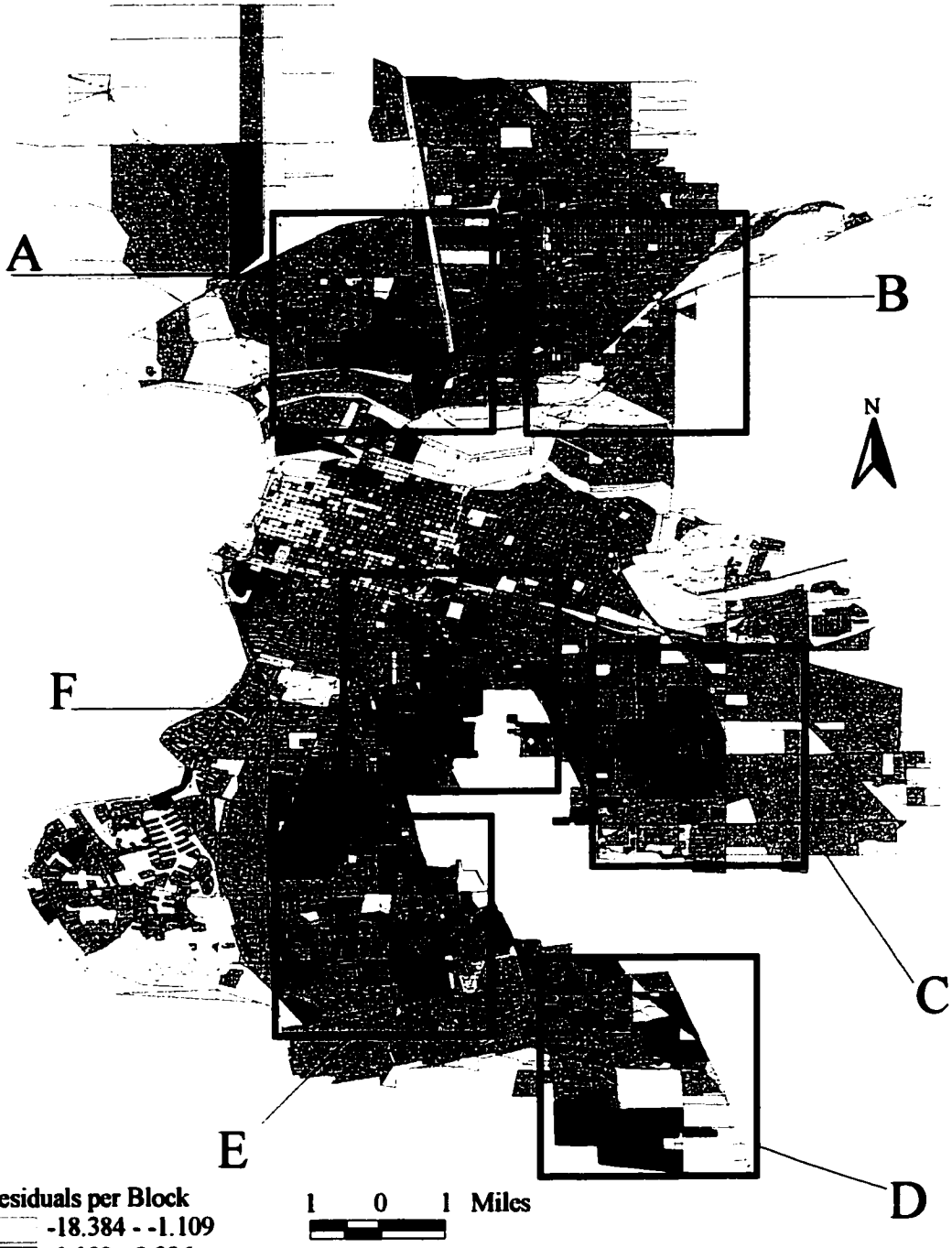
1 0 1 Miles

Data Source: Census 2000 Dress Rehearsal.

Map 13. Two or More and Other Population in the City of Sacramento in 1998

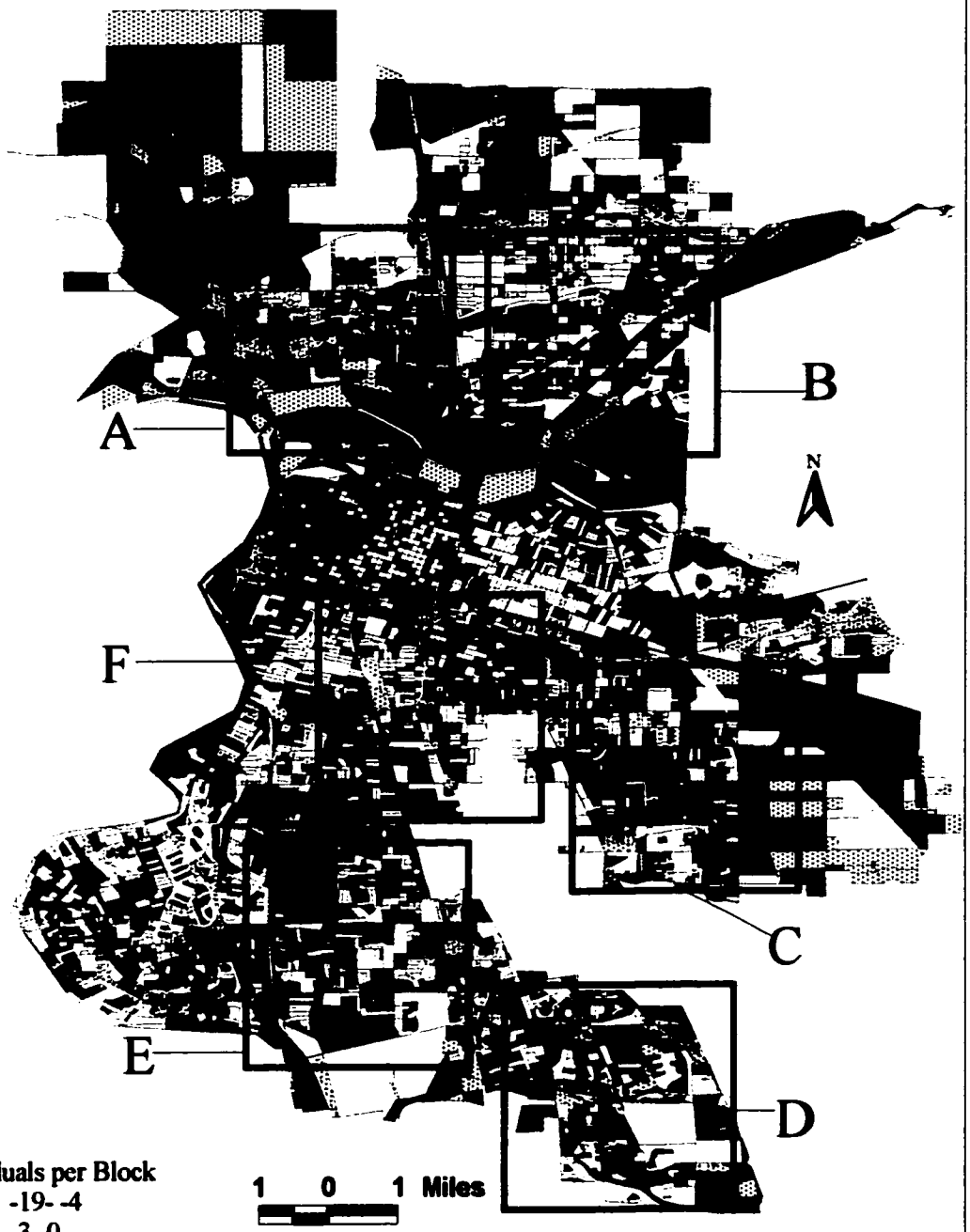


Map 14. Stepwise Multiple Regression Analysis with Racial and Ethnic Categories in the City of Sacramento in 1990.



Data Source: U.S. Census Bureau, 1990.

Map 15. Stepwise Multiple Regression with Racial and Ethnic Categories in the City of Sacramento in 1998.



Map 16. Regression Analysis for Hispanic vs. Other Race in the City of Sacramento in 1990.

Data Source: U. S. Census Bureau, 1990.

Map 17. Regression Analysis for Hispanic vs. Other Race in the City of Sacramento in 1998.

Data Source: Census 2000 Dress Rehearsal.

Map 18. Regression Analysis for Hispanic vs.Other and Two or More Racial Categories in the City of Sacramento in 1998.

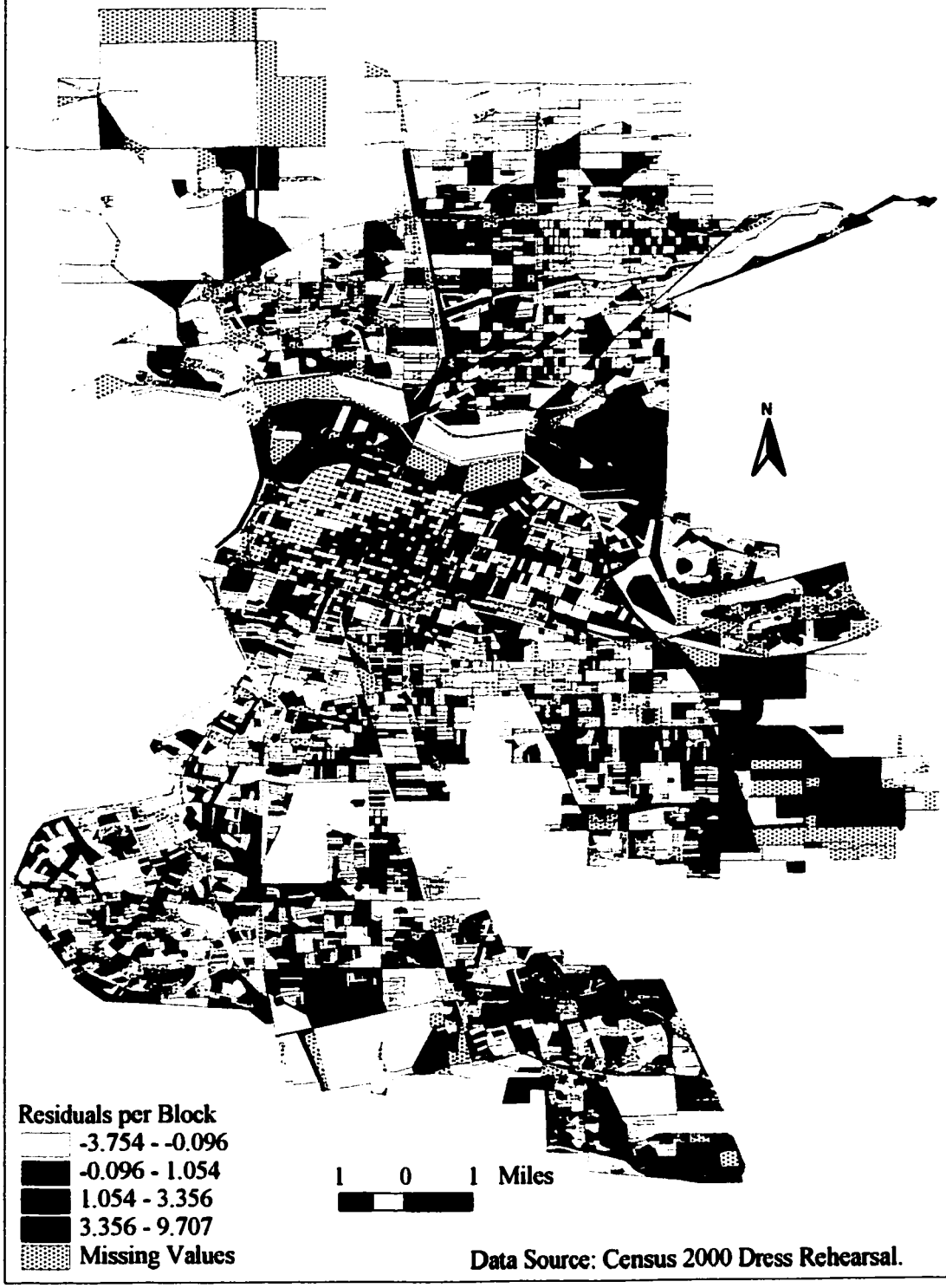


Table 1. Univariate analysis results for racial and ethnic categories in the City of Sacramento in 1990
Block level data collected by the 1990 U.S. Census. (page 1 of 2)

Basic Statistical Measures			White
Mean	65.16		
Median	70		
Std Deviation	26.46		
Variance	700.59		
Range	1000		
N	3851		
Tests for Location			
Student's T	152.79	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov D	0.09	Pr> D	<0.0100

Basic Statistical Measures			Black
Mean	12.68		
Median	5.52		
Std Deviation	17.13		
Variance	293.71		
Range	100		
N	3851		
Tests for Location			
Student's T	45.92	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.23	Pr> D	<0.0100

Basic Statistical Measures			American Indian, Eskimo or Aleut
Mean	1.3		
Median	0		
Std Deviation	3.13		
Variance	9.81		
Range	100		
N	3851		
Tests for Location			
Student's T	25.8	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.33	Pr> D	<0.0100

Table 1. Univariate analysis results for racial and ethnic categories in the City of Sacramento in 1990
Block level data collected by the 1990 U.S. Census. (page 2 of 2)

Basic Statistical Measures			Asian and Pacific Islander
Mean	12.63		
Median	6		
Std Deviation	16.43		
Variance	269.97		
Range	100		
N	3851		
Tests for Location			
Student's T	47.72	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.22	Pr> D	<0.0100

Basic Statistical Measures			Other
Mean	8		
Median	4.47		
Std Deviation	10.82		
Variance	117.2		
Range	100		
N	3851		
Tests for Location			
Student's T	45.87	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.22	Pr> D	<0.0100

Basic Statistical Measures			Hispanic
Mean	15.57		
Median	11.9		
Std Deviation	14.99		
Variance	224.72		
Range	100		
N	3851		
Tests for Location			
Student's T	64.45	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.14	Pr> D	<0.0100

Table 2. Univariate analysis results for racial and ethnic categories in the City of Sacramento in 1998
Block level data collected for the U.S. Census 2000 Dress Rehearsal. (page 1 of 3)

Basic Statistical Measures			White
Mean	44.27		
Median	44.95		
Std Deviation	32.85		
Variance	1080		
Range	1000		
N	5165		
Tests for Location			
Student's T	96.83	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.11	Pr> D	<0.0100

Basic Statistical Measures			African American
Mean	10.53		
Median	4		
Std Deviation	14.8		
Variance	219.15		
Range	100		
N	5165		
Tests for Location			
Student's T	51.15	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.23	Pr> D	<0.0100

Basic Statistical Measures			Native American
Mean	2.08		
Median	0		
Std Deviation	5		
Variance	31.89		
Range	100		
N	5165		
Tests for Location			
Student's T	26.54	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.35	Pr> D	<0.0100

Table 2. Univariate analysis results for racial and ethnic categories in the City of Sacramento in 1998
Block level data collected for the U.S. Census 2000 Dress Rehearsal. (page 2 of 3)

Basic Statistical Measures			Asian
Mean	10.88		
Median	3.93		
Std Deviation	15.41		
Variance	237.59		
Range	100		
N	5165		
Tests for Location			
Student's T	50.75	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.24	Pr> D	<0.0100

Basic Statistical Measures			Pacific Islander
Mean	0.48		
Median	0		
Std Deviation	2.01		
Variance	4.07		
Range	100		
N	5165		
Tests for Location			
Student's T	15.61	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.45	Pr> D	<0.0100

Basic Statistical Measures			Other
Mean	8.22		
Median	3.27		
Std Deviation	12.08		
Variance	148.07		
Range	100		
N	5165		
Tests for Location			
Student's T	48.91	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov	0.24	Pr> D	<0.0100

Table 2. Univariate analysis results for racial and ethnic categories in the City of Sacramento in 1998
Block level data collected for the U.S. Census 2000 Dress Rehearsal. (page 3 of 3)

Basic Statistical Measures			Two or More
Mean	4.19		
Median	2.5		
Std Deviation	6.23		
Variance	38.92		
Range	100		
N	5165		
Tests for Location			
Student's T	48.28	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov D	0.25	Pr> D	<0.0100

Basic Statistical Measures			Hispanic
Mean	15.68		
Median	11.36		
Std Deviation	16.93		
Variance	285.84		
Range	100		
N	5165		
Tests for Location			
Student's T	66.55	Pr> I t I	<0.0001
Test for Normality			
Kolmogorov-Smirnov D	0.177	Pr> D	<0.0100

Table 3. Multiple Stepwise Regression Analysis Results, 1990 Data
Results indicated association between Hispanic ethnicity and three racial categories in the City of Sacramento.
Data was collected on the block level for the 1990 U.S. Census. (page 1 of 2).

STEP 1	Analysis of Variance				
Variable Other: R-square=0.6418					
	DF	SS	MS	F Value	Pr>F
Model	1	555297	555297	6896.59	<.0001
Error	3849	309913	80.5177		
Corrected Total	3849	865210			
Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	6.69341	1.80E-01	111561	1385.54	<.0001
Other	1.1093	0.0133	555297	6896.58	<.0001
STEP 2	**Analysis of Variance**				
Variable Native American : R-square=0.6469					
	DF	SS	MS	F Value	Pr>F
Model	2	556963	279847	3524.68	<.0001
Error	3848	305517	79.3963		
Corrected Total	3850	865210			
Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	6.29397	1.86E-01	90467	1139.43	<.0001
Other	0.34169	0.0459	4395.95	55.37	<.0001
Native American	1.103	0.0132	547764	6899.11	<.0001

Table 3. Multiple Stepwise Regression Analysis Results, 1990 Data
Results indicated association between Hispanic ethnicity and three racial categories in the City of Sacramento.
Data was collected on the block level for the 1990 U.S. Census. (page 2 of 2).

Variable	Partial R-Square	Model R-Squar	F value	Pr>F
Other	0.6418	0.6418	6896.58	<.0001
Native American	0.0051	0.6469	55.37	<.0001
Asian and Pacific Is.	0.0009	0.6478	50.28	<.0001
Sum or Residuals			0	
Sum of Squared Residuals			304687	
Predicted Residual SS (RESS)			305743	

Table 4. Multiple Stepwise Regression Analysis Results, 1998 Data
Results indicated association between Hispanic ethnicity and six racial categories in the City of Sacramento in 1998. Data was collected on the block level for the U.S. Census 2000 Dress Rehearsal. (page 1 of 6)

STEP 1	Analysis of Variance				
Variable Other: R-square=0.6287					
	DF	SS	MS	F Value	Pr>F
Model	1	931289	931289	8742.24	<.0001
Error	4650	550002	106.528		
Corrected Total	4649	1481290			
Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	6.5446	1.74E-01	151179	1419.15	<.0001
Other	1.1111	0.0118	931289	8742.24	<.0001
STEP 2	**Analysis of Variance**				
Variable Two or More : R-square=0.6638					
	DF	SS	MS	F Value	Pr>F
Model	2	983339	491670	5096.89	<.0001
Error	4650	497951	96.4647		
Corrected Total	4649	1481290			
Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	4.68097	1.84E-01	62596	648.9	<.0001
Other	1.0761	0.01141	858248	8897.02	<.0001
Two or More	0.51336	0.0221	52051	539.58	

Table 4. Multiple Stepwise Regression Analysis Results, 1998 Data
Results indicated association between Hispanic ethnicity and six racial categories in the City of Sacramento in 1998. Data was collected on the block level for the U.S. Census 2000 Dress Rehearsal. (page 2 of 6)

STEP 3	Analysis of Variance				
Variable White: R-square=0.6904					
	DF	SS	MS	F Value	Pr>F
Model	3	1022705	340902	3836.57	<.0001
Error	4650	458585	88.8558		
Corrected Total	4649	1481290			

Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	0.80593	2.55E-01	887.953	9.99	0.0016
White	0.0845	0.004	39366	443.03	<.0001
Other	1.1013	0.011	888370	9997.89	<.0001
Two or More	0.495	0.0212	48312	543.71	<.0001

Table 4. Multiple Stepwise Regression Analysis Results, 1998 Data
Results indicated association between Hispanic ethnicity and six racial categories in the City of Sacramento in 1998. Data was collected on the block level for the U.S. Census 2000 Dress Rehearsal. (page 3 of 6)

STEP 4	Analysis of Variance				
Variable Native American: R-square=0.6929					
	DF	SS	MS	F Value	Pr>F
Model	4	1026312	256578	2909.91	<.0001
Error	4650	454978	88.174		
Corrected Total	4649	1481290			

Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	0.4962	2.59E-01	324.89	3.68	<.0001
White	0.0867	4.00E-03	41155	466.74	<.0001
Native American	0.1499	2.34E-02	3606.84	40.91	<.0001
Other	1.095	1.10E-02	871068	9878.96	<.0001
Two or More	0.4831	0.0212	45675	518.01	<.0001

Table 4. Multiple Stepwise Regression Analysis Results, 1998 Data
Results indicated association between Hispanic ethnicity and six racial categories in the City of Sacramento in 1998. Data was collected on the block level for the U.S. Census 2000 Dress Rehearsal. (page 4 of 6)

STEP 5	Analysis of Variance				
Variable African American: R-square=0.6944					
	DF	SS	MS	F Value	Pr>F
Model	5	1028678	205736	2345.03	<.0001
Error	4650	452612	87.732		
Corrected Total	4649	1481290			
Parameter Estimates					
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI
Intercept	-0.0378	2.78E-01	1.6325	0.02	<.0001
White	0.0909	4.00E-03	43452	495.28	<.0001
African American	0.0481	9.20E-03	2365.89	26.97	<.0001
Native American	0.14083	2.34E-02	3161.83	36.04	<.0001
Other	1.0867	1.11E-02	839927	9573.72	<.0001
Two or More	0.4668	0.0214	41740	475.77	<.0001

Table 4. Multiple Stepwise Regression Analysis Results, 1998 Data
Results indicated association between Hispanic ethnicity and six racial categories in the City of Sacramento in 1998. Data was collected on the block level for the U.S. Census 2000 Dress Rehearsal. (page 5 of 6)

STEP 6	Analysis of Variance					
Variable	Native Hawaiian and Other Pacific Islander: R-square=0.6951					
		DF	SS	MS	F Value	Pr>F
Model		6	102970	171617	1960.18	<.0001
Error		4650	451590	87.55		
Corrected Total		4649	1481290			
Parameter Estimates						
Variable	Par. Estimate	Sandard Error	Type II	F value	Pr> I tI	
Intercept	-0.0859	2.78E-01	8.37576	0.1	<.0001	
White	0.09103	4.08E-03	43558	497.51	<.0001	
African American	0.0457	9.28E-03	2119.08	24.2	<.0001	
Native American	0.13986	2.34E-02	3118.14	35.62	<.0001	
Hawaiian and Pac.Is.	0.2219	6.49E-02	1022.11	11.67	<.0001	
Other	1028533	1.11E-02	836682	9556.47	<.0001	
Two or More	0.4636	0.02141	40993	468.22	<.0001	

Table 4. Multiple Stepwise Regression Analysis Results, 1998 Data
Results indicated association between Hispanic ethnicity and six racial categories in the City of Sacramento in 1998. Data was collected on the block level for the U.S. Census 2000 Dress Rehearsal. (page 6 of 6)

Summary of the Stepwise Multiple Regression

Variable	Partial R-Square	Model R-Square	F value	Pr>F
Other	0.6287	0.6287	8742.24	<.0001
Two or More	0.0351	0.6638	539.58	<.0001
White	0.0266	0.6904	443.03	<.0001
Native American	0.002	0.6929	40.93	<.0001
African American	0.0016	0.6944	26.97	<.0001
Hawaiian and Pac.Is.	0.0007	0.6951	11.67	<.0001
Sum or Residuals			0	
Sum of Squared Residuals			451590	
Predicted Residual SS (RESS)			454936	

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